INDIVIDUAL COMPETENCIES AND ORGANISATIONAL SUPPORT MECHANISMS TO ENHANCE VIRTUAL TEAM SUCESS

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International dual doctorate

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ABSTRACT

Advances in information and communication technology allow organizations use virtual teamwork to meet their strategic goals. Research results regarding virtual teamwork outcomes are contradicting. From one side, virtual teams have been reported to produce better work outcomes, make more effective decisions, generate unique and high-quality ideas, develop more original solutions to problems, allow organizations to cut back time and expenses on traveling, recruit talents worldwide, and react quickly to global trends. On the other hand, virtuality has been reported to generate problems related to communication trust, knowledge sharing, coordination, etc. Also, virtual team members are exposed to increased occupational risk factors, including physical and psychosocial risks, due to blurred boundaries between home and work, decreased workplace ergonomics, and working from isolation.

Prior studies have shown that individual competencies of virtual team members can mitigate or even reverse the problems and risks caused by virtual context. Besides individual abilities, the situational context, such as leadership and organizational culture, play an important role in increasing virtual team members' effectiveness and decreasing occupational risk factors. Thus, to materialize the benefits of virtual teamwork and successfully manage the global workforces, organizations need to be able to both: identify and develop individual virtual teamworking competencies and develop an organizational culture that supports the actualization and (further) development of the competencies needed for virtual working environment. The main challenge now lies in the limited knowledge about a) virtual teamworking competencies and b) the complex relationships between competencies and the environmental aspects increasing or decreasing the actualization of the competencies.

The current study thus aimed to develop an academic and practical understanding of competencies and the complex relationship between competence actualization and external team-and organization-level aspects. Critical realism and case study approaches were selected to meet the overall aim of the research, as they allow the development of contextual understandings of complex phenomena. In the current research – contrary to the most virtual team and management-related research – an agency was given to the individuals. It was believed that individuals are the main

drivers of the virtual teams' success and the best source for understanding the complex process of overcoming constraints in virtual teams. Thus, the data was gathered through in-depth interviews with 24 professionals working for the virtual teams daily.

In the analysis process, the researcher moved iteratively between theory and data, which helped to develop an empirically grounded and theoretically supported understanding of the individual competencies and organizational support mechanisms. Content and narrative analysis approaches were used to allow both: categorizing and connecting between different findings. The study included three distinct yet interconnected steps: 1) identifying the main challenges that virtual team members experience, 2) identifying individual competencies that help to overcome the challenges, and 3) identifying external team- and organizational-level aspects to support the application of competencies.

The analysis of empirical findings and literature in step one resulted in a thorough overview of the challenges that may hinder the effectiveness of virtual team members. However, it is important to note that the main body of virtual team-related literature treats the topic of challenges as if they were static and as if everybody would experience them in the same way. There is an alternative stream of literature acknowledging that the way people experience challenges depends on their prior experiences, competencies, social situations, etc. Though, an approach to challenges from the experience-based view is relatively complex as there are so many different aspects to consider. However, the current study can help shed light on some generalizable patterns and processes across different situations and individuals. Namely, the present study revealed a pattern of challenges emerging based on individuals' prior virtual teamwork-related work experience. The current study revealed that individuals undergo three distinct phases when adapting to virtual teamwork, which all include different challenges and require different competencies and organizational support mechanisms.

Acknowledging the challenges and processes that virtual team members go through, the attention was turned to academic and empirical insights about competencies that can help overcome the challenges. A comprehensive virtual teamwork-related competence framework was developed by systemizing the existing body of knowledge in the virtual team's literature, integrating competencies from other fields, and adding findings from the empirical data. In addition, before developing the framework, a thorough overview of the conceptualizations of the term competence and related attributes (values, attitudes, knowledge, and skills) was developed, which can contribute to overcoming the conceptual fuzziness related to the term competence in the academic literature.

Step three brought the researcher to the most unoccupied area in the academic literature. While there can be some indications found from the organizational learning (OL) research regarding the interventions that can help to support the application competencies, the OL scholars themselves call for more research that would provide concrete tools to use in the organizational settings. The current study responded to this call as well as the aim of the current study by incorporating the Self-Determination Theory (SDT) from the motivational theory as a framework that helps to explain the complex relationship between external situational characteristics and competence application. Using the SDT as a framework, several aspects were

highlighted based on the literature and empirical findings to support the competence actualisation in virtual teams. To summarise, it can be said that focusing on the fit between the individual process of adjusting to virtual teams and constraints experienced, individual competencies, and team-and organisational level support mechanisms can significantly help to advance the success of implementing virtual teams.

The main contribution of the current study is that it provides a framework for connecting different studies in the virtual team's literature, which have the same aim – to explain the success factors of virtual teams. So far, these studies have been carried out in isolation. Although closely connected, it was challenging to understand where they belong on the complex landscape of aspects related to virtual team-related success. Based on the results of the current study, three distinct yet interconnected research streams are proposed: a) research on virtual team-related constraints, b) research on virtual team member's individual characteristics (such as competencies, motivations, prior experiences, etc.), and c) research on team- and organisational level support mechanisms (such as tools, leadership, culture, etc.). The higher the congruency between factors in these streams – the higher the success of virtual teams.

KEYWORDS: virtual teamwork, virtual teams, competencies, competence, values, attitudes, skills, knowledge, self-determination theory, person-environment fit

TIIVISTELMÄ

Tieto- ja viestintätekniikan edistysaskeleet ovat antaneet organisaatioille mahdollisuuden hyödyntää virtuaalityöskentelyä strategisten tavoitteiden saavuttamiseksi. Tähänastiset tutkimustulokset virtuaalityöskentelyn tuloksista ovat kuitenkin ristiriitaisia. Toisaalta virtuaalitiimien on raportoitu tuottavan parempia työskentelytuloksia, tehokkaampaa päätöksentekoa, yksilöllisempiä ja korkealaatuisempia ideoita, kehittävän alkuperäisempiä ratkaisuja ongelmiin, mahdollistavan organisaatioille tehokkaampaa ajankäyttöä ja matkakulujen säästöä, lahjakkuuksien rekrytointia maailmanlaajuisesti sekä nopeampaa reagointia globaaleihin trendeihin. Toisaalta virtuaalisuuden on raportoitu aiheuttavan ongelmia muun muassa viestinnässä, luottamuksen rakentamisessa, tiedon jakamisessa ja tehtävien koordinoinnissa. Lisäksi virtuaalitiimien jäsenten on havaittu altistuvan kasvaneille työperäisille riskeille, kuten fyysisille ja psykososiaalisille riskeille liittyen muun muassa koti- ja työelämän rajan hämärtymiseen, työpaikan ergonomian heikentymiseen ja eristyksissä työskentelyyn.

Aiemmat tutkimukset ovat osoittaneet, että virtuaalitiimien jäsenten yksilölliset kyvykkyydet voivat lievittää tai jopa kumota virtuaaliympäristön aiheuttamia ongelmia ja riskejä. Yksilöllisten kykyjen lisäksi tilanteen konteksti, kuten johtajuus ja organisaatiokulttuuri, ovat tärkeitä virtuaalitiimien jäsenten tehokkuuden lisäämisessä ja työperäisten riskitekijöiden vähentämisessä. Näin ollen virtuaalityöskentelyn hyötyjen konkretisoimiseksi ja globaalin työvoiman menestyksekkääksi johtamiseksi organisaatioiden on kyettävä sekä tunnistamaan ja kehittämään yksilöllisiä virtuaalitiimityöskentelyn kyvykkyyksiä, että kehittämään organisaatiokulttuuria, joka tukee kyvykkyyksien hyödyntämistä ja kehittämistä virtuaalisessa työympäristössä. Päähaasteena tutkimuksessa on tällä hetkellä rajoittunut ymmärrys liittyen yhtäältä virtuaalitiimityöskentelyn kyvykkyyksiin ja toisaalta kyvykkyyksien ja niiden toteutumista lisäävien tai vähentävien ympäristötekijöiden monimutkaisiin suhteisiin.

Tämän tutkimuksen tavoitteena oli kehittää akateemista ja käytännön ymmärrystä kyvykkyyksistä ja kyvykkyyksien hyödyntämisestä sekä ulkoisten tiimi- ja organisaatiotason tekijöiden monimutkaisesta suhteesta. Kriittinen realismi ja tapaustutkimusmenetelmät valikoituivat tutkimuksen lähestymistavaksi, sillä ne

mahdollistavat kontekstuaalisen ymmärryksen kehittämisen monimutkaisista ilmiöistä. Tässä tutkimuksessa – toisin kuin useimmissa muissa virtuaalitiimiä ja johtamista käsittelevissä tutkimuksissa – toimijuus annettiin yksilöille. Tutkimuksen lähtöoletuksena on, että yksilöt ovat virtuaalitiimien menestyksen pääasiallisia ajureita ja näin ollen myös parhaiten ymmärtävät, miten virtuaalitiimien kohtaamat rajoitteet voidaan selättää osana monimutkaista vuorovaikutteista prosessia. Tästä seuraten tutkimusaineisto kerättiin syvähaastatteluilla 24 virtuaalitiimeissä päivittäin työskentelevältä ammattilaiselta.

Analyysiprosessissa toteutettiin iteratiivisesti teorian ja tutkimusaineiston vuoropuheluna, mikä auttoi kehittämään sekä empiirisesti perusteltua että teoreettisesti tuettua ymmärrystä yksilöllisistä kyvykkyyksistä ja organisaation tukimekanismeista. Sisällön- ja narratiivianalyysimenetelmiä käytettiin sekä erilaisten löydösten kategorisoimiseen että niiden välisten yhteyksien luomiseen. Tutkimus sisälsi kolme erillistä, mutta toisiinsa liittyvää vaihetta: 1) virtuaalitiimien jäsenten kokemien päähaasteiden tunnistamisen, 2) yksilöllisten, haasteiden voittamisessa auttavien kyvykkyyksien tunnistamisen, ja 3) ulkoisten, kyvyk-kyyksien soveltamista tukevien tiimi- ja organisaatiotason tekijöiden tunnistamisen.

Empiirisen aineiston ja kirjallisuuden analyysi ensimmäisessä vaiheessa johti perusteelliseen katsaukseen haasteista, jotka saattavat haitata virtuaalitiimien jäsenten tehokkuutta. On kuitenkin tärkeää huomata, että pääosa virtuaalitiimejä koskevasta kirjallisuudesta käsittelee haasteita muuttumattomina ja kaikille yhtäläisinä. Vaihtoehtoisessa tutkimussuuntauksessa taas on havaittu, että se, miten yksilöt kokevat haasteita, riippuu muun muassa heidän aikaisemmista kokemuksistaan, kyvykkyyksistään ja sosiaalisista tilannetekijöistä. Haasteiden kokemukseen perustuva lähestymistapa on kuitenkin suhteellisen monimutkainen, sillä tarkastelunäkökulmia on useita. Tämä tutkimus voi kuitenkin auttaa valaisemaan joitakin yleistettävissä olevia malleja ja prosesseja eri tilanteissa ja eri yksilöiden kohdalla. Osana tämän tutkimuksen kontribuutiota kehitettiin haasteiden muodostu-misen malli, joka perustuu yksilöiden aikaisempiin kokemuksiin virtuaalitiimi-työskentelystä. Tämä tutkimus paljasti myös, että yksilöt käyvät läpi kolme erillistä vaihetta sopeutuessaan virtuaalitiimityöhön, joihin kaikkiin sisältyy erilaisia haasteita ja jotka edellyttävät erilaisia kyvykkyyksiä ja organisaation tukimeka-nismeja.

Toisessa vaiheessa, virtuaalitiimien jäsenten kohtaamien haasteiden ja prosessien määrittelyn jälkeen keskityttiin tutkimaan akateemisia ja empiirisiä näkemyksiä kyvykkyyksistä, jotka voivat auttaa haasteiden voittamisessa. Kattava virtuaalityöskentelyyn liittyvä kyvykkyyskehys kehitettiin yhdistelemällä olemassa olevaa tutkimustietoa virtuaalitiimeistä, kyvykkyystutkimusten tuloksia muilta aloilta ja empiirisestä tutkimusaineistosta saatuja löydöksiä. Lisäksi kehyksen kehittämistä edelsi perusteellisen katsauksen suorittaminen kyvykkyyden käsitteen ja siihen liittyvien tekijöiden (arvot, asenteet, tieto ja taidot) osalta, mikä voi osaltaan auttaa kyvykkyyden käsitteeseen liittyvän käsiteellisen epäselvyyden vähentä-misessä akateemisessa kirjallisuudessa

Kolmannessa vaiheessa keskityttiin akateemisessa kirjallisuudessa vielä vähemmän tutkittuun organisaation oppimisen (OL) alueeseen. Vaikka OL-tutkimuksesta on löydettävissä viitteitä tutkimustuloksista liittyen kyvykkyyksien hyödyntämisen tukemiseen, OL-tutkijat itse peräänkuuluttavat lisää tutkimusta, joka

tarjoaisi konkreettisempia työkaluja organisaatioiden kontekstissa. Tässä tutkimuksessa pyrittiin luomaan uutta tutkimustietoa muun muassa sisällyttämällä tutkimuksen tavoitteeseen motivaatioteoriaan pohjaavan itsemääräämisteorian (SDT), joka osaltaan auttaa selittämään ulkoisten tilannetekijöiden ja kyvykkyyksien välistä monimutkaista suhdetta. SDT-kehyksen pohjalta kirjallisuudesta ja empiirisestä tutkimusaineistosta nousi esiin useita näkökohtia, jotka tukevat kyvykkyyksien hyödynnettävyyttä virtuaalitiimeissä. Yhteenvetona voidaankin sanoa, että virtuaalitiimeissä keskittyminen yksilön sopeutumisprosessiin ja hänen kokemiinsa rajoitteisiin sekä yksilön kyvykkyyksiin ja tiimi- ja organisaatiotason tukimekanismeihin voi merkittävästi edistää virtuaalitiimin menestyksekästä työskentelyä.

Tämä tutkimus tarjoaa pääasiallisena kontribuutionaan olemassa olevan virtuaalitiimitutkimuksen yhdistävän kehyksen, joka selittää virtuaalitiimien menestystekijöitä. Vastaavanlaista, menestystekijöiden monimutkaisia suhteita ja kontekstia selkeyttävää synteesiä olemassa olevasta tutkimuksesta ei ole vielä tehty. Tämän tutkimuksen tulosten perusteella ehdotetaan kolmea toisiinsa liittyvää, mutta erillistä jatkotutkimussuuntaa: a) jatkotutkimus keskittyen virtuaalitiimeihin liittyviin rajoitteisiin, b) jatkotutkimus keskittyen virtuaalitiimin jäsenten yksilöllisiin ominaisuuksiin (kuten kyvykkyyksiin, motivaatioon ja aikaisempiin kokemuksiin), ja c) jatkotutkimus keskittyen tiimi- ja organisaatiotason tukimekanismeihin (kuten työkaluihin, johtajuuteen ja kulttuuriin). Oletuksena siis on, että suurempi yhdenmukaisuus näiden tekijöiden välillä johtaa todennäköisemmin virtuaalitiimien menestyksekkääseen työskentelyyn.

KEYWORDS: Virtuaalinen tiimityö, Virtuaalitiimit, Kyvykkyydet, Osaaminen, Arvot, Asenteet, Taidot, Tieto, Itsemääräämisteoria, Henkilö-ympäristö sopivuus

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SIRJA SULAKATKO: Töötajate pädevused ja organisatsiooni tasandi
toetusmehhanismid suurendamaks virtuaalsete meeskondade edukust.
Väitekiri, 320 lk.
December 2023

RESÜMEE

Info- ja kommunikatsioonitehnoloogia areng võimaldab organisatsioonidel kasutada virtuaalseid meeskondi oma strateegiliste eesmärkide saavutamisel. Uurimistulemused virtuaalsete meeskondade tulemuste osas on vastuolulised. Ühelt poolt on leitud, et virtuaalsed meeskonnad saavutavad paremaid töötulemusi, omavad tõhusamaid otsustusprotsesse, genereerivad unikaalsemaid ideid ja originaalsemaid lahendusi probleemidele, võimaldavad organisatsioonidel kokku hoida aega ja reisikulusid, värvata talente kogu maailmast ning reageerida kiiresti globaalsetele trendidele. Teisest küljest on leitud, et virtuaalsus tekitab väljakutseid seoses kommunikatsiooni, usalduse, teadmiste jagamise, koordineerimise ja palju muuga, mis omakorda võivad omada tõsiseid negatiivseid mõjusid meeskonnatöö tulemile. Lisaks on leitud, et virtuaalsetes meeskondades töötamine suurendab riskifaktoreid meeskonnaliikmetele. Riskifaktroid hõlmavad endas nii füüsilisi kui psühhosotsiaalseid tegureid, mis on põhjustatud piiride hägustumisest töö ja eraelu vahel, vähenenud ergonoomikast töökohal, psühholoogilisest isoleeritusest jms.

Varasemad uuringud on näidanud, et virtuaalsete meeskonnaliikmete pädevused võivad leevendada või isegi aidata vältida probleeme ja riske, mida põhjustab virtuaalne kontekst. Lisaks on uuringud näidanud, et lisaks meeskonnaliikmete pädevustele mängib virtuaalsete meeskonnaliikmete efektiivsuse suurendamisel rolli ka töökeskkond (sh juhtimise- ja organisatsioonikultuur, digitaalsete tööriistade valik, meeskonna sisekliima, jne.) Seega, et virtuaalsed meeskonnad saaksid organisatsioonidele tuua maksimaalset kasu, peavad organisatsioonid suutma teha mõlemat: a) tuvastada ja arendada meeskonnaliikmete virtuaalse meeskonnatööga seotud pädevusi, ning b) luu keskkond, mis toetab virtuaalmeeskonna liikmete pädevuste ellu rakendamist ja arengut. Peamine väljakutse seisneb hetkel piiratud teadmises järgmistes asjaolude osas: a) millised pädevused on vajalikud virtuaalmeeskonnas edukaks töötamiseks?; b) milline on seos virtuaalmeeskonna liikmete pädevuste ning töökeskkonnast tulenevate aspektide vahel?; ning c) kuidas saab organisatsioon toetada meeskonnaliikmeid virtuaalse meeskonnatööga seotud pädevuste rakendamisel?

Käesoleva uuringu eesmärk oli arendada nii teaduslikku kui ka praktilist arusaama individuaalsetest virtuaalmeeskonna tööga seotud pädevustest ja välistest teguritest, mille abil organisatsioonid saavad soodustada meeskonnaliikmeid pädevuste ellu rakendamisel. Lähtudes uurimistöö eesmärgist sai uuringu

filosoofiliseks alustalaks valitud kriitiline realism. Kriitiline realism toetas antud uuringu eesmärkide täitmist, kuna see võimaldab uurida selliseid uurimisobjekte (nagu pädevused ja keskkonna mõju pädevuste rakendamisel), mida ei saa käega katsuda ja mõõta – tehes järeldusi nende märkide abil, mida me saame näha ja kogeda – nagu uuritavate indiviidide kogemused, sündmused, käitumine, jms. Et antud nn käega katsutavaid kogemusi koguda, intervjueeriti kahtekümmend nelja virtuaalmeeskonnas töötavat isikut. Siinjuures on oluline välja tuua, et käesolev uuring erines senistest virtuaalmeeskonna pädevsutega seotud uuringutest selle poolest, et virtuaalsetele meeskonnaliikmetele anti nn sõna ja usuti, et meeskonnaliikmed ei ole passiivsed keskkonna mõjude osas, vaid vastupidiselt – neil on endil oluline roll enda ümber oleva (töö)keskkonna kujundamisel.

Analüüsiprotsessis liikus uurija iteratiivselt teooria ja andmete vahel, mis aitas luua empiiriliselt põhjendatud ja teoreetiliselt toetatud arusaama individuaalsetest pädevustest ja võimalikest teguritest, mille abil pädevuste ellu rakendamist toetada. Kombineerides sisu- ja narratiivanalüüsi tuvastas antud uuring: 1) peamised väljakutsed, millega virtuaalse meeskonna liikmed kokku puutuvad, 2) individuaalsed pädevused, mis aitavad väljakutsetest üle saada, ja 3) välised aspektid meeskonna- ja organisatsioonitasandil, mille abil toetada pädevuste ellu rakendamist ja edasi arendamist.

Uuringu esimeses etapis loodi põhjalik ülevaade väljakutsetest, mis võivad vähendada meeskonnaliikmete efektiivsust virtuaalmeeskonnas töötamisel. Siin on oluline välja tuua, et suurem osa senisest kirjandusest käsitleb virtuaalmeeskondadega seotud väljakuteid staatiliselt, ehk eeldades, et väljakutsed kohalduvad ühtemoodi kõigile. Lisaks nn. staatilisele vaatele, võeti antud uuringus kasutele ka alternatiivne vaade, mille kohaselt kogevad virtuaalmeeskondade liikmed väljakutseid erinevalt – sõltuvalt meeskonna virtuaalsuse tasemest, meeskonnaliikmete tööülesannetest/ varasemast kogemusest/ pädevustest, jne. Kombineerides mõlemat vaadet oli võimalik luua põhjalikum arusaam sellest, kuidas virtuaalsus võib meeskonnaliikmete efektiivsusele mõju avaldada.

Ning, kuigi inimesed on väga erinevad, tõi antud uuring välja teatavad sarnasused selles osas, kuidas virtuaalmeeskonnas töötamine võib meeskonnaliikmetele mõjuda sõltuvalt liikmete varasemast kogemusest virtuaalmeeskonna tööga. Nii avastatigi antud uurimistöö intervjuudele tuginedes, et virtuaalse meeskonnatööga kohanemisel läbivad meeskonnaliikmed kolm eristuvat etappi, mis kõik hõlmavad teatud liiki väljakutseid ja nõuavad omakorda teatud pädevusi ja organisatsioonilisi toetusmehhanisme väljakutsete ületamisel. Antud ülevaade on akadeemilises kirjanduses üks esimesi, mis vaatleb lisaks virtuaalmeeskonnatööga seotud väljakutsetele ka nende kujunemise protsesse. Lisaks aitab antud ülevaade organisatsiooni ja meeskonna juhtidel oma töötajaid paremini mõista ja toetada virtuaalmeeskonnatööga kohanemisel.

Tuginedes esimesest etapist saadud tulemustele, olemasolevale kirjandusele ja empiirilistele tulemustele, loodi uuringu teises etapis põhjalik ülevaade pädevustest, mis aitavad meeskonnaliikmetel virtuaalmeeskonnaga seotud väljakutseid ületada. Antud etapis süstematiseeriti olemasolevast kirjandusest leitud teadmisi lisades neile empiirilised andmed, mis ühtekokku võimaldaski luua põhjaliku ülevaate virtuaalmeeskonnatööga seotud pädevustest viies kategoorias: a) koostöö, b) suhtlus; c) IKT, d) juhtimine ja e) enesejuhtimine. Lisaks raamistiku väljatöötamisele loodi

antud uurimistöös põhjalik ülevaade pädevustega seotud mõistetest, mis võib aidata ületada hetkel valitsevat kontseptuaalset ebamäärasus pädevustega seotud kirjanduses. Lisaks tõi antud uuring välja, et pädevuste uurimisel võib tulla kasuks pöörata edaspidi senisest enam tähelepanu väärtustele ja hoiakutele, mis on nn. baasiks individuaalsete oskuste ja teadmiste arendamisel.

Kolmas ja viimane samm viis uurija antud uurimistöö kõige väljakutsuvama, kuid teisalt ka kõige põnevama küsimuse juurde – millised välised töökeskkonnaga seotud tegurid aitavad toetada virtuaalmeeskonnaliikmeid pädevuste ellu rakendamisel? Väljakutsuv oli antud küsimus just seetõttu, et selle vaatenurga alt on pädevusi väga vähe uuritud. Enamikes senistes pädevustega seotud uuringutes keskendutakse kas pädevuste kaardistamisele või siis pädevuste arendamisega seotud teemadele. Ja kuigi organisatsiooniteooriatest võib leida mõningaid vihjeid võimalikele aspektidele, mis võivad aidata pädevuste rakendamist toetada, tunnistavad ka antud valdkonna uurijad, et siiani ei ole õnnestunud luua praktilisi tööriistu, mida personalijuhid tegelikkuses edukalt rakendada saaksid. Üks põhjusi senise vähese edu taga võib olla see, et töökeskkonnas on väga paljutegureid, on keeruline on luua ühte lihtsasti hõlmatavad ülevaadet, mis oleks teisalt ka piisavalt põhjalik. Teisalt võib olla ka põhjuseks see, et sarnaselt pädevustele, on töökeskkonna tegureid siiani käsitletud eraldiseisvalt - jättes kõrvale meeskonnaliikmete endi mõju töökeskkonna kujundamisel.

Käesolevas uuringus võeti kasutusele motivatsiooniteooriat pärit Enesemääramisteooria (inglise keeles STD), mis oli abiks, et visualiseerida ja lihtsustada keerulist suhet väliste situatsiooniliste aspektide (nagu organisatsioonikultuur, töödisain), kui sisemiste tegurite (sh motivatsioon, pädevused, autonoomia) vahel. Enesemäärmisteeoria rakendamine võimaldas luua lihtsasti hoomatava ülevaate aspektidest ja tegevustest, millega organisatsioonide ja meeskondade juhid saavad oma töötajaid toetada, eesmärgiga, et meeskonnaliikmed oma olemasolevaid virtuaalmeeskonnatööga seotud pädevusi rakendaks või edasi arendaks.

Kokkuvõtvalt võib öelda, et selleks, et virtuaalsed meeskonnad oleksid edukad väljakutsete ületamisel on esmalt oluline, et meeskonna*liikmed* suudaksid väljakutseid ületada. Siinjuures mängivadki olulist rolli meeskonnaliikmete pädevused ja nende pädevuste sobivus käesolevate väljakutsetega. Lisaks on oluline meeskonnaliikmeid toetada, lähtudes virtuaalse meeskonnatööga seotud eripäradest, kuna toetuse olemasolul on suurem tõenäosus, et meeskonnaliikmed oma olemasolevaid pädevusi väljakutsete ületamisel rakendavad, ning vajadusel edasi arendavad.

Akadeemilise külje pealt aitab käesolev uuring olemasolevat teadmist virtuaalmeeskondadega seotud väljakutsete ja pädevuste osas süstematiseerida ning edasi arendada. Lisaks on käesolev uuring teadaolevalt üks esimesi, mis uuris lisaks üksikisiku pädevustele ka väliseid tegureid, mis võivad omada olulist mõju pädevuste rakendamisel. Praktilise poole pealt on võimalik antud uuringus loodud pädevuste ja sellega seotud toetusmehhanismide raamistiku kasutades teha teadlikumaid valikuid nii virtuaalmeeskonnaliikmete valimisel, väljakutsetega toimetuleku toetamisel kui ka koolitamisel.

VÕTMESÕNAD: virtuaalne meeskonnatöö, virtuaalsed meeskonnad, pädevused, väärused, hoiakud, teadmised, oskused, enesemääramisteooria, väliste tegurite mõju pädevuste rakendamisel.

Acknowledgments

The doctoral journey and the end achievement is usually attributed to the individual whose name appears on the book. However, there are people behind every author who make it possible for the author to achieve the results. Herewith, I would like to take the opportunity to highlight my gratitude to those without whom I would not have made it.

I have been extremely lucky to have three professional supervisors together from both universities. I would like to start by sharing my greatest gratitude to Dr. Marge Täks, my supervisor from Estonian Business School (EBS). You helped me define the topic of my doctoral studies, understand what competencies are (and are not), and make many important decisions regarding my doctoral research. Also, besides postgraduate studies, you included me in other activities at EBS – for example, lecturing and developing a new BA program, which was incredibly inspirational and eye-opening. During the year I worked at EBS, I learned many new things that have supported my doctoral studies and other activities in which I am involved today.

Next, I wish to share my deepest gratitude to Dr. Peter Zettinig. Firstly, I am deeply grateful that you agreed to take me under your supervision. Even before I was officially accepted as a doctoral student at Turku School of Economics (TSE), you shared your valuable time to discuss my research with me. Also, you included me in the teaching activities, which was an eye-opening experience. Moreover, you introduced me to other students at TSE working on similar topics and thus made me feel part of the community. Because of your support, I am not only richer in knowledge - but I am also richer in having new and very dear friends – Danijela Majdenic, Dr. Majid Aleem, Katharina Schilli, and Isabel Galvis Cardenas. Even though I worked from a distance, I always felt like part of the community at TSE, thanks to Peter and my dear friends there.

I would like to continue by sharing my deepest gratitude to Dr. Eriikka-Paavialainen Mäntymäky. You were the one who finally made me understand the difference between different paradigms in social sciences. Your skill in explaining simply the most complex things is remarkable. Moreover, your guiding questions regarding my research design and philosophy opened my eyes to many new and important aspects and thus helped me improve my research design remarkably.

I would like to extend my sincere gratitude to Professor Jakob Lauring and Associate Professor Jonna Pauliina Koponen who agreed to be my dissertation's preexaminers. The insights and suggestions they have provided helped to increase the quality of the current work and will continue to benefit me in my future research.

I am sincerely thankful to Professor Jakob Lauring for the engaging and thought-provoking dialogue during the final examination. Your profound inquiries and insightful perspectives not only challenged me but also significantly enhanced the depth of my work. I appreciate your commitment to academic rigor and your valuable contribution to my scholarly growth. Thank you for being an integral part of this pivotal stage in my academic journey.

All the co-supervision would not have happened without Professor Niina Nummela. Your support played a critical role in me being accepted to TSE as an official student and helping me understand the requirements I need to meet to get the degree from TSE. You gave me also a lot of valuable comments that significantly improved my dissertation.

I would like to extend my gratitude to Jenni Grey - I would have never managed myself through the so-called "paperwork" at TSE without your quick and professional support. I am deeply impressed by the professionalism in your responses and your speed and way of making me always feel as if you are there just for me.

I want to continue by sharing my gratitude to the ex-rector of Estonian Business School – Dr. Arno Almann. You invited me (along with other students from MA and MBA) to continue our learning journeys in the doctoral school. Although I had thought about this opportunity earlier, your invitation made the final and crucial nudge.

Also, I have been fortunate that the first years of my doctoral studies were carried out under the warm and supportive guidance of Dr. Olav Aarna (head of Doctoral Studies and Doctoral Research at Estonian Business School then). Your warmth, support, wisdom, empathy, good faith, and curiosity are remarkable. Professor Aarna, you have been and continue to be my role model regarding kindness, intelligence, and curiosity.

Doctoral research also needs financial support. Thus, I would like to point out and thank the following funding bodies for seeing value in my research and supporting me financially: SA Estonian Business School, Marcus Wallenberg Economic Research Foundation, Turku University Foundation, Foundation for Economic Education (The Liikesivistysrahasto), and Turku School of Economics.

Now, I would like to turn my attention to my friends and family members – who have always been there for me. Without the support of my dear husband, Dr. Virgo Sulakatko, I would not have dared to apply for doctoral studies. Similarly, my mother, father, sister, and mother-in-law became the support network emotionally as

well as practically – by always helping us with babysitting. I want to share my gratitude to my friends, who had to be patient, as we did not have the opportunity to spend as much time together as we had wished. However, I have always felt moral support and encouragement from your side.

Finally, I would like to thank my kids – Sirena, Sigmar, and Sigmond. I hope that one day when you are older, this achievement will make you proud, as you had an important role to play in this. Seeing you every day, even if I was puzzled by some problem in my research, always brought a smile to my face. The times I was less active with my research and more active with you gave me important breaks and inspiration that enabled me to turn back to my work with a fresh eye. Although there has been a constant search for a healthy balance between family and work, and it has not always been easy, your presence has made has helped me find the motivation to continue with my chosen path.

Sirja Sulakatko, 05.12.2023

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List of Original Publications

This dissertation is accompanied by a copy of the following original publication:

I. Sulakatko, Sirja. Integrating Qualitative Content and Narrative Analysis: A Five-Step Approach. *Accepted for publication in the proceedings of the European Conference on Research Methods (ECRM)*, 2024. The publication will become available after the conference (4-5 July 2024) at https://papers.academic-conferences.org/index.php/ecrm.

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1 Aims of the Study

1.1 Motivation of the study

Meet Joanna,[1] a prior marketing manager of a big information technology (IT) company who used to work in the office. However, in 2017, just a year before her interview for the current study, her role changed. Suddenly, she worked with colleagues from 12 different countries and a manager in another country. Before the role switch, she *"hated doing Skype calls"*. However, after the change, virtual calls became the only means of collaborating with her colleagues and manager. In the study interview, she explained the challenges she faced with virtual calls when she started working on a virtual team:

> *When you are meeting in face-to-face meetings, you can see each other's facial expressions and body language. In calls, suddenly, you had to make sure you were using the right words, the right tone of voice, etc.*

Virtual calls were not the only challenge Joanna faced when starting to work on a virtual team. Suddenly, she did not have to go to the office, since none of her colleagues were there. She explained how working from home impacted her daily life: "*So, suddenly I found myself from home, being in pyjamas all day, my hair not washed for four days…and talking to my cat. I became almost, like, antisocial.*"

Joanna's example was one of many stories shared by the respondents of the current study that most readers can relate to, especially after facing the restrictions from Covid-19. Before the pandemic, about 9% of European citizens used remote work regularly (Eurofound and the International Labour Office, 2017); however, during the pandemic, that percentage grew to 22% (Eurofound, 2022a). A Gallup survey conducted in June 2022 found that 8 out of 10 people work remotely or in a hybrid mode (Flexjobs, 2022). However, the results greatly depend on whether respondents work exclusively or sometimes from home and whether the survey is conducted online or offline, as offline workers are usually those who work on site.

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[1]   Respondent 20, name changed.

For example, a study by Eurofound (2022b) found that only 12% of employees continued working exclusively from home after the pandemic. While it is difficult to come up with a concrete number or percentage of people involved in remote work, it is clear that there is a strong preference for working flexibly. According to Eurofound (2022b), more than 60% of both women and men have expressed a preference for working from home several days per month since the pandemic.

However, even before the pandemic hit, virtual teamwork was found by many organisations to be a valuable means of building organisational (cost) efficiency, and international talent pool, and innovativeness (Dekker and Rutte, 2007; Settle-Murphey, 2012). Virtual teams have also been found to have better work outcomes, be more effective in decision-making, and generate more innovative ideas compared to traditional face-to-face teams (Gilson et al., 2015). Moreover, virtual teamwork has also been shown to bring benefits to virtual team members – such as increased flexibility and a sense of control (Purvanova and Kenda, 2018) – which explains the employees' preferences for flexible ways of working.

At the same time, it has been acknowledged that developing effective virtual teams is not easy (Flavian et al., 2019). In some cases, it has been found that the virtual team's success may drop by over 50% compared to in-office teams (Sobel-Lojeski, 2015). One of the reasons behind such poor results can be related to team members' abilities (or inabilities) to adapt to virtual ways of working (Shin, 2004). Research has suggested that the virtual team dynamic requires members to adjust their behaviours to meet the challenges of the virtual working environment – such as increased diversity in the team, increased reliance on technologies, and so on (Gilson et al., 2015). Not being able to adapt to the challenges related to virtual teamwork may result in virtual team members becoming frustrated and disengaged, leading to decreased work quality and performance (Settle-Murphey, 2012).

1.2   Problem setting of the study

In light of the issues discussed above, the main aim of the current research is to advance the theoretical and practical knowledge of developing successful virtual teams by looking at the mechanisms that can help team members adapt to challenges related to virtual teamwork. According to Gilson and colleagues (2015), adaptation is critical to virtual team success and has not been covered extensively in the virtual team literature. However, while Gilson and colleagues (2015) called for more research on virtual *team* adaptation, the focus of the current study is *individual* adaptation, as the present study posits that team *members,* but not teams, adapt – for example, a team's ability to adapt is the sum of its members' abilities to adapt. In addition, virtual team–related research is already dominated by team theories and team-based studies (Gilson et al., 2015; Raghuram et al., 2017). Therefore, the

individual-level approach to this research is believed to have the potential to bring new insights to the existing theoretical knowledge and practical applications of developing successful virtual teams.

Before elaborating on the problem setting, it is worthwhile to explain what is considered a virtual team in the current study, as the distinction between virtual teams and regular teams is rather fuzzy. First, it is acknowledged that most teams today combine face-to-face contact with virtual work and thus can be, to some extent, considered virtual (Watson-Manheim et al., 2012). Thus, it is not easy to draw a line between teams and *virtual teams*. However, it has also been found that, when the physical dispersion between team members increases, the reliance on information and communication technologies (ICT) increases (Berry, 2011). Therefore, researchers have suggested that teams can be considered virtual when their reliance on electronic communication to complete organisational tasks has increased significantly due to physical dispersion (Berry, 2011). Thus, in virtual teams, members lose the privilege of choosing between face-to-face and virtual working methods. Instead, they are "forced" to apply ICT when communicating and accomplishing organisational and team tasks because of the situational characteristics – namely, physical dispersion between members. This understanding is in line with most virtual team-related definitions that *highlight geographic dispersion* and *dependence on technology* in work-related interactions between employees (Raghuram et al., 2017).

The reason for making a distinction between teams and *virtual teams* is related to the practical and research-based findings highlighting that virtual teams manifest certain teamwork-related processes (e.g. communication, knowledge sharing, and team building) differently than traditional teams (Leidner et al., 1999; Salas et al., 2005). As such, research has demonstrated that the high level of physical dispersion experienced in virtual teams can have significant adverse effects on team members (Powell et al., 2004; Purvanova and Kenda, 2018). For example, building trust and relationships (Jarvenpaa et al., 1998; Kanawattanachai and Yoo, 2002; Germain and Mcguire, 2014; Breuer et al., 2020), developing effective communication (Dekker and Rutte, 2007; Daim et al., 2012; Scott and Scott, 2013), and obtaining a general overview of the work processes have been found to be more difficult in virtual teams.

At the same time, research on virtual teams has highlighted that team members' unique characteristics can mitigate or even reverse the problems caused by the virtual context (Schulze and Krumm, 2017). One possible way to address the unique individual characteristics is to use the term *competence*, which has been found to be the primary catalyst for dealing with external demands. As such, Kotsiou and colleagues (2022, p. 174) defined competence as the individual's *"ability to respond to a complex demand by combining their internal resources (such as knowledge, skills, values, and attitudes) to respond successfully to a given situation or context".*

Moreover, competence has been found to be a useful concept when identifying the individual characteristics that lead to effective and/or superior job performance (Le Deist and Winterton, 2005; Wesselink et al., 2015). Therefore, individual competencies were chosen as the central focus of the current study. In the present study, individual competencies are understood as mechanisms that support individuals in adjusting to the constraints of the virtual working environment, which, in turn, enables the person to focus on bringing high-quality results, thus enhancing personal and team performance.

An analysis of the current state of academic research regarding virtual team–related competencies revealed mentions of some individual competencies, such as technical competencies (Zakaria et al., 2004), social skills (including group communication) (Dekker and Rutte, 2007), interpersonal competence (Harvey et al., 2004), cultural awareness (Anawati and Craig, 2006; Dekker and Rutte, 2007), self-management competencies (Harvey et al., 2004), the ability to learn new competencies (Harvey et al., 2004), and leadership competencies (Mukherjee et al., 2012), among others. However, previous research has mostly determined individual characteristics by drawing conclusions based on results unrelated to individual characteristics (Krumm et al., 2016). The problem with studies that have treated individual competencies as a side product of the main research is that they provide a fragmented overview of individual competencies related to virtual teamwork and stay at a very general (not to say superficial) level. For example, self-management competency is a broad term that includes several smaller attributes, such as time management skills, self-monitoring skills, impulse control, and knowledge about virtual team–related health risks (based on the results of the current study), that support self-management in a virtual teamwork context. Thus, for example, for training purposes, a deeper, wider, and more holistic understanding of how self-management (and other) competencies manifest in the virtual teamwork environment is needed.

The two most profound and systematic attempts to discover individual competencies related to virtual teamwork were carried out by Krumm and colleagues in 2016 and Schulze and Krumm in 2017. However, the problem with the study by Krumm and colleagues (2016) is that it is based on a generic competence framework called the Great Eight (developed by Bartram, 2005, as cited in Krumm et al., 2016, p. 123). Thus, the study's findings are limited to the competencies mentioned in Bartram's Great Eight competence framework. The study by Schulze and Krumm (2017) also used a deductive theory-driven approach that connected virtual team–related boundaries with the competencies mentioned in prior research. Thus, the author of the current study found that there is room to advance virtual team–related research by developing an up-to-date understanding of individual competencies and

their role in individual effectiveness in virtual teams by using an approach that considers both existing theoretical understandings and empirical evidence.

However, before elaborating on the methods used in the current study, it is necessary to explain the other side of individual behaviour – the contextual and situational characteristics. As such, an analysis of existing research on competencies revealed that the competence literature has mostly focused on *individual differences*, excluding *situational characteristics* and their impact on individual behaviour. While the prevalent stream of competence research has focused only on individual characteristics as the determinants of individual behaviour, a parallel stream of literature has seen both individual characteristics and the external environment as determinants of individual behaviour. Most importantly, not only can both aspects be considered vital explanations for individual behaviour, but the key to preferred individual behaviour (such as performance at work) relies on *congruence* between individual characteristics and environmental characteristics (also referred to as person–environment [P-E] fit) (Shin, 2004).

Analysing the situational variables to explain the effectiveness of individual competencies can be considered novel in the virtual team literature and in the competence literature in general. An overview of the competence literature showed that the impact of external factors on competence application has received little attention. The closest interests to external factors that would support competence actualisation can be found in research on organisational learning (OL). In OL, the question of how to support the implementation of employee competencies has been around for a long time (Doyle and Johnson, 2019). However, the problem with OL research is that it has looked at the issue mainly from the organisational level while neglecting the role that individuals (and, most importantly, individual characteristics) play in the process of competence implementation (Doyle and Johnson, 2019). Thus, it can be said that OL research has focused on the other side of the spectrum – the situational characteristics – while at the same time neglecting the individual characteristics and the role of the individual in the competence implementation process. As such, it is time to carry out research that considers both – individual and situational characteristics, when explaining employee and organizational behaviour (Doyle and Johnson, 2019).

In addition, according to Shin (2004), congruence between individual and environmental characteristics will, in addition to enhancing employee performance, also likely increase employee well-being. These are important aspects to consider in the highly globalised job market, where employees hold more power in job placement than ever before (Kaur, 2015). In addition, remote working and virtual teamwork have increased the opportunity to work simultaneously for several organisations and projects. According to a survey by *The Wall Street Journal* (seen in *Forbes* by Kelly, 2021), more than 50% of employees in the IT and banking

industries have used the opportunity to work on two projects or organisations simultaneously. Thus, today, more than ever, organisations need to pay attention to employee well-being to retain talent and keep a talented workforce engaged with their organisations. When individuals have fewer opportunities to build relational bonds by meeting in face-to-face conditions, a pleasant virtual teamworking experience can be an anchor to keep individuals engaged with the team, project, and company. Thus, successful implementation of virtual teamwork implies not only that teams have the ability to produce business-related results but also that team members experience high levels of well-being.

To summarise the above discussion, virtual teamwork can benefit organisations, teams, and team members. However, the increase in physical dispersion and reliance on ICT risks constrain individual and overall team performance. Therefore, individual ability to adapt to the constraints related to virtual teamwork is vital from the perspective of successful implementation of virtual teams. As individual competencies are considered the most critical element in supporting the ability to cope with external demands, the current research will focus on identifying competencies that would support individuals in overcoming constraints related to virtual teamwork. This study also adopts the theoretical proposition that the key to virtual team success, individual performance, and well-being lies in the congruency between individual and situational (e.g. environmental) characteristics (Shin, 2004). Based on the former, the following overarching research question (RQ) and related sub questions were posed:

Main RQ: Which individual competencies and other factors enhance individuals' adaptation to a virtual working environment?

Sub-RQ1: What are the main constraints on individual effectiveness in virtual teams?

Sub-RQ2: Which competencies help individuals overcome key constraints in virtual teamwork?

Sub-RQ3: How can organisations support the actualisation of virtual teamwork–related competencies?

It is important to note that the current research uses the word "effective" to refer to the expected behaviour of virtual team members from both the taskwork and teamwork perspectives. Although used in the team-based literature, Salas et al.'s (2005, p. 562) approach to the word "effective" can also be applied to individual contexts. In their 2005 article (p. 562), Salas and colleagues explained how teamwork requires more than just mere completion of tasks; it requires the ability to "*coordinate and cooperatively interact with each other to facilitate task objectives*

through a shared understanding of the team's resources (e.g., members' knowledge, skills, and experiences), the team's goals and objectives, and the constraints under which the team works". Thus, effective individuals in virtual teams do more than perform tasks; they create shared understandings within the team, develop mutual trust, communicate and coordinate team tasks, and so on.

1.3   Selected research methods

Regarding the research design, critical realism was chosen as the philosophical stance to support the development of an understanding of individual competencies and their situational and contextual linkages. Critical realism has been found suitable for studying complex phenomena (such as competencies) that cannot be studied by direct measuring and/or testing (as in the natural sciences) (Bell, 2009). Instead, critical realism supports the development of knowledge and generalisations based on individual perceptions and experiences (Wynn and Williams, 2012). Critical realism also has a unique approach that allows the development of a better understanding of the relationships between generative mechanisms (such as competencies), situational factors (such as social context, actors, tendencies, events, etc.), and the actual events (such as the behaviour of the individuals).

In addition, since existing studies on virtual teamwork–related competencies have approached the topic deductively, the use of a qualitative research approach was decided upon for the current study, as it would allow the development of an empirical understanding of the phenomena. The empirical evidence was used to systematise and extend the existing knowledge about virtual teamwork–related competencies and develop an understanding of the impact of situational factors on the application of competencies. The individuals chosen as informants for the current study were professionals working daily in virtual teams. Altogether, 24 individuals were interviewed, most of whom worked in technologically advanced organisations, such as telecommunications and IT companies.

Regarding the data analysis, the current study applied both content analysis and narrative analysis approaches. The lesser-known narrative analysis process involved developing narratives based on the data across different interviews. The selection of a multimethod approach to the data analysis allowed the author to capture the benefits of both analysis techniques. Qualitative content analysis was used to categorise the data, and narrative analysis was used to connect different categories and contextual aspects. In addition, the researcher moved iteratively between the theory and data during the analysis process. The iterative approach was suitable, as it allowed for the development of a convergence between the data and existing theory (Orton, 1997). Consequently, the empirical evidence supported by the theoretical frameworks allowed for the development of several interesting findings, briefly

summarised here and further elaborated in the chapters that deal with results and discussions (Chapter 8, 9 and 10).

1.4   Key contributions of the current study

Regarding RQ1, the current study adopted the theoretical proposition developed by Watson-Manheim and colleagues (2012) that individuals experience virtual team–related constraints differently. This is known as the *discontinuity approach*. By mixing content and narrative analyses, the current research extends the theory of discontinuities by providing a systematic approach to explaining how certain virtual team–related constraints unfold over time based on virtual team members' experience in working in virtual teams. This has important theoretical and practical implications. From the theory perspective, research has treated virtual team–related constraints as static elements. Looking at them from the process-based view provides an additional mechanism for understanding how individuals experience virtual teamwork and, more importantly, how to provide more individualised yet structured support to individuals like Joanna to adapt to the virtual teamwork context.

Regarding RQ2, two important contributions should be highlighted. First, the empirical evidence and the systematic approach to defining and delimiting the concept of competence and its related attributes helped advance the understanding of virtual team–related competencies and their role in the virtual team's success. The current research directly builds on and advances the research carried out by Krumm and colleagues (2016) by systematising the current knowledge about virtual team–related competencies and integrating additional competence elements from other fields into a virtual teamwork context. The current study advances the academic understanding of individual characteristics and their role for virtual team members and in team adaptation processes. From the practical perspective, the competence framework developed in the current study (see Appendix 2) provides a practical tool for human resources (HR) and human resource development (HRD) managers to develop organisational selection and training processes.

Second, from a more general perspective, the current study develops a systematic and thorough overview of the concepts of competencies and competence attributes, which can help clarify the conceptual fuzziness related to competence and its related attributes in the literature (Le Deist and Winterton, 2005). Moreover, the results of the current study, which highlight the importance of values and attitudes in predicting individual behaviour and adaption, suggest that it is time to reverse the order of competence attributes in the definitions of competence; for example, start treating competencies as a combination of *values, attitudes, skills,* and *knowledge*, instead of the current approach seeing them as *knowledge*, *skills, attitudes,* and *values*. The former can help direct research towards placing more importance on and

paying more attention to individual values and attitudes when carrying out competence-based research.

Finally, the current study adopted the P-E fit approach (Shin, 2004) to explain how the environment impacts the application of competencies and, thus, individual behaviour. Self-determination theory (SDT) was adopted from motivation-related research and used to frame the identification of situational aspects and explain their role in competence application. Applying the SDT model in the current study can be considered a proof of concept, which showcases that it is possible to use the SDT model in competence and OL research to a) explain the complex relationship between individual characteristics (competencies) and situational aspects and b) explain how and which situational aspects can enhance the application of individual competencies. Regarding the aim of the current study, the SDT model proved to be a useful framework for identifying and systematising the situational aspects that, together with the development of employee competencies, can help increase the theoretical and practical understandings of the development of successful virtual teams.

1.5 Structure of the study

The reporting structure of the current research lies between an essay-based style and a traditional monograph reporting style. The reason for this is that all three subquestions of the research could be treated and approached as separate research projects, while at the same time being closely connected and building on each other. At first, the researcher tried to follow the essay-based approach, with each essay starting with its theory and methods, followed by the results and discussion. Soon, it became apparent that this type of approach was not suitable, as it would have meant duplicating the research methods, which were the same for all three questions. In addition, it would have hampered the interconnectedness of the theory for the three subquestions, as the theory for Sub-RQ1 helps answer Sub-RQ2, and the theory for Sub-RQ1 and Sub-RQ2 helps answer Sub-RQ3. Therefore, in the next phase, the researcher tried to follow the regular monograph structure, including a theory block, research design block, results, and discussion.

Unfortunately, the traditional monograph structure also has several impediments. For example, too many results (facts) before the discussion created the risk of forgetting some of the results. Thus, finally, a mix of an essay-based approach and a traditional monograph reporting style was found to work best. The following figure (**Figure 1**) illustrates the structure of the study on an aggregated level, without real titles.
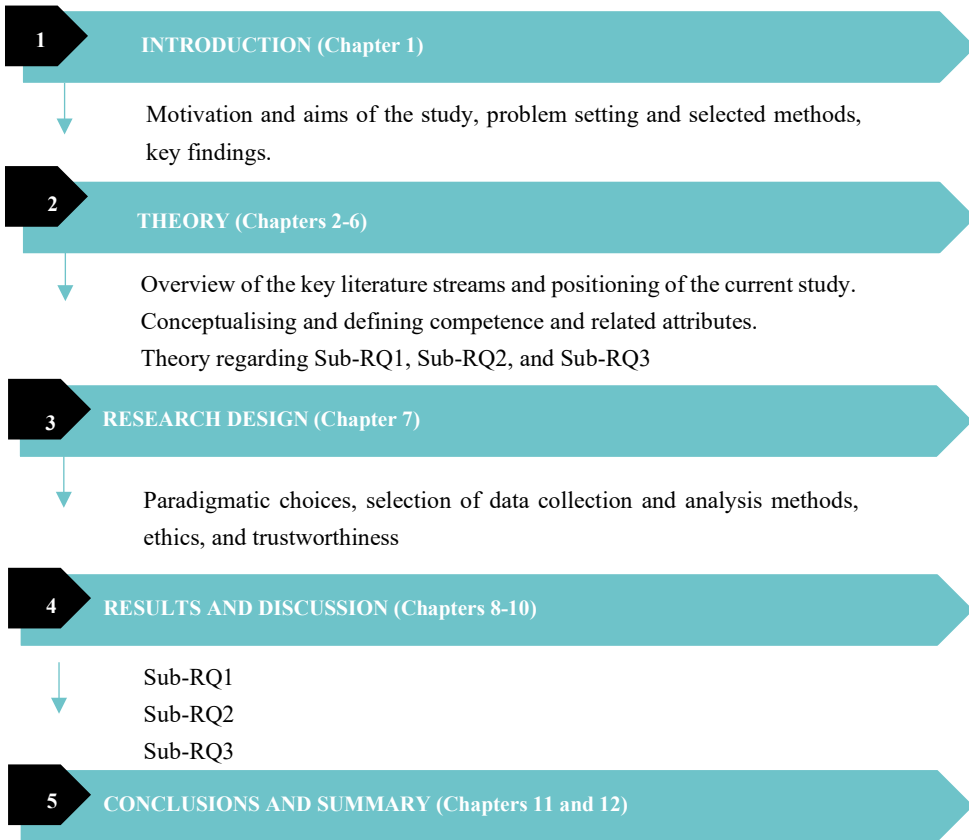
Figure 1. Monograph structure – a bird's eye view (developed by the author).

The dissertation starts with an introduction explaining the motivation and aims of the study. The introduction is followed by a theory block (including chapters 2-6) giving an overview of the literature streams used in the study, conceptualising and defining the term competence and highlighting theory related to sub-questions 1,2 and 3. The research design block (Chapter 7) explains the paradigmatic choices, data collection and analysis methods, and ethical considerations of the research. The results and discussions regarding the sub-research questions of the current study are presented in Chapters 8-10. The dissertation finishes with conclusions and summary highlighting the theoretical and practical implications of the research, limitations and suggestions for future research (Chapter 11 and 12).

2 Overview of the Key Literature Streams and Positioning of the Study

The theoretical block of the monograph includes five chapters. The current chapter (i.e. Chapter 2) is an introductory chapter providing an overview of the main literature streams and the positioning of the study. The next chapter (Chapter 3) investigates the concept of competence and its related attributes. Since the competence literature itself claims that competence is a concept that is often used inconsistently, a thorough effort has been made in the current study to avoid stepping into the same trap. Chapter 4 answers Sub-RQ1 by summarising, based on theory, the main constraints related to virtual teamwork, thus helping identify possible competencies to add to the competence framework. Chapter 5 focuses on identifying virtual teamwork–related competencies based on the theory and existing competence frameworks. The final chapter in the theory block (Chapter 6) analyses, based on the literature, how situational variations can affect the application of competencies.

The main streams of the literature used to answer the RQs can be summarised in three broad categories: a) research on organisations, b) research on virtual teams, and c) research on competencies (see **Figure 2**). Why were those research streams chosen, and what value did they bring to answering the current RQs? First, the seminal theories on work organisations, such as the resource-based view of the firm (starting from Penrose in 1959, seen in in Kay, 2018), the dynamic view of the firm (Nonaka and Toyama, 2002), and the knowledge-based theory of the firms (starting with Conner, 1991, seen in Foss, 1996), help gain understanding of where the competencies belong within the broad landscape of different aspects that, combined, have an impact on the firm's success. As previously mentioned, the current study takes a situational approach to competencies. Therefore, understanding the broader organisational context is vital to developing meaningful answers to the study's RQs.

- Management literature
- Information science

Current research project

Research on **virtual teams**

Research on **organisations**

Research on **Competences**

- HRM/HRD literature
- Education and training
- Applied psychology/ behavioural psychology
- EU policies and competence frameworks

- Organisational psychology
- Research on work organisations and firms
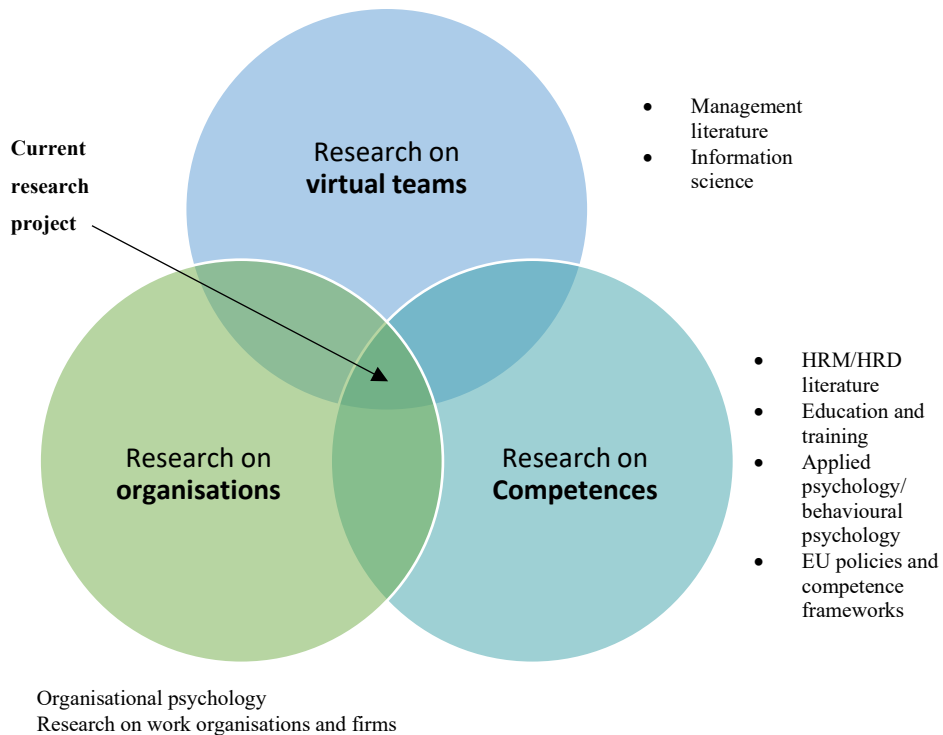
Figure 2. Overview of literature streams used in the current research. (*Note:* HRM = human resource management; HRD = Human Resource Development and EU = European Union).

Contrary to organisational theories, which look at firms on the aggregated level, organisational psychologists are more interested in granular-level aspects, such as group dynamics, leadership issues, and the differences between employees, which lead to certain workplace behaviour. One such example is the SDT model (Deci et al., 2017), which is applied as a macro-level theory in the current study to explain the impact of different aspects within organisations on employee behaviour. SDT and other intragroup and intraorganisational studies, such as those on psychological safety within teams (e.g. Edmondson, 1999), aided the researcher in understanding the situational aspects that can support the actualisation of competencies. The literature on organisational psychology also includes studies that look at employee characteristics (e.g. attitudes and values; Arieli et al., 2020) and explain their role in employee behaviour. Such studies were crucial to the current study, as they helped define the attributes of competencies (e.g. knowledge, skills, values, and attitudes) and identify them from the existing theory and empirical data while developing the virtual teamwork competence framework.

As the current research was carried out in the context of virtual teams, the virtual team literature can be considered a foundation of the current dissertation. Research on virtual teams aided the researcher in understanding the main constraints experienced in virtual teams (RQ1). Research on virtual teams has also devoted considerable effort to determining the success factors of virtual teams. The studies about virtual team success factors, especially review articles on this topic (e.g. Morrison-Smith and Ruiz, 2020), helped gain an understanding of how and which situational factors to consider important with regard to competence actualisation in virtual teams. Although competencies themselves have not received extensive attention in virtual team research, the two more profound approaches to individual competencies by Krumm and colleagues (2016) and Schulze and Krumm (2017) aided the author of the current study in developing the competence framework and determining new insights from the empirical data.

The literature on competencies was, at first, treated as a source to conceptualise and define the concept of competencies. However, interestingly, after conducting the interviews, the insights from the interviews yielded the systematisation of existing competencies in the virtual team literature and the integration of competencies from other fields into the context of virtual teamwork. Therefore, the literature on future competencies, including different sources from practice-based journals (e.g. research conducted by McKinsey and Company) to EU-based frameworks (e.g. DigComp by Ferrari, 2013) to research articles (e.g. Rios, 2020), played an essential role in developing the theory-based framework for virtual teamwork.

The current research adopts SDT as a macro-level theory explaining the need for and role of competencies in individuals' everyday work lives. In addition, SDT was found useful in connecting the external organisation- and team-level aspects with the internal characteristics such as competencies to understand better the mechanisms behind the actualization of individual competencies. To conclude, SDT was chosen because it considers both - the individual and organisation level aspects when explaining success of organizations, teams and individuals. The authors of SDT explained:

Research in work organizations has tended to take the perspectives of either the employees (i.e., their wellbeing) or the owners (i.e., their profits). SDT provides the concepts that guide the creation of policies, practices, and environments that promote both wellness and high-quality performance. (Deci et al., 2017, p 19)

The underlying theoretical proposition of SDT is rooted in cognitive evaluation theory and states that the feeling of being competent and autonomous helps increase employees' intrinsic motivation (Deci et al., 2017), which, in turn, helps increase employee performance and well-being (Gagne and Deci, 2005). However, while cognitive evaluation theorists see rewards (such as pay and competition) that

increase external (e.g. controlled) motivation as something negative, SDT sees external motivational rewards as part of the whole symbiotic continuum leading to performance and well-being. To explain it more simply: according to SDT, leaders do not need to choose between one or the other but instead find a suitable balance between measures that increase external motivation and those that increase internal motivation. For example, all work includes tasks that are routine and that can be motivated only with external rewards (e.g. pay), and on the other, all work includes tasks that increase employees' sense of autonomy and competence.

Thus, SDT divides motivational factors into two categories: external aspects, such as job design, pay, and managerial styles, and internal aspects, such as goals, motivation, and basic psychological needs (Gagne and Deci, 2005; Deci et al., 2017). Both, the external as well as internal motivational aspects, need to be met to lead to higher employee productivity and well-being. Basic psychological needs (part of internal aspects) include autonomy, belonging, and competencies that are essential for individuals' mental well-being and effective functioning in social and work-related settings (Deci et al., 2017). **Figure 3** summarises the primary aspects and their relationships with employee well-being and performance according to SDT. It is important to highlight that, although competencies are not at the centre of SDT, they play an important role in the whole combination explaining individuals' work performance and well-being.

It is also important to note that SDT focuses more on perceived competence than on actual competence. In other words, the theory explains that, to maintain psychological well-being and perform well at work, employees need to feel competent. This feeling can be either increased or decreased by external factors (such as company policies, managerial styles, and roles and tasks given to the employee). However, it is also intuitively clear that work performance will not meet expectations without actual competence, and perceived competence will not last long (no matter the policies and managerial styles) if the actual competence do not meet the job demands. Thus, it can be concluded that the SDT model implicitly assumes that individuals hold (at least on the basic level) relevant competencies. Furthermore, SDT promotes the development of employee competencies, for example, through training, mentoring, increasing autonomy, and assigning challenging tasks. (Deci et al., 2017; Manganelli et al., 2018).

SDT also promotes flexibility (which can be provided by virtual teamwork[2]) as one means of increasing employee autonomy and, thus, employee performance and well-being (Manganelli et al., 2018). Therefore, SDT is in line with the topic of the current study and sees flexible ways of working as an important means of increasing employee well-being and performance.

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[2]   Author's remark.
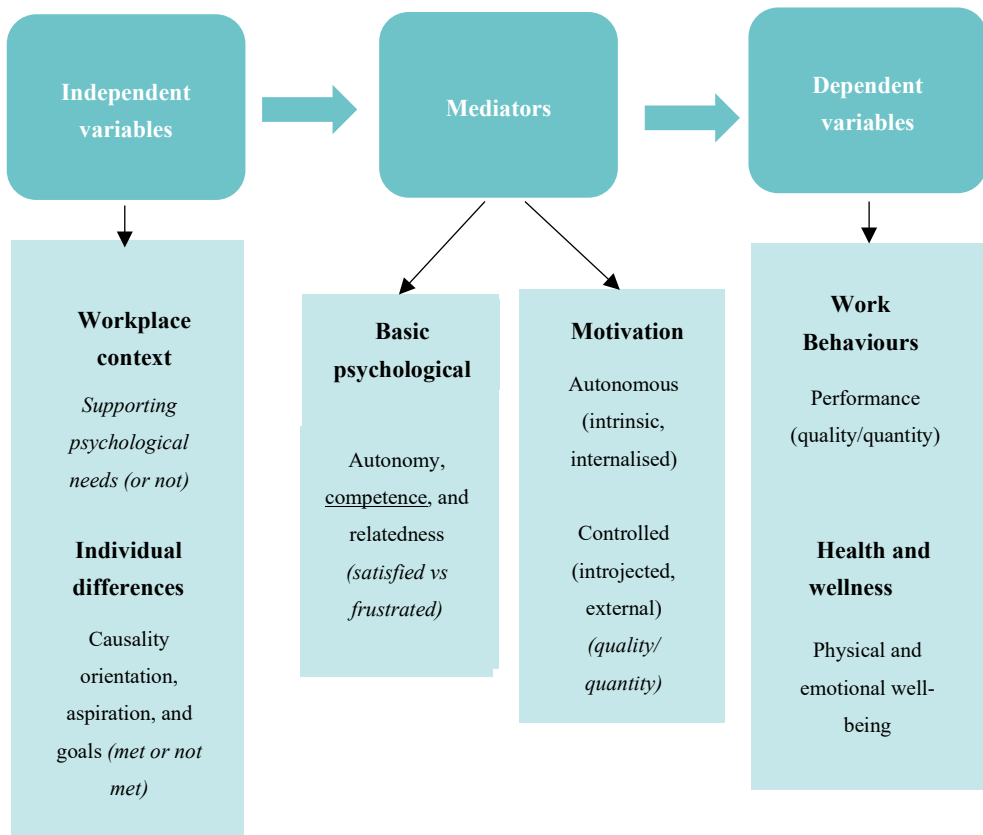
Figure 3. Aspects influencing individuals' work performance and well-being (adapted from Deci et al., 2017).

To conclude, SDT was found to be a useful theory for the current study for the following reasons. First, SDT focuses on both employee well-being and performance, and according to SDT, competencies and competence development are important for achieving performance and well-being. Second, SDT looks at both environmental factors and individual factors when explaining employee behaviour – which is in line with the critical realism and P-E fit approach chosen for the current study. From a practical perspective, applying the SDT framework helps identify and systematise the aspects that support the application of virtual team–related competence. Finally, SDT sees flexible work arrangements as an important means of increasing employee autonomy and thus intrinsic motivation. To conclude, the SDT framework is considered a suitable underlying framework for the current study, as it can help connect and systematise the results of the three sub questions.

3 Conceptualising Competence and its Related Attributes Based on Theory

The current chapter starts by placing competencies into a broader context – the firm – as supporting firms with tools to enhance their success is one of the motivations of the current study. Thus, it is important to understand where competencies belong on the map with other relevant factors that determine the firm's successes and failures. The next section focuses on conceptualising and defining competence and its related terms (competency, competencies). Then, attention is turned to the competency attributes – knowledge, skills, values, and attitudes – that together form the individual competencies. After defining and delimiting the competency attributes, the researcher describes different approaches to developing the competence framework, as these approaches initially determine how the competency attributes are organised and displayed in the final framework.

3.1 Role of competencies in firms

The following section will develop a historical overview of the evolution of firm-related theories (summarised in **Figure 4** at the end of this section) and the role of competencies in these theories. All of the presented theories, with their slightly different approaches, have one thing in common – they all try to understand the main factors behind a firm's success (or failure). They all also consider, to some extent, individual abilities (i.e. part of competencies) in relation to the firm's success – for example, skills in the earlier theories during the Industrial Revolution and knowledge during the development of the knowledge-based economy. And, it can be summarised that throughout the evolution of firm-related theories, the importance placed on individual characteristics (i.e. competencies) regarding a firm's success has changed from almost no importance to high importance. The following overview helps with understanding the position and role of competencies within firms, historically and at present.

The rise of corporations in the 19th century significantly increased the interest that scientists and economists at the forefront paid to firms (Kay, 2018). Several theories regarding the firm were developed to explain the existence and basic

mechanisms of the firm's functions. Coase's (1937) *transaction cost theory of the firm* was one of the first theories to emerge and is considered seminal today (Kay, 2018). In Coase's view, firms are mainly coordinated by external factors, such as price mechanisms and demand from buyers, along with internal factors, such as management decisions, organisational design, and so on (Kay, 2018). Coase's theory of the firm was extended by Williamson (1975, seen in Kay, 2018), who highlighted the importance of investments in physical equipment and acquired skills. Although *skills* were mentioned in the Williamsons extended theory of the firm, firms and their success were still seen mainly as a result of legal agreements with customers, suppliers, and employees (Kay, 2018). Due to the nature of businesses in the late 19-th centuries (primarily manufacturing companies), firms mainly focused on vertical integration, but this soon changed due to the growing trend of globalisation in the 20th century (Kay, 2018). "Make or buy" soon became the central question in the business community (Kay, 2018). The approach for making the decision between make or buy emphasised the role that competencies and capabilities play in a firm's success (Kay, 2018).

The growing interest in competencies began in 1959 with the theory known as the *resource-based view of the firm*, developed by Edith Penrose (Kay, 2018). Penrose's central insight was that firms are more than just a web of contracts – they are a collection of the capabilities of a particular group of people and the relations between them (Kay, 2018). Wernerfelt (1984) and Barney (1991) further developed the original idea, explaining that only when *"these internal capabilities were valuable, rare, and inevitable could they be a sustainable source of profit"* (as cited in Kay, 2018, p. 16). According to the resource-based view of the firm, the task of the corporate strategy is to match internal capabilities with the external environment. In the resource-based view of the firm, the boundaries of the firm are defined by the scope of the firm's capabilities rather than transaction costs (Kay, 2018).

The resource-based theory of the firm was largely neglected by the economists dominating the field in the mid-19th century. In business strategy and later theories (emerging at the end of 1990 and early 2000), Penrose's ideas made a real impact (Kay, 2018). For example, according to Le Deist and Winterton (2005), the resource-based view resonates with the dominant literature in the management strategy developed in the 1990s (e.g. Mitrani et al., 1992; Campbell and Sommers Luchs, 1997; seen in Le deist and Winterton, 2005), which emphasised *core competence* as a critical organisational resource supporting competitive advantage. According to the Le Deist and Winterton (2005, p. 27), the *core competence approach* aims to *"recognize the complex interaction of people, skills and technologies that drives firm performance and addresses the importance of learning and path dependency in its evolution"*.

While the resource-based view of the firm focuses a bit more on the internal processes of the firm, the level of analysis is still more aggregated (e.g. at the macro level), similar to the transaction cost theory of the firm. As valuable as they are, these aggregated-level theories were found to be incapable of answering many of the emerging questions, such as why firms make certain decisions (often impractical and irrational). A call was made to open up the black box of how firms behave due to lower-level processes involving individuals and groups (Levienthal, 2012). The *behavioural theory of the firm* answered this call, as it focuses on organisational decision-making processes (Levienthal, 2012). According to Levienthal (2012), a behavioural theory of the firm developed in 1963 by Cyert and March was extraordinarily influential and gave rise to a whole school of behaviourally oriented scientists. Critical to this position was the realisation that decision-makers usually lack perfect knowledge and resources; thus, their decisions are often inconsistent and irrational (Levienthal, 2012). The bounded rationality of agents, explained by the behavioural theory of the firm, was an important development of the prevalent rational agent models (Levienthal, 2012). The key ideas and conceptualisations of the behavioural theory of the firm still inform the micro-level theories of contemporary organisations (Levienthal, 2012).

The transaction cost and resource-based theory of the firm both treat firms as producers of physical goods. However, with the rise of the *knowledge economy,* it was time to replace the word *goods* with the word *knowledge*. The *knowledge-based theory of the firm* (starting with Conner, 1991, as seen in Foss, 1996) explains the knowledge creation, sharing, and internationalisation processes within a firm. According to the knowledge-based view of the firm, a firm is successful when it *"can produce knowledge more efficiently than the market"* (Nonaka and Toyama, 2002, p 997). The continuous acquisition and transfer of knowledge within and across the firm's boundaries is necessitated by factors such as ever-changing competitive conditions, globalisation, and technical advancements. Knowledge-based theory of the firm builds mainly on the resource-based view of the firm (Nonaka and Toyama, 2002). However, it emphasises the process of organising and internalising knowledge rather than looking at it as a sum of individual capabilities (Nonaka and Toyama, 2002). The knowledge-based theory of the firm also highlights the temporal aspect of knowledge-based assets, as knowledge is highly contextual, for example, location- and time-specific (Nonaka and Toyama, 2002).

Knowledge-based theory looks at the firm on both the macro and micro levels. On the macro level, it acknowledges the external environment (e.g. markets) and its impact on the firm (Nonaka and Toyama, 2002). Regarding the internal aspects, it analyses how creative routines, internal systems, and distributed leadership affect knowledge-based asset development (Nonaka and Toyama, 2002). In their seminal paper from 1994, Hamel and Prahalad called on managers to use this type of

combination of knowledge about the external environment (industry foresight) and their firms' internal processes to transform their companies to better meet the market demands of the future. Instead of just making companies leaner (e.g. cutting costs, downsizing product categories and personnel, etc.), managers were invited to simultaneously make companies *leaner and smarter*. With the rise of the knowledge-based theory of the firm, interest increased in core competencies and their effect on developing firms' competitive advantage (e.g. Aaker, 1989; Prahalad and Hamel, 1990; Hamel and Prahalad, 1994; Le Deist and Winterton, 2005).
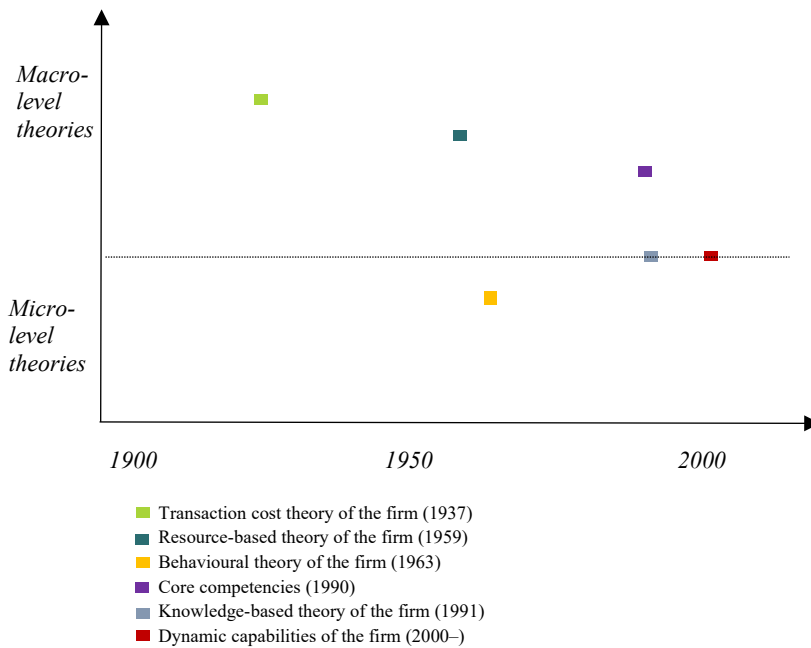
Figure 4. Timeline of the emergence of firm-related theories and their level (macro vs micro) (developed by the author).

Today, in the era of globalisation, the aim of developing and sustaining a competitive advantage is more challenging than ever. Firms face many contradictions: achieving both global integration and local adaption, achieving creativity and efficiency in their operations, ensuring business growth while maintaining employee satisfaction, and providing autonomy for organisational members while exercising control over work processes (Nonaka and Toyama, 2002). These contradictions are captured in the *dynamic theory of the firm*, which stresses that firms are only successful if they can continuously react and adapt to changing circumstances (e.g. globalisation, market needs, customer behaviour, employee

preferences, etc.) (Nonaka and Toyama, 2002). However, to accomplish this, organisations need to develop an organisational culture that can innovatively react and adapt to changes. The role of competent employees is to face and solve the many challenges arising from both the firm's external and internal environments. According to Lans and colleagues (2014, p 38), *"Competencies can be viewed as a catalyst for creating a more critical, innovative, and reflexive organizational culture that frequently questions its own routines, assumptions, and guiding principles."*

In the literature focusing on employee competencies, a divide can be seen based on the level of analysis, namely, *individual* or *collective*. The individual approach is centred on analysing individuals and their competencies, and the collective approach is centred on building the required collective competence in an organisation (Le Deist and Winterton, 2005). Both individual and collective competencies of employees, which together form a firm's collective competence, are important to survive in today's business environment. Moreover, from the individual and collective competence perspectives, the ability to adapt to changes in the external and internal working environments has become vital to maintaining a firm's success (Truss et al., 2013).

However, as important as they are, competencies are not the only factors determining a firm's success. In general, firms are considered to consist of tangible and intangible assets (Sveiby, 2001) and current assets (based on a traditional firm balance sheet) – and competencies are part of a firm's intangible assets (see **Figure 5**). Firms' tangible assets consist of all physical assets and financial resources, such as buildings, equipment, and machinery (Carboni and Medda, 2019). Current assets include all monetary assets in the bank account, accounts receivable, and investments. Intangible assets consist of external and internal assets. External intangible assets are formed through relationships with customers and suppliers and the reputation of the firm (Carboni and Medda, 2019). Internal intangible assets consist of internal structures (patents, concepts, models, administrative systems), internal networks, individual competencies, and the firm's culture (Carboni and Medda, 2019).
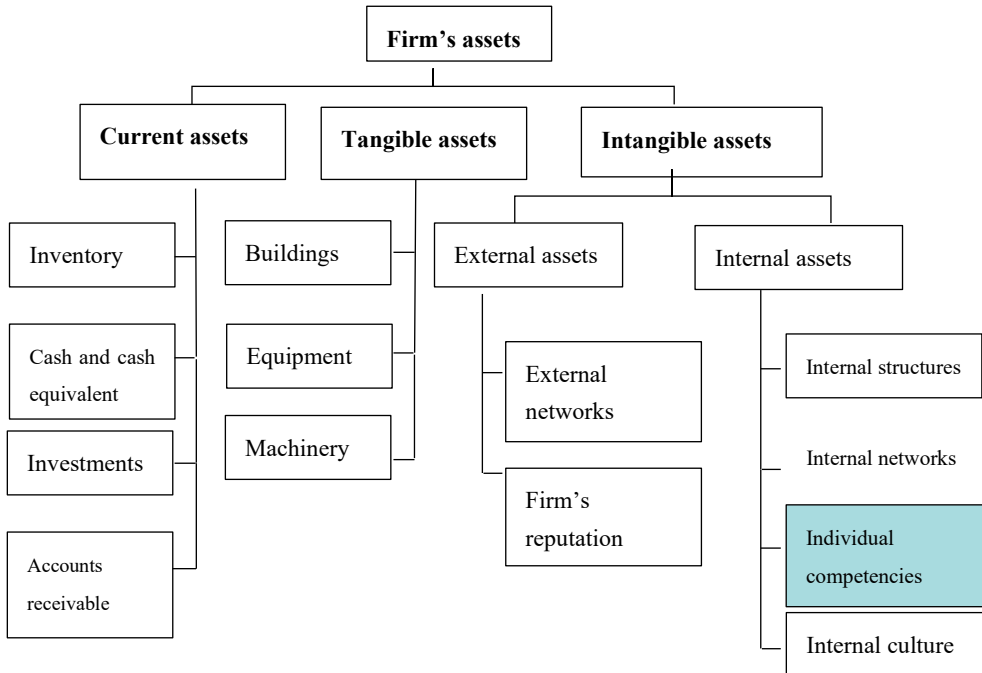
Figure 5. The positioning of competencies within a firm's asset structure (developed by the author based on Sveiby, 2001, and Carboni and Medda, 2019).

The following sections delve into the conceptualisation of competence and its related attributes, which will allow for the development of a theoretically grounded competence model.

3.2 Conceptualising competence

The decision to expend thorough effort to define the concept of competence and competencies' role in individual success did not come only from the wish to develop construct clarity (Suddaby, 2010) but also from the revision of existing competence frameworks, which revealed challenges that researchers have faced when identifying and describing competencies. This is not surprising, as experienced competence researchers have expressed that competence is a confusing concept (Le Deist and Winterton, 2005). In the same line of thought, Shulze and Krumm (2017), after careful revision, expressed that competencies have been vaguely defined in research on virtual teams. However, a lack of care in defining competence and its related attributes can lead to overlooking important insights and developing inconsistencies between different frameworks. Therefore, developing a thorough overview of the concept of competence and its related attributes was found useful for the current

study and to be an opportunity to develop extra value for virtual team (and other) researchers who study competencies.

According to Le Deist and Winterton (2005), the terms *competence* and its related concepts *competency* and *competencies* are often used interchangeably across research. Despite the continuous debates on how to define competence and its related attributes (e.g. Le Deist and Winterton, 2005; Mulder, 2015; Wesselink et al., 2015), researchers still agree that they are useful, since they allow for bridging the gap between job characteristics and individual requirements for effective and/or superior job performance (Le Deist and Winterton, 2005; Wesselink et al., 2015). After extensive analyses of the different approaches to *competence* and its related definitions in US, UK, and European academic schools of thought, Le Deist and Winterton (2005) provided a simplified distinction between the terms *competence* and *competency*. According to this simplified distinction, *competence* generally refers to characteristics related to the functional aspects of a job, and *competency* refers to behavioural characteristics associated with effective individuals. Still, a significant overlap exists in the literature regarding the use of the two terms within different approaches. Thus, instead of simply differentiating between terms (and their definitions), it makes sense to look closely at their conceptual approaches.

Le Deist and Winterton (2005) identified historical and epistemological developments related to the three concepts that help in understanding the choice made in the current dissertation. Namely, Le Deist and Winterton identified three approaches to competence and its related concepts: a) the behavioural approach, which is rooted in the United States; b) the functional approach, which is rooted in the United Kingdom; and c) the holistic approach, which has been adopted in the United States, the United Kingdom, and other countries. In his review article, Sandberg (2000) built a similar divide but named the approaches somewhat differently: a) the worker-oriented approach, b) the work-oriented approach, and c) the multimethod approach. Mulder (2015, p. 1) also identified three different conceptual approaches to competence and competence framework development: a) *"competence as behaviouristic functionalism"*, b) *"competence as integrated occupationalism"*, and c) *"competence as situated professionalism"*. The first two overlap significantly with Le Deist and Winterton (2005) and Sandberg (2000). The current study adopts the terminology of Le Deist and Winterton (2005), e.g. naming the three approaches as behavioural, functional, and holistic approaches.

The behavioural (also referred to as the worker-oriented approach) was introduced by White in the 1960s and is concerned with what differentiates superior employees from their colleagues (Le Deist and Winterton, 2005). Among the three terms competence, competencies, and competency, competency became the most widely used under this research tradition. The definitions of competency in this research tradition underline job performance as an ultimate goal. According to

McClelland (1973, as cited in Le Deist and Winterton, 2005, p 29, see also Chouhan and Srivastava, 2014, p 15) competency can be understood as *"a personal trait or set of habits that lead to more effective or superior job performance"* and *"an underlying characteristic of a person that leads to or causes superior or effective performance"* (Boyatzis, 1982, as cited in Rothwell and Lindholm, 1999, p. 93).

The primary argument for using the behavioural approach to competency identification and competence framework development was that it allowed organisations to centre the conversation around what excellent people *do* to add value to the organisation (Lucia and Lepsinger, 1999). However, at some point, it became evident that the widespread use of the behavioural approach yielded frameworks that were too generic, which led to the approach being criticised (Sandberg, 2000). For example, Jacobs (1989, as seen in Sandberg, 2000) argued that, because behavioural competency frameworks are too generic and abstract, they have limited value as a basis for competence development. Furthermore, the generic competence frameworks went against the firms' wishes to develop unique firm-specific competences (e.g. core competences) that would help them gain competitive advantages (Le Deist and Winterton, 2005).

Whether due to the abovementioned critique, changes in the external environment, or natural developments happening in the field, most of the literature at the end of the 1990s and early 2000s focused on identifying functional aspects (also referred to as the work-related characteristics), often associated with the underpinnings of the behavioural approach (Le Deist and Winterton, 2005). The main goal of developing work-focused competence frameworks was to allow the opportunity to assess and develop employee competences and thus ensure their fit with the work role. The process of developing competence-based vocational standards involves a) describing the work role, b) identifying units and subunits of competence, and c) describing performance criteria and indicators (Le Deist and Winterton, 2005). The definition of *occupational competence* proposed by the Manpower Services Commission in the United Kingdom (1986, as cited in Le Deist and Winterton, 2005, p 34) defined competence as *"the ability to perform activities in the jobs within an occupation, to the standards expected in employment*".

The benefit of a functional approach to competence framework development is that it allows for creating more concrete and detailed descriptions of competences, thus overcoming the problem of competence frameworks being too generic (Sandberg, 2000). Many organisations still use competence frameworks developed per function(s) to generate detailed descriptions of the expected candidates and their capabilities. However, the functional approach to competence development has also been criticised. Some have argued that this approach lacks adequate theoretical underpinnings (Le Deist and Winterton, 2005), while others have argued that *"the lists of work-based activities"* do not sufficiently explain or indicate the *personal*

attributes needed to accomplish the activities efficiently (Sandberg, 2000). Thus, Hodkisson and Issit (in 1995) and, Cheetham and Chivers (in 1996 and 1998 as cited in Le Deist and Winterton, 2005, p. 31) called for a more holistic approach to *"professional competence"* comprising a set of interconnected competences including competencies (competency in the singular).

The third category – the holistic approach to competence framework development – attempts to avoid criticism of the worker- and work-oriented conceptualisations by building on both approaches (Sandberg, 2000). The holistic approach also points to the importance of the context in identifying competences. In 1995, Hodkinson and Issitt (as cited in Wesselink et al., 2015, p. 499), distinguished two dimensions of holism in competence framework development, with the first dimension concerning the integration of behavioural and functional aspects and the second dimension referring to the competence's interrelatedness with the context. According to Mulder (2015), contextualised competence frameworks can be developed by explicitly referring to the domain and adding exemplary quotations of the contextualised meaning of the competencies and/or developing narrative job descriptions.

In addition to the holistic approach proposed by Hodkinson and Issitt (1995, cited in Wesselik et alk, 2015, p. 499) and Mulder (2015), the chosen paradigm – critical realism – allows for looking at how different contextual aspects support or limit the application of individual competencies in overcoming virtual team–related constraints. As discussed more profoundly in Chapter 6, individual behaviour is determined not only by individual capabilities but also by environmental factors. According to Shin (2004), *congruence* between situational and individual characteristics (also known as P-E fit) enhances employee performance and well-being. Thus, analysing the relationship between situational characteristics and the application of individual competencies is worthwhile.

Considering the previous discussion related to conceptual approaches to competence and the goals of the current research, the author decided to follow the holistic approach when developing the virtual teamwork–related competence framework. The holistic approach is carried out in the current study by

1. discussing both functional and behavioural expectations of virtual team members and leaders during the interviews;

2. developing narrative descriptions of competent virtual team members and leaders in addition to identifying units and subunits of competence; and

3. analysing the contextual factors that support the actualisation of the described individual competencies.

The selected holistic approach is thus a combination of a) a multidimensional/holistic approach developed in the early 2000s that calls for

considering both the nature of the work and the behavioural characteristics of successful employees; b) the approach of situated professionalism, which calls for making competence frameworks practically relevant by adding context-based descriptions to identified competencies; and c) the P-E fit approach to explaining individual behaviour, which considers both individual and external situational characteristics essential in explaining individual behaviour. Pursuing a combination of the three approaches is well supported by the selected philosophical paradigm (critical realism) and the research strategy (collective case study). Both allow for the development of contextualised understandings and are explained in more detail in the "Research Design" chapter (Chapter 7).

3.3   Defining competence and its related attributes

Careful analysis of the competence literature showed an inconsistency in using the terms competence, competency, and competencies. For example, some researchers use competencies as a synonym for competence (e.g. Maduka et al., 2018). Some researchers use competencies as a plural of competency (e.g. Bartram. 2005). Other scholars use an integration of all three terms (e.g. Mulder, 2015). Thus, it seems that the only way to solve the problem of defining the concept in the current study is to select one approach that best reflects and fits the aim and selected philosophical underpinnings of the current dissertation. In the present dissertation, the author follows Mulder's (2015) suggestion to maintain the terminology of competence, competency, and competencies.

According to Mulder (2015, p. 13), "competence is the generic capability of a professional […] competency is a part of competence, and competencies the plural of that.". Thus, virtual teamworking competence in the current study refers to a combination of competencies (competency in the singular). While defining competencies, the author of the current study decided at first to follow the most widely spread definition (Winterton et al., 2005) of competencies as "a series of integrated capabilities consisting of knowledge, skills, and attitudes" (Lilleväli and Täks, 2017, p. 2). However, after careful analysis of the data and existing competence frameworks, the author saw the need to add values to the definition, which proved to form a solid foundation of behavioural patterns of successful virtual team members. Therefore, the decision was made to adopt Kotsiou and colleagues' (2022, p. 174) definition of competencies as an "individual's ability to respond to a complex demand by combining their internal resources (such as knowledge, skills, values, and attitudes) to respond successfully to a given situation or context" (see **Figure 6**). Based on the selected definition by Kotsiou and colleagues (2022), the following sub-chapters explore the concepts that form competencies (competency in singular) – namely, knowledge, skills, attitudes, and values.
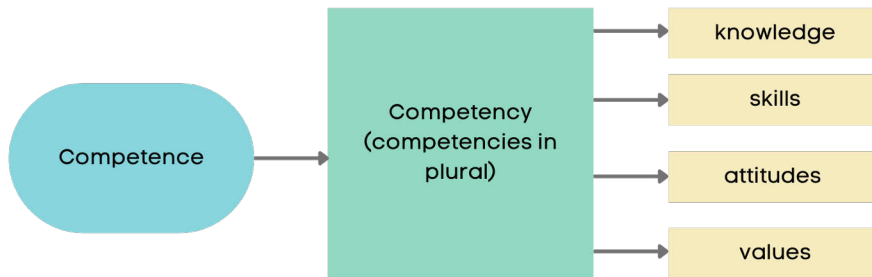
Figure 6. Visual representation of the definition of competence and competency(-ies) and related attributes (developed by the author).

3.3.1 Knowledge

Knowledge is understood primarily as a cognitive characteristic that reflects familiarity and expertise, reduces uncertainty, and increases the ability to plan and act (Nonaka, 1994; Spitzberg, 2006). Although sometimes used interchangeably, there is a clear distinction between *information* and *knowledge*. According to Machlup (1983, as cited in Nonaka, 1994, p. 15), *"information is a flow of messages or meanings which might add to, restructure or change knowledge"*. Thus, information can be said to be a flow of messages – a formalised representation of existing knowledge. At the same time, knowledge is created and organised based on the available information. After which, it is internalised based on the commitment and beliefs of its holder (Nonaka, 1994). It is important to note that, to be considered *knowledge*, it has to be considered true, not only by one individual but also by the wider community (Hunt, 2003). Therefore, individuals must be able to justify their knowledge to be considered knowledgeable.

According to the most widely used framework for classifying human domains for learning – Bloom's taxonomy, developed by Anderson and Krathwohl (seen in Amer, 2006) – knowledge consists of four dimensions: *factual*, *conceptual*, *procedural,* and *metacognitive*. Factual knowledge refers to knowledge that is the basis of specific disciplines, such as essential facts, terminology, details, or elements related to a particular domain (Kratwohl, 2002). Conceptual knowledge includes classifications, principles, generalisations, theories, frameworks, or structures (Amer, 2006) – for example, interrelationships between the factual elements (Kratwohl, 2002). Procedural knowledge enables individuals to do something specific within a particular domain, such as methods of inquiry, algorithms, techniques, and specific methodologies (Amer, 2006). The fourth dimension – metacognitive knowledge – is the awareness of one's knowledge and cognitive processes and is essential for solving problems, performing complex tasks, and learning (Amer, 2006).

Although knowledge is often treated as something that can be tested, not all knowledge is explicit (Grant, 2007). In the 1958 book *Personal Knowledge*, Polanyi (seen in Grant, 2007) explained that individuals do or know things that cannot be explained or taught to others, or that even they themselves are not aware of. This type of knowledge is called *tacit knowledge* and is defined as *"non-codified, disembodied know-how that is acquired via informal learning"* (Howells, 1996, p. 92). Tacit knowledge consists of cognitive and technical elements (Nonaka, 1994). Cognitive elements, also called *mental models,* include schemata, paradigms, beliefs, viewpoints, and perspectives that help individuals perceive and define their world (Nonaka, 1994). An example of a mental model is the *growth mindset*, which refers to a person's belief that everything is learnable. The technical element of tacit knowledge consists of concrete know-how that applies to specific contexts and helps individuals perform tasks (Nonaka, 1994). According to Polanyi (1958, seen in Grant, 2007), tacit knowledge can be transferred mostly through informal learning, such as experimenting with and learning from examples.

Another distinction can be made between codified knowledge and personal knowledge. According to Eraut (2000, p. 114), *codified knowledge* is public knowledge that is *"subject to quality control by editors, peer review and debate and given status by incorporation into educational programs, examinations, and courses."*. Codified knowledge is acquired through formal learning while absorbing publicly available and accepted information (Eraut, 2000). Personalised knowledge is created when an individual applies codified knowledge in everyday actions, and it consists of different types of knowledge – codified, procedural, process, experiential, tacit, and so on (Eraut, 2000). In other words, codified knowledge is explicit, whereas personal knowledge may be either explicit, implicit, or a combination of both.

An essential dimension of knowledge is *metacognitive knowledge* – i.e. a person's awareness and certainty about their knowledge about something. Knowing something without being certain about it delimits a person's ability to use that knowledge in everyday actions. It is important to note that certainness in something does not necessarily mean that what is believed to be true is in fact true. At the same time, certainty in individual knowledge influences the way in which individuals utilise their knowledge. For example, underestimating one's own knowledge may lead to insecurity in decision-making, whereas overestimation may lead to problems related to overconfidence. Therefore, acting in a knowledgeable way requires metacognitive knowledge, such as awareness and reasonable confidence in one's own knowledge base.

To conclude, contrary to the widespread understanding, not all knowledge can be identified and measured through scores in official tests, as high test scores could result from guessing and good luck. At the same time, people who can luckily guess the right answers might not be confident using factual knowledge in real life.

Awareness and reasonable certainty in knowledge (e.g. not being under- or overconfident) will lead to applying factual knowledge in everyday practice, which will, in turn, lead to developing personalised knowledge. Personalised knowledge will consist of different elements (codified, procedural, process, experiential, and tacit knowledge) and will eventually govern everyday actions and decisions and lead to new learning.

3.3.2   Skills

The main aspects that differentiate skills from knowledge are their *behaviouristic nature* and the ways in which skills are acquired. Polanyi distinguished skills from knowledge, primarily based on how they are acquired. According to Polanyi (1958, as cited in Grant, 2007, p. 175), *"The aim of a skillful performance is achieved by the observance of a set of rules which are not known to the person following them."* Proctor and Dutta (1995, p. 18) (arguably the most authoritative text on skills based on Winterton et al., 2005, p. 12) defined skill as *"goal-directed, well-organized behavior that is acquired through practice and performed with economy of effort".* Proctor and Dutta's definition highlights the behaviouristic nature of skills in addition to how they are acquired. In other words, skills are goal-directed behaviours that are developed over time with practice. Another characteristic of skills is that, with time and practice, skills become more automatic – for example, requiring less mental effort (Winterton et al., 2005).

Skills, combined with effort (time, dedication, and physical and mental energy), enable individuals to perform their intended tasks. Skills are divided into three distinct yet interconnected categories: physical skills, cognitive skills, and noncognitive skills. The root cause for any activity/action to take place is an incentive or motivation. It may be physical (e.g. hunger, cold, etc.) or psychological (e.g. to learn something, achieve something, etc.). The performance of the activity relies on the combination of effort (the energy put into it), physical skills, and mental skills (categorised as cognitive and noncognitive skills) (see **Figure 7**).
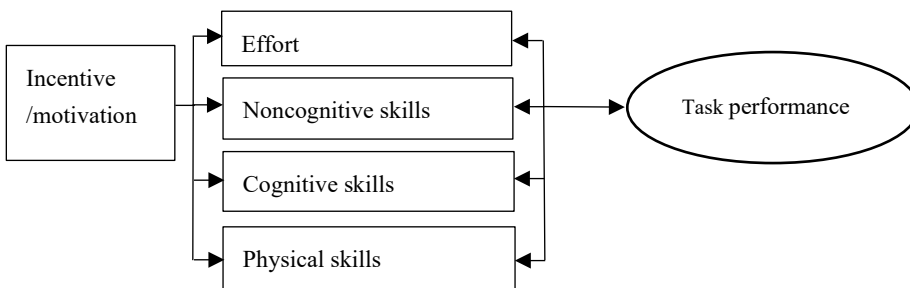
Figure 7.   Determinants of task performance (inspired by a figure in Kautz et. al., 2014).

Each skill category (physical, cognitive, and noncognitive) is divided into smaller categories (see **Table 1**). In the early days, researchers were primarily interested in identifying and developing physical skills (Winterton et al., 2005). However, after a while, it became clear that a cognitive dimension must be considered alongside the physical dimension. Thus, in 1928, Renold (as cited in Winterton et al., 2005, p. 10) defined skill as *"any combination, useful to industry, of mental and physical qualities which require considerable training"*.

Table 1. The division of skills (developed by the author).

Skill category	Definition	Name of skill	Definition	Examples
Physical skills	*"low-level set of processes linked to the transmission to the brain of signals coming from the sensory receptors, to the adjustment of muscle length and forces, and to the regulation of feedback loops involved in the control of movement" (Boyer et al., 2014, p 4)*	Motor skills	*"learned sequences of movements that are combined to produce a smooth, efficient action to master a particular task"* (van der Fels et al., 2015, p 697).	Gross motor skills (walking and jumping); fine motor skills (buttoning clothes, tying shoelaces); bilateral body coordination (walking on a rope); timed performance in movements (racing); object control (throwing a ball in the basket), etc. (van der Fels et al., 2015)
Complex cognitive skills	Ability to consider a variety of context-specific information, adapt to situations, and seek out new knowledge that can be used to solve the problem at hand (Brienza et al., 2018)	Cold cognitive skills	*"mental actions or processes of acquiring knowledge and understanding through thought, experience, and the senses"* (van der Fels et al., 2015, p 698)	Language skills (vocabulary, reading comprehension, spelling, etc.); math skills (math concepts, problem-solving, computation); visualisation skills, reasoning skills, etc. (Farkas, 2003)
		Metacognitive skills	*"individuals' having information about their cognitive structure and being able to organize this structure"* (Oguz and Sahin, 2011, p 3732)	Planning, monitoring, evaluating, self-observation, self-regulation, etc. (Oguz and Sahin, 2011),

Skill category	Definition	Name of skill	Definition	Examples
		Epistemic cognition	Metacognition refers to the *"meta-meta level of cognitive monitoring"*, e.g. *"knowing about knowing in the epistemic sense"* (Kitchener, 1983, p 223)	Constructing several solutions to the same problem, evaluating the solutions, and selecting the best possible solution out of them (Kitchener, 1983); mindfulness, critical thinking, reflective judgement, systems thinking, executive functioning, and argumentation skills (Saiz-Manzanares, 2015, Chapter 4)
Noncognitive skills		Hot cognitive skills	Patterns of thoughts, feelings, and behaviours (Borghans et al., 2008)	Feelings, values, and personality traits, such as extraversion and introversion
		Social skills	Understanding and adapting to social situations (Monnier, 2015)	Communication skills, collaboration skills, argumentation skills, conflict management skills, emotional and social intelligence, etc. (Monnier, 2015)

As cognitive and noncognitive skills are the drivers of effective relationship building and communication in (virtual) teamwork, the next two subsections are dedicated to providing a more profound overview of them.

3.3.2.1   Complex cognitive skills

In virtual teamwork, individuals are often faced with complex problems that require considerable mental effort. The skills that support solving complex problems are called complex cognitive skills. Complex cognitive skills are also referred to as 21st-century skills, deeper learning, critical thinking, and higher-order thinking (Kraft, 2019). Complex cognitive skills involve the ability to analyse context-specific information, adapt to situations, and discover new knowledge that can be used to solve the problem at hand (Brienza et al., 2018). Therefore, many national and international organisations e.g. Organisation for Economic Co-operation and Development (OECD) (2019b) have identified complex cognitive skills as essential

for coping with the challenges of the workplace in the modern economy, such as dealing with contradicting arguments, partial information, and unclear meanings or end goals (Brienza et al., 2018). Complex cognitive skills are a combination of three distinct yet interconnected skills: cold cognitive skills, metacognitive skills, and epistemic cognition. The current dissertation uses a three-level model of cognitive processing (Kitchener, 1983) to understand how complex cognitive skills function. In the three-level model (see **Figure 8**), each level provides a foundation for the next level without subsuming it.
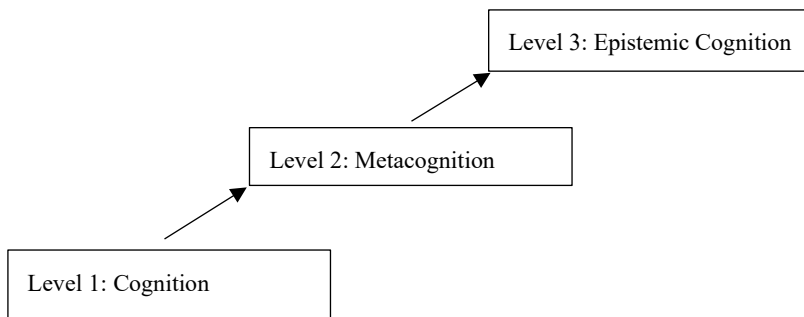
Figure 8.   Three-level model of cognitive processing (developed by the author based on Kitchener, 1983).

Cognitive skills refer to the ability to acquire knowledge and use existing knowledge in various situations. According to Kitchener (1983), *cognition* refers to the ability to develop and manipulate a knowledge base through various processes. According to Bender and Beller (2013), cognitive processes involve perception, categorisation, attention, learning, memorising, thinking, problem-solving, decision-making, and language use. Examples of tasks that are solved using cognitive skills are computing, remembering, reading, and acquiring language (Kitchener, 1983). Cognitive skills are sometimes called cold cognitive skills (Bender and Beller, 2013), as solving these types of tasks does not involve an individual's emotions or feelings.

Metacognitive skills are also referred to as self-management, meta-mentation, meta-learning, and self-regulated learning skills (Oguz and Sahin, 2011; van Meeuwen et al., 2018). Metacognitive skills refer to a person's ability to monitor their own and others' cognitive processes (e.g. learning) (Oguz and Sahin, 2011; van Meeuwen et al., 2018). Thus, the metacognitive process is invoked to monitor activities on the first level: cold cognition. The metacognitive process enhances cognitive effectiveness – for example, by supporting effective learning. The metacognitive process includes planning (before activity), monitoring during

activity, and evaluating (after activity) (Oguz and Sahin, 2011; van Meeuwen et al., 2018). Metacognitive skills consist of several smaller skills and skill sets, such as planning, monitoring, evaluating, self-observation, and self-regulation (Oguz and Sahin, 2011).

Closely related to metacognition is self-efficacy. While metacognition is the executive part of self-management, self-efficacy refers to the belief in one's own abilities (Moores et al., 2006). According to Banduras' general model of self-efficacy (as seen in Moores et al., 2006), self-efficacy determines individual behaviour and indirectly affects performance. This means that, while self-efficacy plays a role in the support of coping, the coping itself (with complex problems) is still based on metacognitive skills (Moores et al., 2006). However, without one's belief in their own ability to cope with difficult situations, the individual might not even try – and thus, the metacognitive skills will not be activated.

Self-efficacy is an important term for the current study, as it plays a role similar to that of the more commonly known terms *growth mindset* and *self-confidence*. Although growth mindset and self-confidence, as mental models, belong to the knowledge aspect, they demonstrate a person's belief in their own abilities, similar to self-efficacy. Although self-efficacy works mostly as a support mechanism (solving complex problems still needs metacognitive skills) (Moores et al., 2006), it could be argued that, in a virtual context, where individuals work mostly alone, the importance of the belief in one's own abilities increases, compared to traditional teamworking circumstances, where peer support can, at least to some extent, replace or at least support the individual beliefs in one's own capabilities.

The third level, *epistemic cognition*, is particularly critical when solving complex problems. According to Kitchener (1983, p. 225), epistemic cognition allows individuals to "*monitor the epistemic nature of problems and the truth value of alternative solutions*". Individuals who believe there is no single correct answer to each problem are better equipped to solve ill-structured problems. These individuals will not become stressed if they cannot find one right answer. Instead, they will construct different solutions to the same problem and select the best solution out of the selection. Epistemic cognition also requires several smaller skills and skill sets, including reflective judgement, critical thinking, systems thinking, executive functioning, and argumentation skills (Saiz-Manzanares, 2015, Chapter 4). Again, epistemic cognition can be considered vital in the virtual teamworking context, since virtual teamwork increases the need to deal with fragmented information, solve complex and ill-structured problems, and so on.

3.3.2.2 Noncognitive skills

Noncognitive skills are also called soft skills, personality traits, noncognitive abilities, and socioemotional skills (Kautz et al., 2014). Noncognitive skills are developed throughout an individual's lifetime through social interactions with others (Kautz et al., 2014). Although noncognitive skills are sometimes not considered as important as *hard skills*, they play an essential role in individual success over one's lifespan (Kautz et al., 2014). They enable individuals to communicate effectively and build relationships, which is especially important in (virtual) teamworking situations. In the current dissertation, noncognitive skills are divided into two subcategories: 1) *hot cognitive skills*, which refer to an individual's emotions, feelings, and personality traits (such as extraverts vs introverts), and 2) *social skills*, which refer to an individual's ability to effectively interact with others.

Hot cognitive skills (also referred to as emotional regulation by scholars studying organisational behaviour; Grandey, 2000) refer to an individual's emotions and feelings and, most importantly, their ability to control emotions in different situations. Hot cognitive skills can be divided into smaller skills and skill sets; however, the most well-known division is called the Big Five framework (see **Table 2**[3]). The Big Five framework divides hot cognitive skills into five categories: 1) openness to experience, 2) conscientiousness, 3) extraversion, 4) agreeableness, and 5) neuroticism/emotional stability. According to the Big Five framework, *openness to experience*, similar to its name, refers to an individual's readiness to be involved in new experiences. Individuals who are high in *conscientiousness* tend to hold their promises and finish the tasks they have started. *Extraversion* refers to an individual's openness to interacting with the external world. Individuals who are high in *agreeableness* are good team players who are ready to act unselfishly. *Neuroticism/emotional stability* refers to an individual's ability to control emotions and emotional reactions (Kautz et al., 2014; Zhang, 2003).

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[3]   The descriptions in the table largely overlap with the original descriptions.

Table 2. The Big Five personality factors (table developed based on Kautz et al., 2014, and Zhang, 2003)

Big Five personality factor	Description	Related facets	Related skills
Openness to experience	The tendency to be open to new aesthetic, cultural, or intellectual experiences.	Open-mindedness, active imagination, preference for variety, and independence of judgement. In addition, people who are high on the open-mindedness scale tend to be less conservative and traditional.	Adaptability
Conscientiousness	The tendency to be organised, responsible, and hardworking.	Purposeful, strong-willed, responsible, and trustworthy.	Impulse control
Extraversion	An orientation of one's interests and energies towards the outer world of people and things rather than the inner world of subjective experience; characterised by positive affect and sociability.	Sociable, assertive, energetic, and enthusiastic. Extraverts prefer to work with other people.	Social skills
Agreeableness	The tendency to act in a cooperative and unselfish manner.	Altruistic, sympathetic, and readily helpful. People who are high on the agreeableness scale value and respect others' beliefs and conventions.	Cooperation skills
Neuroticism/ Emotional stability	Predictability and consistency in emotional reactions, with the absence of rapid mood changes. Neuroticism is a chronic level of emotional instability and is prone to psychological distress.	People high on the neuroticism scale tend to experience such negative feelings as emotional instability, embarrassment, guilt, pessimism, and low self-esteem.	Internal vs external, locus of control, core self-evaluation (self-analysis)

Social skills are also called social competencies and interactive, people, and interpersonal skills (Monnier, 2015). Social skills enable individuals to understand and adapt to a social situation (Monnier, 2015). Social skills are essential for smooth interactions, relationship building, and knowledge acquisition (Monnier, 2015). According to the Social Skills Improvement System developed by Gresham and Elliott (2008, seen in Monnier, 2015), social skills consist of a combination of smaller skills and skill sets that can be identified and measured separately. These

include 1) communication skills, 2) cooperation skills, 3) assertion, 4) responsibility, 5) empathy, 6) engagement, and 7) self-control. Among these, *communication* and *cooperation* skills are two big building blocks of social skills that deserve extra attention, as conceptualising them is not easy. The main problem is that communication and cooperation are broad terms that are frequently used but often understood differently by different people.

A common idea behind different conceptualisations and definitions of *communication* is that it enables information to be transmitted from one party to another (Krauss and Fussell, 1996) but the ways in which information can be transferred from one individual to another can vary greatly, making defining communication difficult (Krauss and Fussell, 1996). For example, should communication as a term cover only *dedicated behaviour* to deliver a message (such as speech, gestures like waving, etc.) or any conduct that takes part in a social setting that conveys a message to another party (such as blushing)? The first approach has been found to be too restrictive, as, based on this approach, blushing cannot be considered part of communication because it happens unwillingly. However, the second approach has been found to be too wide, as, based on this approach, even eye blinks should be considered part of communication. Thus, it has been found easier to focus on what communication *does* rather than what it *is*. According to Rosengren (2000, seen in van Ruler, 2018), communication enables the creation of *meaning*. The way meaning is created depends on the following:

- the context and situation (e.g. face-to-face or virtual, formal or informal, written or verbal), which determines the way information can be exchanged;

- the sender's preferences and abilities to code information into specific units (including verbal and nonverbal cues) and transmit it to the receiver; and

- the receiver's ability to gather all necessary signals and decode them (based on their previously acquired experiences and understandings) to produce meaning.

Social skills can be viewed from three different perspectives: a) topographical, which focuses on the element of social interactions (e.g. verbal and nonverbal communication); b) functional, which focuses on a person's ability to master social situations (e.g. development of relationships, collaborating with others, etc.); and c) information processing, which focuses on a person's ability to receive, process, and share information (Liberman, 1982). All three views are essential in the virtual teamworking context, as a) virtual teamwork includes limited opportunities for reading nonverbal cues, b) it is challenging to imitate real-life social interaction in the virtual environment, and c) the virtual environment increases challenges regarding information exchange, including misunderstandings.

Social skills include several smaller skills and skill sets, which were identified based on three models developed by Riggio (1986), Elliot (2008), and Matson (1983) (seen in Monnier, 2015) (see **Table 3**). These smaller skills include *assertiveness*, which enables individuals to be confident and stand up to themselves in social situations; *cooperation skills*, which highlight the willingness and ability to work with others; *emotional and social self-control* and *emotional sensitivity*, which enable an individual to understand other's emotions and regulate one's own emotions and responses to others*; responsibility*, which means that a person is trustworthy and reliable; and emotional and social expressivity, which refers to a person's ability to express their ideas and feelings publicly.

Table 3. Elements of social skills: Comparison between different approaches and a summary based on the three approaches that will be used in this research (Source: Monnier, 2015)

Matson et al. (1983)	Riggio (1986)	Gresham and Elliott (2008)	Summary of the three models	Description
Assertion		Assertion	**Assertiveness**	Being confident in oneself and able to stand up for oneself as well as support others (for example, by saying something positive)
Cooperation		Cooperation	**Cooperation skills**	Willingness and ability to work together with others
Self-control	Emotional and social control	Self-control	**Emotional and social self-control**	Ability to observe, control, and regulate one's emotions, nonverbal display, and social self-presentation
Empathy	Emotional sensitivity	Empathy	**Emotional sensitivity (empathy)**	Ability to receive and decode the nonverbal communications of others to understand how they are feeling
Responsibility		Responsibility	**Responsibility**	Being trustworthy or dependable
	Social manipulation		**Social manipulation skills**	Ability to manipulate others or alter elements to the situation to affect the outcome
	Emotional expressivity		**Emotional expressivity**	Ability to nonverbally express attitudes and cues of individual emotions and feelings
	Social expressivity	Communication and engagement skills	**Social expressivity and engagement skills**	Verbal speaking skills and ability to engage others in social interaction

Cooperation and *collaboration* are terms that are often used interchangeably. According to theory, *cooperation* refers to a process in which a task is divided into smaller units and performed independently. In contrast, collaboration refers to a process in which participants work together on the same task (Lai, 2011). While some tasks are performed independently during collaboration, the participants are still interdependent while completing the tasks. Although there are numerous definitions of *collaboration*, some common features can be identified, including a) a common goal, b) joint work or interdependence, c) parity or equality, and d) voluntary participation (Slater, 2004). According to Scoular and colleagues (2020), task completion while collaborating includes several activities, such as a) building a shared understanding, b) contributing collectively, and c) regulating (e.g. resolving differences and adapting behaviours). Thus, collaboration is a broad term that covers many different activities. Similarly, *collaboration skill* is a broad concept defined as a *"person's ability to contribute effectively in a group"* and involves several smaller skills and skill sets, such as a) perseverance, b) contributing to team knowledge, c) valuing the contributions of others, and d) resolving differences (Scoular et al., 2020).

To conclude, *skills* are understood in the current dissertation as tactics and routines that enable individuals to solve intended tasks and are acquired through practice. The current dissertation focuses on identifying the *cold cognitive*, *complex cognitive,* and *noncognitive skills,* as the author found these skills to be strongly connected to virtual teamwork–related activities. The author relies on the three-dimensional model of cognitive skills, noncognitive skills, and epistemic cognition regarding complex cognitive skills. Regarding noncognitive skills, the focus is on identifying skills related to hot cognition (e.g. emotions, feelings, and personality traits) and social skills (including communication and collaboration). It is important to note that, while noncognitive skills form an essential part of individual coping mechanisms in virtual teams, they also impact the situational context for other team members. Thus, noncognitive skills are potentially important from two aspects: 1) they help individuals cope with social situations in virtual teams, and 2) they impact the situational context, which can either support or delimit the actualisation of competencies by other team members (see further discussion on situational factors impacting competence actualisation in Chapter 6).

3.3.3   Attitudes

One of the first authors to mention attitudes was Herbert Spencer in 1862 (as cited in Allport, 1984, p. 1):

Arriving at correct judgments on disputed questions, much depends on the attitude of mind we preserve while listening to, or taking part in the controversy: and for the preservation of a right attitude, it is needful that we should learn how true, and yet how untrue, are average human beliefs.

Attitudes started to gain interest among psychologists in the late 19-th century, as they were found to connote the *"neuropsychic state of readiness for mental and physical activity"* (Allport, 1984, p. 2). In laboratory settings, the *task–attitude* relationship was proven, and sociologists, who were dissatisfied with the *instinct hypotheses* and explanations of the *social force,* gradually started to adopt the concept of attitudes (Allport, 1984). Eventually, the interest in attitudes in social psychology grew so large that for a while social psychology was defined as the scientific study of attitudes (Ajzen et al., 2018; Chaiken and Ledgerwood, 2012). Attitudes were considered the key to understanding and explaining human behaviour – and the early work of social psychologists gave no reason to doubt this (Ajzen et al., 2018). Since then, research on attitudes and their relationship with behaviours and situations has informed research in many applied settings, including organisations and management.

In the beginning, the focus was on studying the links between attitudes and behaviour. Early and mostly experimental studies in laboratory settings found positive results regarding the relationship between attitudes and behaviour. However, around the 1930s, some psychologists began to doubt that attitudes could provide insight into how people behave in the real world (Ajzen et al., 2018). New studies (e.g. LaPiere, 1934) started to reveal discrepancies and controversies in attitude research, leading to a more profound doubt that people might say one thing yet act in an opposite way (LaPiere, 1934). These and many other studies that failed to bring the expected results proving the attitude–behaviour relationship led to attitudes being considered simple evaluative tools for measuring favour and disfavour (Albarracin and Shavitt, 2018). A profound analysis of attitude literature by Ajzen and colleagues (2018) explained how the discrepancies in the level of analysis (e.g. mixing general-level attitudes with specific actions) were the primary source of inconsistencies leading to doubt about the existence of the attitude–behaviour relationship.

According to Ajzen and colleagues (2018), general attitudes can predict aggregated actions (e.g. behavioural patterns). For example, a general attitude that indicates favouring charity may be a poor predictor of a single action (e.g. donating money to a local fund for homeless children); however, such general attitudes can predict aggregated behaviours related to charity (donating money to other funds, donating clothes to homeless people, organising a local charity event, adopting, etc.). This pattern is called the *principle of compatibility* and explains how *general*

attitudes can predict only *aggregated behaviours*. At the same time, predicting *specific behaviour* is possible only through identifying an individual's attitude towards the particular behaviour itself (Ajzen et al., 2018). For example, a favourable attitude towards sorting waste can be a good predictor of people sorting waste. Thus, attitudes *can* be used to predict behaviour, but only if the measure of behaviour is representative of the attitude domain, and vice versa (Ajzen et al., 2018). **Figure** illustrates the *principle of compatibility*.

Principle of aggregation:	General attitudes towards an object	↔	Set of behaviours, e.g. behavioural patterns
Principle of compatibility:	Attitude towards a specific behaviour	↔	Specific behaviour (action)
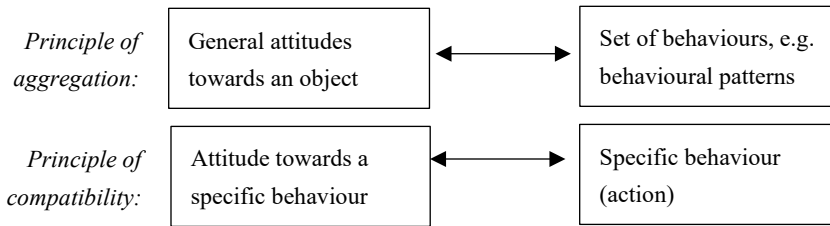
Figure 8. The principle of compatibility in attitudes research (developed based on Ajzen et al., 2018).

In addition to attitudes, other terms, including *motivation*, *engagement*, and *commitment*, are also used to explain why individuals behave the way they do. Researchers have also made a great effort to separate each concept theoretically from each other. The same cannot be said about the industry or management consulting fields, in which the terms are often used interchangeably. Therefore, for the sake of clarity in the current dissertation, it is essential to explain how these terms can be differentiated. The current study turned its lens to *motivation* and *engagement*, as these terms were often used during the interviews with the respondents. According to Judge and Kammeyer-Mueller (2012), there is a significant difference between the concepts of attitudes, motivation, and engagement, while at the same time, they are closely connected with each other in real life. The following discussion highlights the differences and relationships among the concepts.

According to Schunk and DiBenedetto (2020, p 1), *motivation* refers to the *"processes that instigate and sustain goal-directed activities".* According to this conceptualisation, internal (personal) processes manifest in goal-directed actions. Internal processes that lead to *goal-directed actions* have interested researchers for many decades. Attempts to explain why and how people behave the way they do can be summarised under the umbrella of *motivational theories* (Graham and Weiner, 2013). Since as early as 1930, there have been several shifts in the field of motivational theory (Graham and Weiner, 2013). The first shift was from general *all-encompassing theories* to *mini-theories* focusing on analysing specific aspects that influence motivation. Another trend was the shift from a "*person controlled by*

environmental factors to a *person as a rational scientist, decision maker, information processor [...]*" (Graham and Weiner, 2013, p. 65)

As a result of the abovementioned shifts, several *mini-theories* have evolved that aim to explain the processes that tend to increase one's motivation and thus lead to specific actions/behaviours. According to Graham and Weiner (1996) one such theory, developed by Clark Hull (1943, 1951) is the *drive theory.* The drive theory is concerned mainly with mechanical aspects, such as instinct and needs (e.g. hunger, arousal, etc.), that energise an individual to behave in a certain way. Around the 1950s and 1960s, researchers started to pay attention to the cognitive aspects (e.g. reward) that drive motivation. In 1959, Gardner and Lambert (seen in in Crookes and Schmidt, 1991) divided motivation into two groups: integrative and instrumental motivation. According to the authors*, integrative motivation* is related to positive attitudes towards an object (e.g. towards English), which ultimately increases one's incentive to perform an action or behave in a certain way (e.g. learn English). At the same time, *instrumental motivation* refers to more functional reasons behind one's motivation (e.g. getting a better job, receiving a promotion, or passing a critical examination).

Another well-known distinction regarding motivation is *intrinsic* versus *extrinsic* motivation (Deci et al., 2017). Intrinsic motivation refers to motivation that comes from the inside (because of personal interests or enjoyment) without external rewards or prompts (Deci et al., 2017). An example of intrinsic motivation is the motivation of children to play (Deci et al., 2017). Thus, it can be said that integrative and intrinsic motivations are similar, as they come from inside a person without external motivational triggers.

Extrinsic motivation is similar to instrumental motivation, as it involves doing something to attain a certain consequence (Deci et al., 2017). At the same time, it differs from instrumental motivation, as instrumental motivation (similar to intrinsic motivation) refers to motivation that comes from inside the person, while extrinsic motivation is based on external prompts, such as bonuses and rewards (Deci et al., 2017). Sometimes, extrinsic motivation is internalised and becomes intrinsic motivation; sometimes, it remains extrinsic (Deci et al., 2017). The problem with extrinsic motivation when it stays extrinsic is that it can create a feeling of being controlled by someone else (Deci et al., 2017). **Table 4** illustrates the similarities and differences among integrative, intrinsic, instrumental, and extrinsic motivation.

Table 4. The differences and similarities among intrinsic, integrative, extrinsic, and instrumental motivation (developed by the author based on the synthesis of Crookes and Schmidt, 1991, and Deci et al., 2017)

Motivation type	Motivation comes from inside of the person (personal interests, enjoyment)	The expected results are instrumental (bonus, promotion, exam passed)	The motivation comes from external rewards or prompts (such as a bonus package for sales results)
Integrative	X		
Intrinsic	X		
Instrumental	X	X	
Extrinsic		X	X

The motivational aspects (e.g. mechanical, integrative, instrumental. etc.) of the mini-theories' developments and findings do not rule out one another. They form an integrated understanding of personal motivation, summarised by *motivational theory* (Schunk and DiBenedetto, 2020)**.** According to motivational theory, motives can be divided into three interconnected yet distinct categories: a) *environmental aspects*, b) *personal aspects,* and c) *behavioural aspects* (Schunk and DiBenedetto, 2020). *Personal aspects* include cognitions, beliefs, perception, attitudes, emotions and evaluations of self and process towards for example a goal, which can increase or decrease motivation. *Environmental aspects* represent those that are external to a person yet influence the personal aspects; these include social models, instruction, feedback, standards, rewards, and more. *Behavioural aspects* are related mainly to the effort and success of a particular activity. For example, when a certain task is too hard to complete, the motivation to further engage in this activity will likely decline. Thus, considering the relationship between attitude and motivation, attitude is one of many personal aspects that may increase or decrease one's motivation to act or behave in a certain way.

The concept of *engagement* has been criticised by scholars for serving as an umbrella term for whatever one wants it to be (Judge and Kammeyer-Mueller, 2012). For example, engagement is often used interchangeably with terms such as commitment, satisfaction, involvement, motivation, and extra-role performance (Judge and Kammeyer-Mueller, 2012). Still, a systematic review of the literature on the definitions of engagement revealed that the meaning of engagement differs from those of attitudes and motivation. *Engagement* refers to whether and how one directs their energies toward an object (Judge and Kammeyer-Mueller, 2012). The definitions of engagement by Kahn (1990) and Schaufeli et al. (2002) (as cited in Truss et al., 2013, p. 3) explain engagement as a psychological state that entails *physical-energetic (vigour), emotional (dedication),* and *cognitive (absorption)*

components. Thus, it can be concluded that an engaged person would spend more time and energy learning and working on something. Thus, engagement differs from attitudes, as attitudes refer only to the favour and disfavour of an object – not implying any long- or short-term commitment to the object. In addition, while motivation refers to a person's willingness to act or behave in a certain way, engagement refers to a short- or long-term commitment to the activity.

Bailey and colleagues (2017) found positive links between engagement and situational motivation. In addition, studies on student engagement have found that motivation impacts students' behavioural, cognitive, and emotional engagement at school (Anuradha and Vilma, 2019). In contrast, the existing literature on work engagement suggests that engagement may influence employee motivation (Bailey et al., 2017). According to Taris et al. (2014, p. 128), *"Individuals who are intrinsically motivated [...] engage in that activity for its own sake and act with a full sense of volition."* Similarly, Truss and colleagues (2013, p 3) explained that engaged employees "*are able to express their authentic self and are willing to invest their personal energies into their job".* Thus, it is possible to conclude that motivation and engagement influence each other in opposite directions, depending on the situation and context. At the same time, attitudes (positive or negative) may impact one's motivation to act or behave in a certain way and the person's engagement with an object – for example, with the organisation they work for. According to Bailey and colleagues (2017, p 36), *"a range of positive attitudes towards the organization (including satisfaction with managers, communication, and resources*)" can positively impact one's engagement with the company. Studies have also proven a positive relationship between work-related engagement and attitudes (Bailey et al., 2017). Therefore, it can be summarised that engagement, motivation, and attitudes can impact one another in all directions (see **Figure 9**).
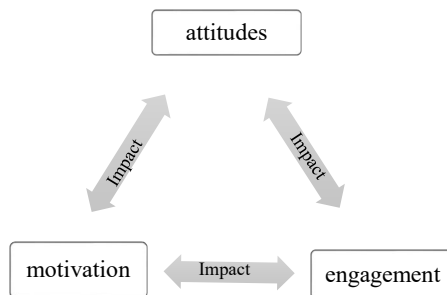
Figure 9. Relationship among attitudes, motivation, and engagement (developed by the author).

To conclude, the current dissertation treats attitudes as individual preferences (favour, disfavour) regarding a specific object or behaviour. It is acknowledged that *general attitudes* can be used to predict *general behavioural patterns* and *specific attitudes* towards a behaviour can predict more specific behaviours. Additionally, it is essential not to mix attitudes with other behavioural predictors, such as engagement and motivation. In reality, engagement and motivation are both strongly connected with attitudes; however, academically, they remain separate concepts and are considered as such in the current study.

3.3.4   Values

In addition to the knowledge, skills, and attitudes commonly referred to as an integral part of competencies, official reports by the OECD (2019b; Piacentini and Barrett, 2018) highlight *values* as an essential part of competencies. Adding *values* to the definition of competency might be related to organisations turning more and more towards value-based hiring. Four aspects can explain the stronger focus on values during employee selection. First, the fit between people's values and their work environment is related to higher job and work satisfaction (Sagiv et al., 2017; Tee, 2020), organisational commitment, and increased job performance (O'Reilly et al., 1991; Tee, 2020). Second, it is relatively easier and less time consuming to develop personal knowledge and skills than values and attitudes that are less malleable. Third, self-reported values have been found to predict various attitudes, preferences, and behaviours (Petty et al., 1997; Sagiv et al., 2017). Fourth, the ways in which values are understood by different individuals are relatively stable across cultures (Schwartz, 2006). Therefore, value-based hiring supports the development of teams in which individuals possess similar values across national and cultural borders – which is especially important in virtual teams.

Personal values can be defined as "*broad desirable goals that serve as guiding principles in people's lives*" (Sagiv et al., 2017, p. 3; see also Arieli et al., 2020). While all values represent individual goals, not all goals can be considered values (Arieli et al., 2020). For example, independence is one such goal that a person most likely incorporates into many different contexts – at work, with family, and with friends – and therefore can be considered a value (Arieli et al., 2020). At the same time, finishing a master's thesis is a specific goal that applies only in certain contexts and thus cannot be considered a value (Arieli et al., 2020). The aim of fulfilling certain goals is based on the individual's wish to experience positive feelings connected to the values (Rohan, 2000). Values are considered the core of one's self-concept and, thus, do not change as often as goals do (Bardi and Goodwin, 2011; Sagiv et al., 2017). Therefore, it can be summarised that values represent broad (and

relatively stable) individual goals and can be used to predict individual attitudes and behaviours in different settings.

There is also a clear distinction between *values* and *attitudes.* For example, many people may say that they value new technologies, while some like to try new technologies and others do not. People who value new technologies but do not like to try them themselves may accept that new technologies are helpful, leaving it up to others to test and experiment with them. Therefore, attitudes work as a more precise tool for predicting behaviours. It has also been found that values are relatively stable - especially in adulthood (Sagiv et al., 2017) whereas compared to values, attitudes are more malleable, and can be changed when a person is exposed to new information or experience (see for example Chaiken & Ledgerwood, 2012, Albarracin & Shavitt, 2018). To summarise, the trans-situational nature of values and the stability of values differentiate them from attitudes and specific goals, which usually refer to particular actions, objects, or situations and change more easily (Arieli et al., 2020).

Motives and *traits* are other terms that might be confused with values. According to theory, *motives* are trans-situational, like values. However, unlike attitudes, goals, and values, motives (such as hate, envy, etc.) may also be personally undesirable. Traits, similar to values, are often perceived as desirable. Therefore, having some desired traits in mind, people may take actions (e.g. training) to achieve these traits. Thus, traits are somewhat similar to values, as they can motivate and predict behaviour. At the same time, people are usually more satisfied with their values than with their traits, meaning that they wish less to change their values than their traits. Therefore, values are more constant and less malleable than traits. **Table 5** illustrates the main differences among values, attitudes, goals, motives, and traits (Arieli et al., 2020)**.**

Table 5. Summary of similarities and differences among values, motives, goals, attitudes, and traits (developed by the author).

	Broad (e.g. trans-situational)	Specific (applied in particular contexts and situations)	Desirable	Sometimes undesirable	Stable (change less often)	Less stable (change more often)
Values	X		X		X	
Motives	X			X		X
Goals		X	X			X
Attitudes		X	X			X
Traits	X		X			X

Turning back to values, different studies have indicated that values act as antecedents in self-persuasion processes when people need to protect their integrity and self-identity (Sherman and Cohen, 2006; Arieli et al., 2014). Moreover, studies have shown that the meanings of different values are relatively similar across different cultures, although there is significant variance in terms of the importance attributed to values within and across cultures (Schwartz, 2006; Lönnqvist et al., 2013; Sagiv et al., 2017). The variance in values means that personal values are ordered in hierarchies according to their subjective importance to the person (Sagiv et al., 2017; Arieli et al., 2020).

In 2006, Schwartz developed a *value theory* in which he identified 10 fundamental values recognised by all cultures around the world (see also Lönnqvist et al., 2013; Sagiv et al., 2017). This model soon became prevalent in value-based studies, such as those related to value and organisational fit, value and occupational fit, and so on. According to De Clercq et al. (2008), the main reason behind the popularity of the value theory is its internal consistency and recognisability across cultures. According to Schwartz (2012), values help individuals cope with the three basic requirements for survival in social contexts: a) biological requirements, b) social requirements, and c) the functioning and survival of groups. Schwartz's (2012) value theory defines 10 universal values grounded in one or three of the abovementioned needs and based on the goal that underlies them (see **Table 6**). For example, the central motivational goal for benevolence is to take care of close contacts by enhancing their welfare (Schwartz, 2012)

Table 6. Ten fundamental values based on Schwartz (2006; adapted from Sagiv et al., 2017, and Albrecht et al., 2020).

10 basic values	Definitions based on Shwartz's (2006, p 1) original model	19 values and their definitions in the refined values model (Schwartz, 2012, p 669)*	10 basic values in the work context (Albrecht et al., 2020, p 536–537)**
Self-direction	*"Independent thought and action— choosing, creating, and exploring"* (freedom, creativity, independence, choosing one's own goals, curiosity)	Freedom of thought – the freedom to cultivate one's own ideas and abilities Freedom of action – the freedom to determine one's own actions	To make one's own decisions at work; to decide what one will do at work; to determine how one will spend their day; to be able to direct one's own work; to decide one's own priorities at work
Stimulation	*"Excitement, novelty, and challenge in life"* (exciting life, varied life, daring)	Unchanged	To do varied work; to experience a wide variety of tasks; to get greater variety in one's work; to experience a variety of challenges; to never be bored by repetition
Hedonism	*"Pleasure and sensuous gratification for oneself"* (pleasure, enjoying life, self-indulgent)	Unchanged	To have pleasurable experiences; to enjoy one's time at work; to have fun; to do things that make one feel good; to enjoy oneself
Achievement	*"Personal success through demonstrating competence according to social standards"* (ambitious, capable, influential, successful)	Unchanged	To advance one's career; to increase one's earning power; to be seen as successful; to get promoted; to be ambitious
Power	*"Social status and prestige, control or dominance over people and resources"* (social power, wealth, authority)	Dominance – power through exercising control over people Resources – power through control of material and social resources Face – security and power through maintaining one's public image and avoiding humiliation	To have authority over other people; to have authority over limited resources; to determine how money is spent; to have authority over other people's work programs; to make decisions about who does what
Security	*"Safety, harmony and stability of society, relationships, and self"* (social order, national security, family security, reciprocation of favours, clean)	Personal security – safety in one's immediate environment Societal security – safety and stability in the broader society	To contribute to the safety of colleagues; to ensure that danger is minimised; to maximise the safety of the workplace; to make a positive contribution to safety and security; to make a safer workplace

10 basic values	Definitions based on Shwartz's (2006, p 1) original model	19 values and their definitions in the refined values model (Schwartz, 2012, p 669)*	10 basic values in the work context (Albrecht et al., 2020, p 536–537)**
Conformity	*"The restraint of actions, inclinations, and impulses that are likely to upset or harm others and violate social expectations or norms"* (politeness, self-discipline, respect for elders, obedient)	Conformity of rules – compliance with rules, laws, and formal obligations Interpersonal conformity – avoidance of upsetting or harming other people	To work in an orderly work place; to work in a group in which people believe that rules are important; to work in a group in which everyone supports the organisation's policies; to work in a job in which one can contribute to the respect for the organisation's rules; to work with colleagues who respect rules even when no one else sees them
Tradition	*"Respect, commitment and acceptance of the customs and ideas that traditional culture or religion provides"* (respect for tradition, modest, humble, accepting my portion in life, devout)	Tradition – maintaining and preserving cultural, family, or religious traditions Humility – recognising one's insignificance in the larger scheme of things	To be able to support the traditions of one's society at work; to be able to work according to the values of one's family; to do work that is in keeping with one's religious beliefs; to do work that society would support
Benevolence	*"Preservation and enhancement of the welfare of people with whom one is in frequent personal contact"* (loyal, responsible, honest, helpful, forgiving)	Dependability – being a reliable and trustworthy member of the in-group Caring – a commitment to the welfare of in-group members	To help the people one comes in contact with; to support the people one meets at work; to do work that helps other people; to be supportive of other people; to improve the lives of people one encounters at work
Universalism	*"Understanding, appreciation, tolerance, and protection for the welfare of all people and of nature"* (equality, unity with nature, wisdom, the world of peace, the world of beauty, social justice, broadminded, protecting the environment)	Concern – a commitment to equality, justice, and protection for all people Nature – preservation of the natural environment Tolerance – acceptance and understanding of those who are different from oneself	To protect the environment; to contribute to environmental sustainability

* and ** descriptions kept mostly similar to the original source

In 2012, Schwartz proposed additional *subcomponents* to the original model to, according to Albrecht et al. (2020, p. 532), *"provide greater heuristic and explanatory power"*. Still, the original 10-factor model remains the most popular and widely cited (Albrecht et al., 2020). In 2020, Albrecht and colleagues developed work-specific values based on Schwartz's original 10-factor model. They argued that *context-specific* attitudes are better predictors of *specific* behaviours than *general* attitudes (Albrecht et al., 2020). Their context-specific value design, in addition to Schwartz's (2006, 2012) 10-factor model, can be considered useful when identifying values governing successful participation in virtual teamwork.

In addition to defining and explaining the universal values, Schwartz presented in 1992 a model explaining the conflicts and congruences between the 10 fundamental values. According to this model (see **Figure 10**), neighbouring values in the circle reflect compatible goals. For example, the value of benevolence is often congruent with the value of universalism, as both values, in essence, are sensitive to the needs of others (Lönnqvist et al., 2013). In contrast, values opposite each other on the value circle reflect conflicting goals (Lönnqvist et al., 2013). For example, the value of stimulation often conflicts with the importance of tradition and security. Hence, individuals who value tradition and security are likely not open to change and risk taking.
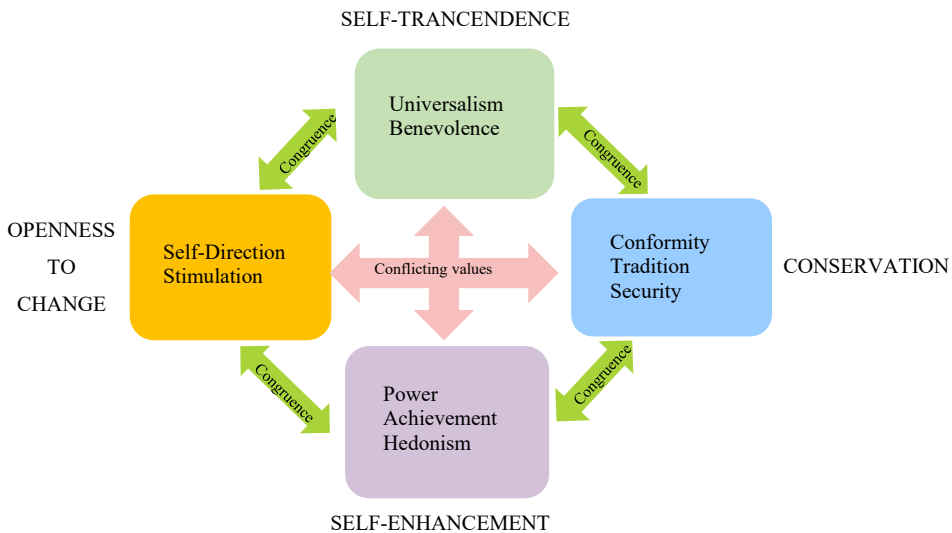
Figure 10. Congruence and conflicts between values (adapted from Lönnqvist et al., 2013; modified by the author to better show congruence and conflicts between the values).

Compatibility (and conflicts) between values is important to know when identifying values that are part of virtual teamwork–related competencies. It helps identify potentially conflicting results, for example, when interviewees mention

conflicting values. This model can also aid in identifying underlying values that can always be considered applicable in virtual teamworking – such an opportunity is discussed in more detail in Section 5.9.

To conclude, in the current study a clear distinction is made between values, motives, goals, attitudes, and personality traits. It can be concluded that from all of the ones mentioned, values are most stable and broad (trans-situational) and something that individuals are proud of (e.g. values are desirable) Also, while values govern individual behavior in various settings, they themselves are poor predictors of specific behavior (as they are too broad). What values can predict is persons willingness to engage to a context, people or activity that support their trans-situational goals (like being independent or caring for the environment). Schwartz's original (2006) and refined (2012) models and Albrecht and colleagues' (2020) values at work are used to develop the virtual teamwork competence framework.

3.4 Competence frameworks and approaches to their development

Competence frameworks (also called models) are standardised descriptions of competencies and their characteristics in a specific context (Lilleväli and Täks, 2017). According to Mulder (2015), what mainly differentiates the efforts of developing competency frameworks is their approaches, which vary from more generic (e.g. "The Great Eight" by Bartram, 2005) to task- or context-specific (e.g. "CanMEDS 2005 Framework" by Frank and Jabbour, 2005). According to Mulder (2015), *functionality* e.g. the competence inter-relatedness with the context is the primary aspect to consider when compiling competence frameworks. However, additional aspects are important to know before crafting a competence framework.

One such aspect is the distinction between *core* and *peripheral* competencies. According to Lahti (1999), the term *core* means that it is a crucial factor or foundation. Although the terms *core competency* or *core competence* are more often associated with organisational studies, they can also be used in studies on the individual level (Lahti, 1999). According to Eden and Ackermann (2000), core competencies are vital to achieving end goals, and peripheral competency is the opposite of core competency. At the same time, one must be careful about neglecting some seemingly peripheral competencies, as sometimes peripheral competencies may be a vital support to core competencies (Lahti, 1999).

Another element to consider is the difference between *task-based* and *behavioural* competencies. Competence frameworks, which use a task-based approach, focus on identifying knowledge and skills related to well-defined tasks (Vakola et al., 2007; Mulder, 2015). The risk with a task-based competency approach is that the outcomes are relatively static and thus limit an organisation's potential to

adapt to evolving strategies based on changes in the external environment (Vakola et al., 2007). The behavioural approach to developing competence frameworks derives competencies from behavioural work samples, videos of real situations or simulations, direct observations, or behavioural event interviews (Boyatzis, 2009). As discussed earlier, the risk of using a behavioural approach is that the resulting competence framework could be too generic. Therefore, the *functional approach*, which considers both task-based and behavioural elements, has been considered a middle road that helps overcome the risks related to choosing either task- or behaviour-based methods.

Competencies can also be identified based on *functions* and *roles*. When using the function–role approach to competence development, researchers first distinguish the expectations of certain roles/functions and then tie these expectations with competencies that enable fulfilling the expectations. The *superior-or-threshold* competencies approach is another way to identify competencies. According to Soderquist and colleagues (2010), superior competencies (also known as differentiating competencies) help identify outstanding employees among average employees. According to the same source, threshold competencies are the basic characteristics that all employees need to perform their jobs. Threshold competencies are often seen as *"entry-level"* competencies that must be ensured when tasks or responsibilities change (Soderquist et al., 2010). Two other aspects might be helpful to consider when creating competency frameworks (Woodruffe, 1993, p. 34): *time* and *seniority*. Regarding time, competencies must be reviewed to decide whether they are likely to increase in importance or become less important over time (Woodruffe, 1993). While seniority of competencies shows which competencies are core throughout the persons whole career, which drop out with seniority, and which become important only when seniority increases (Woodruffe, 1993).

When competency lists are created, competencies are usually categorised to allow for a better overview and operationalisation. Competencies can be categorised in several ways. One way to organise them is based on seniority. A more widely used way to categorise competencies is based on topics – for example, through DigComp (Ferrari, 2013) or EntreComp (European Commission, 2018). A third way of categorising is based on the competence typology developed by Le Deist and Winterton (2005), which includes four categories: 1) conceptual competencies (e.g. cognitive competencies, knowledge, and understanding), 2) functional competencies (e.g. psycho-motor and applied skills), 3) personal meta-competencies (e.g. learning to learn, problem-solving, etc.); and 4) personal social competencies (e.g. social behaviours and attitudes).

3.5　　Summary of the literature on competences

To summarise, competence is considered a generic capability of a professional and refers to a set of competencies (competency in the singular) (Mulder, 2015). Competencies (competency) in the current study consist of a combination of the following elements: knowledge, skills, attitudes, and values. The theoretical approach to the concept of competence and its related attributes (see **Figure 11** at the end of this section) was developed based on the synthesis of the available literature presented in the current chapter. The following discussion reveals the logic and potential practical and theoretical implications regarding the choices made when approaching competencies in the current thesis.

When identifying knowledge, the current study seeks *personalised knowledge*, as it is a better predictor of individual behaviour (compared to factual knowledge). This approach may have interesting theoretical and practical implications since, so far, the competence frameworks that have been developed in virtual teamwork have not specifically determined which kind of knowledge is included in the frameworks. From a practical standpoint, differentiating between factual knowledge and personal knowledge is important, as personal knowledge helps better forecast employee behaviour. Thus, even if the factual and personal knowledge looks the same on paper (e.g. in a CV), it is important to ask for real-life examples that illustrate that the candidate has personalised the knowledge through activities. In addition, in the training process, it is important to allow employees to apply their learning as soon as possible so that factual knowledge can become personalised knowledge. From a theoretical perspective, differentiating between factual knowledge and personal knowledge is important, as it opens up new dialogue about the knowledge that supports and helps forecast individual behaviour.

Skills are considered tactics and routines that enable individuals to solve intended tasks and are acquired through practice. The focus is on identifying *complex cognitive skills,* which consist of cold cognitive skills, metacognitive skills, and epistemic cognition, and *noncognitive skills,* which consist of hot cognitive and social skills. Complex cognitive skills are considered important in virtual teamwork, as they help solve complex problems, deal with ambiguity, scattered information, and so on. Noncognitive skills can be considered important from two perspectives: they 1) enable individuals to deal with the social aspects of virtual teamwork and 2) determine the social situation (context) for individuals themselves and their colleagues. It is also important to note that noncognitive skills (like all other skills and competence attributes) work in combination with other skills, values, and attitudes. However, noncognitive skills (especially social skills) are often the ones that represent the other less visible competencies that a person has. For example, when a team is facing some obstacle regarding technology, the solution to the

problems is developed by using complex cognitive skills but is expressed to other team members through social skills.

Attitudes are considered in the current study as *positive or negative evaluations* of an object, activity, or behaviour. Attitudes, especially *specific attitudes*, work as good predictors of certain behaviours. For example, suppose a person likes to try new technologies. This is a better predictor of adapting to new collaboration tools within the virtual team's framework than a person liking technology, which is too general a statement to lead to a specific behaviour (experimenting with new technologies). At the same time, some general attitudes can also be considered important. For example, a positive attitude towards teamwork might be a good predictor that the person is a "team player" compared to someone who prefers working alone.

Defining and delimiting what is considered attitudes has important theoretical and practical implications. First, theoretically, in competence frameworks, attitudes are unfortunately often treated as a box in which to put everything that does not fit under knowledge and skills (e.g. Ferrari, 2013; Krumm et al., 2016), which creates inconsistencies among competence literature. At the same time, from a practical viewpoint, attitudes, especially specific attitudes, can work as better predictors of certain behaviours than skills. For example, a person with specific skills might not use them in work if they do not have a supportive attitude for doing so. At the same time, not having the right skills but having the right attitudes can work as an important prerequisite for acquiring skills that are currently missing. For example, a positive attitude towards learning new technologies can be considered more important than certain technological skills, as technologies develop quickly and the skills of today may become obsolete tomorrow. Therefore, it is essential to spend effort determining the attitudes that support virtual teamwork to provide theoretical and practical insights.

Finally, values are considered individuals' abstract, general goals that are applicable in various contexts and situations (Arieli et al., 2020). An important aspect of values is that, although two people may express that they have similar values (e.g. value for independence), these values determine their behaviour only if they are high on the individual's value list. For example, although all individuals hold more or less similar values (independence, security, benevolence, control), what differentiates their behaviour from each other is how they prioritise these values. For example, suppose that independence is high on an individual's value hierarchy. In this case, it can be assumed that this person also likes working in virtual teams, since virtual teamwork provides individuals with increased autonomy in decision-making (see Shin, 2004, for more propositions regarding values and their relationship with virtual work). However, suppose that security is high on an individual's value list. In that case, this person might dislike working in virtual teams, since virtual teamwork

includes more ambiguities than traditional teamwork, which may make the person feel insecure about their decisions and actions.

Turning the lens towards values is especially interesting, both theoretically and practically, since values have not been included in the most commonly used definition of competence. For example, most competence literature treats competencies as a combination of *knowledge, skills,* and *attitudes* (Le Deist et al., 2005), leaving *values* unintended or treating them as attitudes or as part of the "other characteristics" [referring to the knowledge, skills, attitudes, and other characteristics (KSAO) approach used for example in Krumm et al., 2016]. At the same time, parallel to competence research is a whole stream of literature (mostly in organisational psychology, but also in applied psychology) that studies the role of values at work and how values can work as predictors of certain attitudes and behaviours (e.g. De Clercq et al., 2008; Albrecht et al., 2020; Arieli et al., 2020). Virtual team literature also includes a couple of studies that have focused on values and their role in virtual teamwork (e.g. the study by Mockaitis et al., 2012, on the role of cultural values in virtual teamwork). However, the focus on values in virtual team competence studies is still very rare.

Following the above-discussed line of thought regarding values, it is expected that, from a theoretical perspective, including values in the competence framework developed under the current study will help systematise existing knowledge about the role of values in virtual teams and provide new insight into the role of values in virtual teamwork. From the practical side, the inclusion of values in the competence framework is expected to provide stronger practical utility to HR managers, as value-based hiring supports the development of teams in which individuals possess similar values across national and cultural borders – which is especially important in virtual teams.

Attitude is an evaluative judgement (positive or negative) regarding an object, behaviour, or activity.

Personalised knowledge is a combination of knowledge elements (e.g. factual, conceptual, procedural, and metacognitive knowledge) that have been personalised through action.

Value is a general goal that guides individuals' attitudes, judgements, and actions.

Complex cognitive skills consist of cognitive, metacognitive skills, and epistemic cognition. Noncognitive skills consist of hot cognitive and social skills.
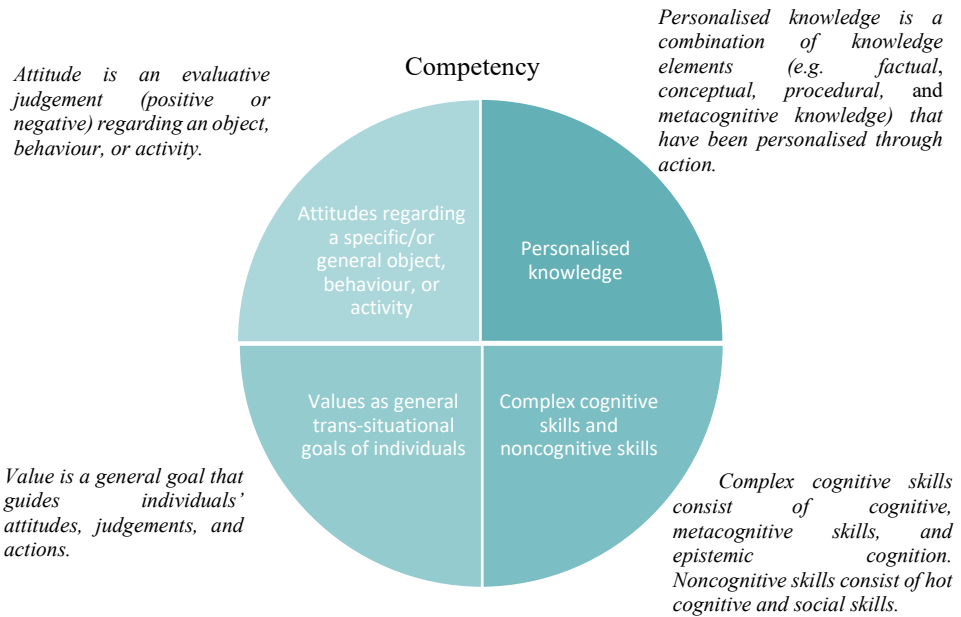
Figure 11. Conceptualisation of competence attributes in the current study (developed by the author).

A functional approach considering both behavioural and task-based characteristics is used in this study to develop the virtual teamwork–related competence framework. As the study aim is that competencies must be recognisable, understandable, and actionable, descriptions of competent individuals are created with the help of narrative analysis. Competencies are categorised using the topic-based approach (e.g. bundling similar competencies together). After identifying the competencies, the situational characteristics are analysed, which will help in understanding the mechanisms that firms and teams can use to maximise the potential of competence actualisation. This type of analysis presents an additional level of holism for developing competence frameworks. The extra level of holism regarding competence framework development is rooted in P-E fit theory (see Shin, 2004, for more details) and supported by the selected research paradigm (critical realism), data analysis, and gathering methods (qualitative approach, collective case–study method, narrative analysis), which are discussed in more detail in the "Research Design" chapter (Chapter 7).

4   The Key Constraints on Individual Effectiveness in Virtual Teams Based on Theory

The academic discussion of the implications of virtual teamwork for firms, teams, and individuals can be divided into two large groups: virtual teamwork as an *enabler* and virtual teamwork as a key *constraint*. From an enabling perspective, virtual teamwork allows organisations to reduce travel expenses, recruit talent worldwide, and react quickly to global trends (Dekker and Rutte, 2007; Settle-Murphey, 2012). From a teamwork perspective, virtual teamwork enables projects to be run 24/7 and establish valuable connections around the globe (Harvey et al., 2004). From an individual perspective, virtual teamwork increases flexibility in the time and place where work is accomplished, which allows for finding a better balance between work and personal life and increases individual autonomy, therefore increasing individual satisfaction related to work (Purvanova and Kenda, 2018).

From a constraining perspective, research on virtual teamwork presents several impediments that such collaboration brings to organisations, teamwork, and individuals. From an organisational perspective, the implementation of virtual teamwork has been seen to create a need to make additional investments in the technology (Maes and Weldy, 2018), renew the existing organisational culture (Maes and Weldy, 2018), and develop virtual team–related leadership competencies (Maduka et al., 2018). From a teamwork perspective, virtual teamwork can cause problems related to communication (Daim et al., 2012; Dekker and Rutte, 2007; Scott and Scott, 2013), trust (Jarvenpaa et al., 1998; Kanawattanachai and Yoo, 2002; Breurer et al., 2020), knowledge sharing (Martins et al., 2004), coordination (Rosen et al., 2007), and monitoring the progress of team members (Gilson et al., 2015).

Careful analysis of the literature on virtual teamwork–related constraints shows that most of the academic discussion about constraints related to individuals practicing virtual teamworking focuses on identifying *boundaries* that negatively impact virtual teams and team members. The underlying assumption regarding the boundary-based view is that boundaries are generic and apply to all virtual team members. In contrast, the *experience-based* approach, introduced by Chudoba and colleagues in 2005, states that a boundary becomes problematic only when an individual perceives it, and only if a

negative effect of a boundary crossing, such as *discontinuity*, has been experienced is there a need to create *continuities*. Continuities can be created by changing behaviours and norms and learning new competencies, among other ways (Chudoba et al., 2005).

To build competence frameworks, such as that in the current study, all boundaries must be identified and considered. However, boundaries are too generic to provide a basis for developing a competence framework. Therefore, a more comprehensive understanding is needed regarding if and how the boundaries are perceived by a variety of people with differences in virtual teamworking experiences, team stages, and so on. To allow the development of a virtual teamworking competence framework and to answer the first RQ in this study, a comprehensive overview is developed in which both virtual teamwork–related boundaries and possible experiences (discontinuities) are identified.

After careful analysis of the academic articles, virtual teamwork's main boundaries can be summarised as *physical dispersion*, *temporal dispersion*, *technology*, and *diversity*. *Physical dispersion* refers to both spatial dispersion (geographic distance) and configurational dispersion, including a) site (locations where team members work), b) isolation (locations where team members work alone), and c) imbalance (locations with an uneven distribution of team members) (O'Leary and Cumming, 2007). *Temporal dispersion* refers to the time difference among team members (O'Leary and Cumming, 2007). *Technology* use refers to the increased dependence on ICT in virtual teams. *Diversity* refers to functional differences, organisational differences, and cultural differences (Daim et al., 2012). Functional differences are differences in communication styles, knowledge bases, and reactions, for example, those of engineers versus marketers (Daim et al., 2012). Organisational differences are differences in organisational cultures and working styles, for example, those of Apple and IBM. Cultural differences refer to differences based on nationalities and cultures, for example, collectivism versus individualism.

These boundaries – physical distance, temporal distance, technology use, and diversity – can lead to several constraints experienced by virtual team members. After analysing the academic articles, it was possible to divide virtual teamwork–related constraints into eight connected yet distinctive categories:

- Communication,
- trust and relationships,
- collaboration and coordination,
- team feeling,
- ICT and technology,
- leadership,
- physical and mental health, and
- self-management.

Figure 12 illustrates the relationship between the eight categories of constraints and the main boundaries related to virtual teamworking.

Boundaries	Examples of discontinuities experienced by virtual team members

Physical dispersion	Communica-tion	Decrease in information richness, delays, lack of instant feedback and clarifying options, different intercultural communication behaviours, lack of language proficiency, etc.
Technology	Trust and relationships	Difficulties in establishing trust and relationships without the opportunity to see each other face to face, spend time socialising, etc.
Temporal dispersion	Collaboration and coordination	Differences in organisational cultures, lower awareness of colleagues and their context, present difficulties in developing common ground and alignment in incentives and goals, lower presence of others (motivational sense).
Diversity	Team feeling	Fewer opportunities to develop team cohesion since communication is fragmented and there are fewer opportunities for face-to-face meetings, which makes it harder to develop team feeling, etc.,
	ICT and technology	Uneven levels of technical competence of team members and unreliable nature of technology, which cause resistance and frustration that inhibit adopting new technologies and lead to inappropriate task–technology fit.
	Leadership	Challenges related to management and difficulties in developing common ground and aligning incentives and goals
	Physical and mental health	Lower awareness of colleagues and their context, presence of others (motivational sense), isolated working, spatial dispersion, temporal dispersion, etc.
	Self-management	Higher demands regarding self-management to start working, take pauses, etc.

Figure 12. Main boundaries and related constraints in virtual teams (developed by the author based on O'Leary and Cumming, 2007; Schulze and Krumm, 2017; and Morrison-Smith and Ruiz, 2020).

Constraints related to the previously mentioned categories are analysed in more detail in the following sub-chapters - alongside the reasons why these categories are worth highlighting in the context of virtual teamwork. Since the virtual teamwork

competence framework developed in the current study looks at a broad array of competencies, the researcher will provide a short overview of the key constraints, not opening up some of the topics as broadly as they have been addressed in the literature. For example, leadership is a topic that has received much research attention; however, in the current study, leadership is approached as one category of the developed competence framework – which determines how the leadership literature is approached and summarised.

4.1 Communication, ICT, and technology-related constraints

Based on the literature analysis, increased use of ICT instead of face-to-face communication can create problems due to low information richness (especially when text-based media is used) (Schulze and Krumm, 2017). Digital communication can result in miscommunication due to a lack of social cues (e.g. hand gestures, facial expressions, etc.) (Schulze and Krumm, 2017) and a lack of immediate feedback and possibilities for instantly solving ambiguities (Krumm et al., 2016). In addition, ineffective task–technology fit (e.g. using text-based media for conflict resolution) can cause ineffective communication (Schulze and Krumm, 2017). Physical distance and time differences increase the use of asynchronous media, which can increase time lags in information exchange (Schulze and Krumm, 2017) and misunderstandings of written text (Morrison-Smith and Ruiz, 2020). Moreover, information exchange is complicated when some team members are co-located and others are not. Co-located team members often share more details with the colleagues next to them than with their dispersed colleagues (Powell et al., 2004; Morrison-Smith and Ruiz, 2020). Additionally, culturally diverse teams may experience misunderstandings due to different languages (Daim et al., 2012) and variance in intercultural communication styles (Schulze and Krumm, 2017).

In addition to task-related communication challenges, research has found that virtual team communication tends to become more task-focused, reducing the time spent on socialising, building relationships, and so on (Morrison-Smith and Ruiz, 2020). Moreover, studies on virtual teams have indicated that virtual communication, where members are protected by miles of distance and computer screens, might increase aggressive and disrespectful communication behaviour (Lee, 2009), which, in turn, may have negative effects on trust, relationships, information exchange, and more.

At the same time, supporting the discontinuities (e.g. experience-based) approach, studies have shown that communication is not perceived as a constraint on collaboration by all virtual team members. For example, in a study conducted by Garro-Abarca and colleagues (2021) among software developers, some respondents

said that communication is a factor that must be improved in terms of quality and frequency because initial instructions that are given in virtual teams are often not enough. At the same time, some respondents in the same study viewed communication as a natural factor of virtual teamwork, not seeing any difference between virtual and face-to-face communication. Interestingly, in a study conducted in Estonia among 44 organisations that received a Remote Working Badge in 2020 (Targa Töö Ühing, 2020), some representatives indicated that the use of virtual teamwork actually improved communication in their teams/organisation. Thus, the challenges related to communication are perceived differently based on several aspects, such as experiences, competencies, preferences, the nature of the task, and the team composition.

Lower or uneven levels of ICT literacy may also create problems related to communication and information exchange, as individuals with lower levels of ICT literacy find it harder to adapt to more sophisticated collaboration technology (with videos, etc.). Poor task–technology fit has also been reported to have a negative impact on virtual team members (Schulze and Krumm, 2017; Morrison-Smith and Ruiz, 2020). The scattered nature of information through asynchronous media can distract members' attention and focus, thus lowering the amount of time and energy spent on the most critical tasks (Schulze and Krumm, 2017; Morrison-Smith and Ruiz, 2020). Using text-based and asynchronous media can create misunderstandings and delay feedback, thus slowing decision-making processes, which may negatively impact overall performance within a virtual team (Schulze and Krumm, 2017; Morrison-Smith and Ruiz, 2020). Virtual teamwork has also been found to increase risks related to data security and cybersecurity since people work from untrusted connections (Ferrari, 2013).

Again, technology-related discontinuities are not experienced by all members of all virtual teams in the same way. Factors such as experience with the task, the nature of the task (e.g. the interdependence of the task), and experience with ICT tools all impact team members' perceptions of ICT in virtual teams (Morrison-Smith and Ruiz, 2020). For example, when team members have experience with the task at hand, know each other's working styles, and can use complex ICT tools, they might not experience ICT-related discontinuities (Morrison-Smith and Ruiz, 2020). In addition, organisation-level support factors, such as organisational structure, leadership style, levels of independence, and the availability of quality tools (hardware and software), are just some of the many factors that impact the overall ICT-related experience of virtual team members (Morrison-Smith and Ruiz, 2020).

4.2   Interpersonal trust and relationships

A lack of social cues in virtual communication and a higher task focus have been found to negatively affect trust and relationships in virtual teams (Schulze and Krumm, 2017). Interpersonal trust, however, is one of the determining factors in effective collaboration in virtual teams (Song and Thompson, 2011), as trust determines whether team members ask each other questions, share feedback, and discuss issues and conflicts (Morrison-Smith and Ruiz, 2020). A lack of interpersonal trust in virtual teams has been associated with 1) an inability to coordinate tasks effectively, 2) an inability to cooperate effectively, 3) decreased eagerness to communicate with team members, 4) decreased willingness to take the initiative, 5) an inability to systematically cope with unstructured tasks and uncertainty, 6) a lack of empathy towards team members, and 7) decreased eagerness to share feedback on each other's work. Therefore, it is unsurprising that some researchers have pointed out that building trust in a virtual team is more important than solving technical issues (Morrison-Smith and Ruiz, 2020).

A widely known distinction regarding trust is the differentiation between *swift* (e.g. cognitive and presumptive, German and Mcguire, 2014) and *affective* (emotional, Kanawattanachai and Yoo, 2002) trust (Song and Thompson, 2011). Even though it has been argued that swift trust also includes affective elements (Blomqvist and Cook, 2018), it can still be said that the majority of trust developed in the early stages of virtual collaboration (before virtual team members can get to know each other) is based on available cognitive and social cues (e.g. introduction by third parties, etc.) (Song and Thompson, 2011; Blomqvist and Cook, 2018). Some theories propose that individuals may employ preexisting dispositions, institutional expectations, and social categorisation in virtual teams to make assumptions about the other person's initial trustworthiness (Song and Thompson, 2011). This may increase the risks related to stereotyping based on team members' cultural backgrounds, prior experiences, and other factors. In addition to external aspects, a person's personal characteristics, such as competencies, integrity, fairness, honesty, and openness, play an essential part in establishing trust (Song and Thompson, 2011). In this regard, swift trust is very fragile, as it can be negatively affected as soon as, for example, some team members delay sending their response or miss essential deadlines (Blomqvist and Cook, 2018).

As swift trust has been found to be very fragile, team leaders are advised to take time building affective (e.g. relationship-based) trust between team members (Song and Thompson, 2011; Blomqvist and Cook, 2018). However, as previously mentioned, virtual teams tend to be more task-focused, and since physical distance limits occasional socialising, relationships are harder to develop. Another aspect that impacts trust is the frequency of communication; thus, even when trust has been established, when the frequency of communication declines, trust may start to

gradually fade (Song and Thompson, 2011). Virtual communication in general has also been found to lack contextual cues and be more impersonal, which again hinders the development of interpersonal relationships and trust (Morrison-Smith and Ruiz, 2020).

In addition, research has shown that social comparison plays a role in making it harder to create and sustain trust in virtual teams. For example, a study by Romeike et al. (2016) found that, in virtual teams, team members start to overestimate their performance compared to their team members' or teams' overall performance. As virtual teams make it harder to see exactly what other members are doing and how they are doing it, it is easy to perceive one's own work as superior to that of others (Romeike et al., 2016). Such perceived overperformance has adverse effects on interpersonal trust in the team (Romeike et al., 2016). From the previously provided examples, it can be concluded that physical distance hampers trust and communication technologies – of more precisely, how communication technologies are used. The use of communication technologies fragments information flow, and this type of irregular, unpredictable, and inequitable communication between collaborators has been found to have a negative effect on building and maintaining trust (Morrison-Smith and Ruiz, 2020).

As can be concluded from the earlier discussion, trust is most at risk during the initial stage of collaboration. Therefore, if team members have already known each other for a while or have had chances to develop affective trust through socialising (either virtual or face to face), they might not experience trust-related discontinuities. However, if the status quo is changed – for example, new team members come to a team that has been working together for a long time – team members might face discontinuities, as it might be more difficult to get to know the new team members. However, here again, the process of how a new person is onboarded to the team plays a vital role. If team members have sufficient opportunities (either online or offline) to get to know new members, the negative effects of physical dispersion might not be experienced at all – at least from the members' side. As for the leader, it might still be more challenging to introduce team members to each other using only online measures. In addition, as research suggests, the more complex problems that team members solve, the more critical the role that trust plays (Morrison-Smith and Ruiz, 2020). Therefore, if the team consists of members performing rather low-skilled or routine tasks, they might not feel discontinuities regarding trust building in virtual teams, as trust plays a less critical role in their daily activities. In addition, virtual team members who work in organisations with higher institutional trust may find it easier to develop swift trust in newly composed teams.

4.3 Collaboration-, coordination-, and leadership-related constraints

As mentioned above, physical dispersion and the fragmented nature of technology-led communication may negatively impact the development of an overview of the team's tasks and work processes. Additionally, the virtual environment makes it harder to develop common ground and alignment of team goals and tasks, which increases the risk of double work (Morrison-Smith and Ruiz, 2020). Lower levels of cohesion in team goals and processes may negatively impact the overall quality of team output. At the individual level, lower quality in team output may lead to lower satisfaction with the work done, which can ultimately lead to lower motivation to contribute to team-related tasks. In addition, without an overview of other people's work processes, individuals may feel less motivated to put their maximum effort into achieving the team's goals. Fewer opportunities to see others physically can also lead to decreased motivation, as some people are more self-starters while others need the presence of other people to start working (Morrison-Smith and Ruiz, 2020). Less motivated and engaged team members make it difficult to coordinate workflows and obtain input from others, which may create a vicious circle and lead to a downward spiral regarding the team's overall collaboration. Collaboration and, thus, motivation may also be affected by a lower awareness of team members' context and working styles, which may lead to more misunderstandings, a decrease in trust, and lessened team feeling (Schulze and Krumm, 2017; Morrison-Smith and Ruiz, 2020).

Here, again, those team members who operate in newly composed teams or work on complex tasks may experience coordination-, motivation-, and collaboration-related constraints much more strongly than those who work on less interdependent tasks. Additionally, examples of successful 100% virtual companies (CleverTech, Automattic, GitLab, Toggl, Time Doctor, and many more) have proven that shared goals, coordination, collaboration, and motivation can be developed and maintained in virtual teams.[4] Often, it is just a matter of effective leadership that adapts to the challenges of the virtual environment. It can be concluded that virtual team members who work under competent leadership may not experience discontinuities (or may experience fewer constraints) related to goal setting, coordination, motivation, and collaboration (Morrison-Smith and Ruiz, 2020).

The main challenges of virtual team leadership include establishing team cohesion, common goals, knowledge sharing, nourishing trust, open communication, and creativity; developing effective communication and information exchange processes; developing an overview of the processes; and having an overview of how team members are doing (Zander et al., 2012; Morrison-Smith and Ruiz, 2020).

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[4]   Author's remark.

Again, different leaders may face virtual team–related constraints differently. For example, those managers who are used to managing in a more hierarchical style by giving orders and having constant overview and control of what team members are doing might find it difficult to adapt to virtual teamwork's more ambiguous nature (Morrison-Smith and Ruiz, 2020). In contrast, leaders who use a more transformational leadership style might face fewer issues with virtual team leadership (Morrison-Smith and Ruiz, 2020). The leadership of virtual teams becomes especially crucial when tasks become more complex and the interdependence with each other increases (Morrison-Smith and Ruiz, 2020). Thus, even leaders with long experience in leading virtual teams might be challenged when they start leading teams with more dynamic and complex tasks. It is also clear that leaders with less experience and technological competence find it more challenging to lead virtual teams. It is harder for them to choose the right technologies to foster team communication and collaboration.

4.4   Team cohesion

Spontaneous and informal communication has been proven to foster team feeling (Morrison-Smith and Ruiz, 2020). However, in virtual teams in which communication is less frequent and more task focused, it may be harder to develop or maintain team cohesion. In addition, when virtual teams experience imbalanced dispersion (e.g. hybrid working arrangements), some team members may be excluded (by accident) from the informal decision-making processes, jokes, and information exchanges that happen outside the formal meeting room (Morrison-Smith and Ruiz, 2020). This may create a feeling of being left out of the team, which may lead to a decrease in motivation and engagement with the team (Morrison-Smith and Ruiz, 2020). In addition, virtual team–related research suggests that physical dispersion may lead to psychological dispersion between team members (Garro-Abarca et al., 2021). Moreover, occasional face-to-face meetings have been found to be irreplaceable in terms of developing trust, mutual understanding, and team feeling (Morrison-Smith and Ruiz, 2020). Limited opportunities for face-to-face meetings may harm team feeling. In addition, misunderstandings, language differences, and potential sociocultural distance in virtual teams may lead to conflicts, which are harder to resolve in the virtual environment. Moreover, conflicts may lead to a decrease in team feeling (Schulze and Krumm, 2017; Morrison-Smith and Ruiz, 2020)

Here, it is important to note that virtual teams may vary greatly in terms of opportunities for face-to-face meetings. Team members who operate in teams in which occasional face-to-face meetings are held may feel limited in the case of any discontinuities regarding team cohesion. Additionally, virtual teams with shared

goals and shared leadership have been reported to have higher team cohesion (Morrison-Smith and Ruiz, 2020). Moreover, team members who experience fewer language and sociocultural differences may find it much easier to develop and maintain team cohesion. Team agreements have also been reported to minimise the risk of uneven information distribution and decision-making and higher accountability, thus fostering team trust and cohesion (Ford et al., 2017). Virtual team members may have different perceptions of what cohesion is and different expectations of team cohesion. Thus, team members from the same team might experience discontinuities related to team cohesion differently (Garro-Abarca et al., 2021) – for example, some members might find the level of cohesion too low, while others are perfectly okay with the situation.

4.5   Physical and mental health and self-management

Research has found that virtual team members may be exposed to higher levels of stress than co-located team members. These stress factors include physical and psychological aspects (Nurmi, 2011; Trindade, 2021). From a psychological point of view, the context of virtual work increases the risk of feeling isolated and lonely (Nurmi, 2011). The isolation or feeling of exclusion is partly due to the increased effort needed to reach out and contact teammates (Morrison-Smith and Ruiz, 2020). An increase in isolation can increase stress, as studies have shown that receiving social support from colleagues reduces employees' stress levels (Nurmi, 2011). Virtual work has also been reported to negatively impact the work–life balance, especially when some team members work from other time zones and thus send messages after other members' work hours (Purvanova and Kenda, 2018). Virtual work can also lead to physical exhaustion due to extended working hours, extensive use of computers, decreased workplace ergonomics (e.g. when from home, at the airport, etc.), increase in noise (e.g. in public places), and less physical movement (Purvanova and Kenda, 2018; Trindade, 2021).

Again, individuals may perceive health-related discontinuities very differently. For example, team members who can visit the office from time to time may experience less isolation, which helps mitigate stress factors. At the same time, virtual team members who do not have the opportunity to visit the office but have a high support network at home might be at lower risk of isolation-related stress factors. Research has also shown that younger individuals are more vulnerable to stress factors than older (than 29) adults in virtual teams (Sawang and Newton, 2018). At the same time, young people are generally more tech savvy and use more ICT tools for socialising than older adults, and this may mitigate stress factors related to isolation. Research has also shown that those individuals with higher competencies for individual coping (e.g. self-disciplined, self-awareness,

prioritising, etc.) experience less stress in virtual teams (Nurmi, 2011). Moreover, a supportive management style can mitigate physical and mental health risks. Finally, some individuals have reported not needing a better work–life balance because they are so fond of their work (Chamakiotis et al., 2014). Therefore, individual expectations and the ability to meet those expectations also play a crucial role in maintaining good mental health.

Research has suggested that virtual team members face much higher demands for self-management (Krumm et al., 2016). Members of virtual teams work under lower social control; thus, they might find it harder to start their work, take breaks, and take on additional tasks without so-called peer pressure (Krumm et al., 2016). The virtual environment also offers many distractions (e-mails, notifications), and thus, it is harder to remain focused on the work or tasks at hand (Morrison-Smith and Ruiz, 2020). However, here again, individual factors – such as personal self-management and coping skills – may mitigate or even reverse the possible discontinuities. Members with good planning, time management, prioritising, and self-analysis skills are much less prone to self-management–related risks (Schulze and Krumm, 2017). In addition, members who experience higher team cohesion and alignment with team goals might find it easier to start working, as they wish to exert effort to reach the team goals. Moreover, family-related responsibilities might increase or decrease negative feelings regarding work–life balance.

4.6   Summary of virtual teamwork–related constraints

To summarise, virtual team members and leaders face several constraints when working in the virtual context. Based on the analysis of the existing literature, it is evident that most of the virtual team literature regarding constraints is based on the *boundary-based view*. Under the boundary-based view, virtual team–related constraints are treated as general barriers that virtual team members need to cross at some point in their virtual teamworking experience, and crossing them is what is challenging for the virtual team members. Based on theory, the main boundaries in virtual teamwork are a) physical distance, b) technology use, c) time differences, and c) diversity.

In a way, the boundaries can be said to summarise the general external characteristics related to virtual teamwork, illustrating how virtual teamwork differs from traditional teamwork. However, the static boundary-based view is not enough to develop insights into how different individuals experience virtual teamwork and its related boundaries in reality, as it depends on many things – for example, their familiarity with virtual teamworking and existing boundaries, individual capabilities, the social structure, and external support mechanisms. As a response to this, the discontinuity-based approach, developed by Chudoba and colleagues (2005)

emerged. This approach aims to develop a deeper understanding of the implications of virtual teamwork for its members by turning attention to the differences in experiences. The current study found it useful to combine both the boundary- and experience-based approaches. The boundary-based view helped create a starting point and added systematicity to the complicated topic. In contrast, the discontinuity approach enabled creating a deeper understanding of the implications of virtual teamworking–related constraints for its members.

In the next chapter competencies and their related attributes are identified from the existing literature. The overview regarding virtual teamwork-related constraints developed in the current chapter based on theory, helped to synthesise literature and select competencies relevant to virtual teamworking context. Also, as the current doctoral study uses an iterative approach – then additional insights from interviews (namely regarding virtual teamwork-related constraints) were already incorporated in the next chapter – even though the full overview of interview results is presented to the readers in Chapter 8. It was decided that, even though unconventional, the approach of incorporating interview results to theory chapter enabled developing more holistic results regarding virtual teamwork related competencies, and thus was considered justified.

5 Virtual Teamwork-Related Competencies Based on Theory

This chapter develops an initial virtual teamworking competence framework based on academic research related to the future of skills and competencies, European policy papers (regarding the future of skills and competencies, e.g. OECD papers), articles from popular science (e.g. published by McKinsey and Company), virtual teamworking literature, and other relevant articles. Numerous general studies, frameworks, and reports have identified 21st-century skills and competencies (Rios, 2020; OECD, 2019b; Dondi et al., 2021; Burrus, 2021; European Training Foundation, 2018) and those in specific areas, such as green competencies (Bianchi et al., 2022), entrepreneurial competencies (European Commission, 2018), and digital competencies (Ferrari, 2013), among others. Using the knowledge about virtual-team related constraints (described in the previous chapter) it was possible to identify virtual teamwork related competencies from existing competence frameworks – even if the frameworks were developed to cover some other theme (e.g. EntreComp, which focuses on entrepreneurial competencies).

The analysis of the different competence frameworks revealed that most of the general frameworks talk about skills. This is probably because it is easier to recognise skills than values and attitudes in real life; therefore, skills have received more attention than values and attitudes. However, with a deeper analysis and synthesis of the literature, it is possible to identify values and attitudes that could be considered relevant in virtual teamworking. The competencies and competence attributes that are considered important in a virtual teamwork context are divided into seven areas and discussed in the following chapter in the following order:

1. Digital competencies,
2. creative problem-solving,
3. competencies related to learning and coping with changes,
4. competencies related to ethical thinking,
5. social competencies,
6. self-management competencies, and
7. leadership-related competencies.

Before diving deeper into each topic, a brief discussion is presented on how this selection and division was made. First, virtual teamwork relies heavily on digital communication – illustrated by the fact that the reliance on ICT is part of the virtual team definition (Berry, 2011). Digital communications (tools and software) were also highlighted in the previous chapter to bring up constraints (e.g. difficulties in adapting to new technologies). Therefore, ICT competence is considered crucial to working in virtual teams. Second, virtual team members often face complex (and novel) problems, which members (and leaders) need to solve independently. Creative problem-solving is a higher level of complex problem-solving skills and enables solving ill-structured and novel problems or using ready-made solutions in new situations. An aspect related to virtual team constraints that was featured more strongly in the current study's interviews (see Chapter 8 for full overview of interview results) than in the theory is that virtual team members face constant changes. Therefore, competencies related to coping with changes and learning (which is the basis for dealing with changes) were considered important elements to discuss.

Next, competencies related to ethical thinking were found in both the theories – which highlighted that, in virtual teams, it can be easier to act aggressively towards each other – and in the current study's interviews – as many interviewees had high levels of responsibility in making fair and ethical business decisions but were working mostly in isolation while making these decisions. Although not explicitly mentioned by the interviewees in the current study, the situational context of virtual team members, based on the author's opinion, calls for each team member to be more educated in the ethical questions and to be able to make good decisions and act respectfully and considerately towards colleagues. Communication and collaboration issues were highlighted strongly in both the theory and the study's interviewees; thus, competencies regarding communication and collaboration were included in the theory-based competence framework.

Virtual teamwork, by nature, requires its members to be much more independent in managing their work (as well as their rest time). Both the theory and the current study's interviewees highlighted well-being and self-management–related challenges. Therefore, extra attention is given to self-management–related competencies. Finally, leadership-related issues received great attention in the theory (and appeared strongly in the empirical data). For example, the interview respondents mentioned that companies are increasingly using cross-functional teams, meaning that virtual team members might work as members of one team and as leaders in other teams. Thus, it can be proposed that virtual team leadership–related competencies can be considered something that each virtual team member should possess at the basic level.

5.1   Digital competencies

There is no doubt that digital competencies are fundamental for effective participation in virtual teams. Digital competencies are embedded in every activity in virtual teams – communication, networking, brainstorming, informing, learning, and leading. Moreover, the European Union (EU) has listed digital competence as one of the eight key competencies that support effective participation in education, work, and personal lives in present and future societies and economies (Ferrari, 2013). The DigComp framework can be considered the most profound and well-known competence framework summarising digital competencies on the EU level. In academia, a recent paper by Oberländer et al. (2020) also identified the digital competencies needed to successfully manage the digitalised future of work.

DigiComp defines digital competencies as the "confident, critical and creative use of ICT to achieve goals related to work, employability, learning, leisure, inclusion and/or participation in society" (Ferrari, 2013, p. 2). Oberländer and colleagues (2020, p 3) defined digital competencies as "a set of basic knowledge, skills, abilities, and other characteristics that enable people at work to efficiently and successfully accomplish their job tasks regarding digital media at work". A comparison of the two frameworks showed that the competencies (although categorised slightly differently) overlapped with each other. In addition, because the DigiComp framework was found to be more profound and because it has been widely used in the EU and thus has proven itself, the author of the current study decided to rely on the DigiComp framework when discussing digital competencies. The DigiComp framework (Ferrari, 2013, p. 4) highlights five key competence areas:

1. Information – the ability to *"identify, locate, retrieve, store, organize and analyze digital information, judging its relevance and purpose"*.

2. Communication – the ability to *"communicate in digital environments; share resources through online tools; link with others and collaborate through digital tools; interact with and participate in communities and networks; and cross-cultural awareness"*.

3. Content creation – the ability to *"create and edit new content (from word processing to images and video); integrate and re-elaborate previous knowledge and content; produce creative expressions, media outputs, and programming; deal with and apply intellectual property rights and licenses"*.

4. Safety – the ability to *"apply personal protection, data protection, digital identity protection, and security measures to safe and sustainable use"* of IT in everyday life.

5. Problem-solving – the ability to *"identify digital needs and resources; make informed decisions as to which are the most appropriate digital tools according to the purpose or need; solve conceptual problems through digital means; creatively use technologies; solve technical problems; update one's own and others' competences"*.

A closer look at the DigComp framework (see also **Table 7**) revealed many important competencies that should be considered part of the virtual teamworking competence framework. For example, all competencies related to "information" (e.g. browsing, evaluating, retrieving, and storing information) are undoubtedly important since individuals in virtual teams are much more independent in searching and evaluating potential information sources. The communication category – interacting through technologies, sharing information and content, collaborating through digital channels, managing digital identity, and netiquette – was also found to apply to the virtual teamwork context.

At the same time, *engaging in online citizenship* was found to be less relevant in the virtual teamwork context. However, instead of leaving it out, it should perhaps be modified to meet the context better – thus, the author proposes *engaging in online teams and communities* as a possible way of grasping the important competency of *belonging* by using virtual means instead of physical means. The next category – content creation – includes four competencies: developing content, integrating and re-elaborating content, copyright, and licences and programming. Of these four, programming seems too extreme to be required for every virtual team member. Possibly, it should be replaced with a more modest version of *install and modify applications*, as virtual team members are often on their own and thus need to manage their software and tools independently.

The fourth category in the DigComp framework is *safety*. It includes four categories: protecting devices, personal data, health, and the environment. Of these four, *protecting personal data* should be extended to protecting *personal and organisational data* to include the organisational dimension. Moreover, *protecting the environment* might be too broad; however, as it resonates with the *ethical thinking* competence, which will be discussed later, it will be kept here to be evaluated in the later stage of the study as either a part of the virtual teamwork competence framework or not.

From the last category – *digital problem-solving* – all four competencies seem relevant to virtual teamworking. The four virtual problem-solving competencies include solving technical problems, identifying needs and technological responses, innovating and creatively using technology, and identifying digital competence gaps. The virtual problem-solving category resonates with general creative problem-solving and learning competencies, which will be elaborated upon in the following part of the current chapter.

Table 7. DigComp framework (Ferrari, 2013, p 5-6)*, edited by the author to meet the virtual teamworking context (changes in italics)

Competence subcategories	Competencies	Examples
Information competencies	Browsing, searching, and filtering	Access and search for online information; articulate information needs; find relevant information; select resources effectively; navigate online sources; and create personal information strategies.
	Evaluating information	Gather, process, understand, and critically evaluate information.
	Retrieving and storing information	Manipulate and store information and content to organise information and data for easier retrieval.
Communication competencies	Interacting through technologies	Interact through various digital devices and applications; understand how digital communication is distributed, displayed, and managed; understand appropriate ways of communicating through digital means; refer to different communication formats; and adapt communication modes and strategies to the specific audience.
	Sharing information and content	Share with others the location and content of information; be willing and able to share knowledge, content, and resources; act as an intermediary; be proactive in the spreading of news, content, and resources; know about citation practices; and integrate new information into an existing body of knowledge.
	Engaging in online *communities/teams*	Participate in *communities/teams* through online engagement; seek opportunities for self-development and empowerment in using technologies and digital environment; and be aware of the potential of technologies for *team/community* participation.
	Netiquette	Have the knowledge and know-how of behavioural norms in online/virtual interactions; be aware of cultural diversity aspects; be able to protect self and others from possible online dangers (e.g. cyberbullying); and develop active strategies to discover inappropriate behaviour.
	Managing digital identity	Create, adapt, and manage one or multiple digital identities; protect one's e-reputation; and deal with the data produced through several accounts and applications.
Content creation competencies	Developing content	Create content in different formats, including multimedia; edit and improve content; and express creatively through digital media and technologies.
	Integrating and re-elaborating content	Modify, refine, and mash up existing resources to create new, original, relevant content and knowledge.
	Copyright and licences	Understand how copyright and licences apply to information and content.
	Install and modify applications	*Install and adjust the settings of programs and applications.*

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Competence subcategories	Competencies	Examples
Safety-related competencies	Protecting devices	Protect one's own devices, understand online risks and threats, and know about safety and security measures.
	Protecting personal data	Understand standard terms of services; actively protect personal data; understand other people's privacy; and protect oneself from online fraud and threats and cyberbullying.
	Protecting health	Avoid health risks related to using technology (in terms of threats to physical and psychological well-being).
	Protecting environment	Be aware of the impact of ICT on the environment.
Digital problem-solving competencies	Solving technical problems	Identify possible problems and solve them (from troubleshooting to solving more complex problems) with the help of digital means.
	Identifying needs and technological responses	Assess one's own needs regarding resources, tools, and competence development; match needs with possible solutions; adapt tools to personal needs; and critically evaluate possible solutions and digital tools.
	Innovating and creatively using technology	Innovate with technology; actively participate in collaborative digital and multimedia production; express oneself creatively through digital media and technologies; and create knowledge and solve conceptual problems with the support of digital tools.
	Identifying digital competence gaps	Understand where one's own competence needs to be improved or updated; support others in developing their digital competence; and keep up to date with new technological developments.
Digital Mindset		*An open and positive mindset regarding organisational resources and digital innovation – believing that digital innovation will develop new career opportunities instead of limiting them.*

* Descriptions kept the same as in the original source.

In addition to digital competencies, the literature uses the term *digital mindset*, which was not found in the DigComp framework. A digital mindset is a broad term that includes many thinking skills or habits that support the adoption and application of new technologies. A study by Hildebrandt and Beimborn (2021) identified 15 thinking patterns that support a digital mindset, including collaborative thinking, risk-averse thinking, technological combinatorial thinking, disruptive and convergent thinking, and so forth. Perhaps a slightly easier approach to grasping the *digital mindset* is that proposed by Solberg et al. (2020), who divided digital mindsets into two subcategories: a) individuals' beliefs about the malleability of personal abilities (growth/fixed mindset) and b) their beliefs about the availability of situational resources (zero-sum/expandable-sum mindset). Both subcategories of the digital mindset influence the extent to which individuals treat digital technologies as a threat or opportunity for professional growth.

What is important to note about digital mindset is that a recent study (Wong et al., 2022) showed that individuals with higher levels of *fixed* digital mindset and *fixed* mindset about organisational resources experience greater helplessness in virtual teamwork environments. In contrast, individuals with an open *digital mindset* believe that technological competencies can be improved with effort (in line with a growth mindset). Individuals with an *open mindset regarding organisational resources* believe that technologies can enlarge organisational resources and thus provide more growth and career opportunities (Wong et al., 2022). This open mindset regarding organisational resources can also be referred to as *valuing digital innovation*. To summarise, an *open digital mindset* and *valuing digital innovation* can be essential elements to add to the virtual teamworking competence framework.

5.2   Creative problem-solving

The workplaces of today and the future, including virtual teamwork, require members to be much more independent and find solutions to novel problems (e.g. using new technologies) (Krumm et al., 2016). Therefore, it can be concluded that *creative problem-solving competence* is essential for successful participation in virtual teams. As mentioned in the previous section, creative problem-solving is also vital in digital problem-solving. However, the process and competencies behind digital problem-solving highlight the digital aspect (e.g. troubleshooting) more. In this section, the focus is more on opening up the process and competencies related to creative problem-solving, no matter the tools used for solving the problem itself.

It is important to note that not all problem-solving is or has to be creative. Traditional problem-solving refers to the process in which individuals use existing or predefined solutions to the occurring problems (Rios, 2020). Contrary to

traditional problem-solving, *creative* problem-solving allows for the following (Rios, 2020):

- finding solutions to ill-structured or complex problems,
- generating novel solutions that have not yet been created, or
- using existing (pieces of) solutions in new situations.

Considering the nature of virtual teamwork, it could be argued that traditional problem-solving methods might not be enough to deal with ambiguity and constant changes (e.g. regarding technologies). Creative abilities related to problem-solving were divided into three main categories with respective subcategories (see **Table 30** Description of competencies related to creative problem solving (developed by the author based on Rahman, 2019, European Commission, 2018, Ferrari et al., 2012, Dwyer, 2017 and Krumm et al., 2016) can be seen in Appendix 1. To summarise the table in Appendix 1, creative problem-solving includes the following competencies and competency attributes: observation skills, including *information gathering*, *processing*, and *analysing*; critical thinking skills, including *analytical thinking*, *synthesising*, *conceptualising*, *logical reasoning*, *decision-making*, and *application*; and creative thinking skills, including *opportunity recognition*, *flexibility*, *synthesising*, and *experimenting*.

The first step in creative problem-solving, according to Rahman (2019), is understanding the problem, and this stage includes skills related to *observation*. Observation is essential for solving problems, as it allows for the identification and gathering of more information about the issue that needs to be solved. In today's world, where online tools create large amounts of data availability, knowledge about trusted sources and how to detect source validity is vital (Ferrari, 2013). In virtual teams, it is often not possible to discuss the validity and relevance of information with colleagues; therefore, individuals must possess the capability of critically assessing source validity by themselves. Although it may sound trivial, foreign language skills are essential in the information-gathering process since they allow for finding relevant information from more sources (Ferrari, 2013).

Critical thinking skills in the current study were expanded with the help of Rahman's (2019) article highlighting the essential elements of critical thinking and problem-solving. According to Rahman, critical thinking is the second most important tool of problem-solving and includes the following skills: a) analytical thinking, b) synthesising, c) conceptualising, d) logical reasoning, e) decision-making, and f) application. Krumm and colleagues' (2016) study highlights also *interpreting* skills, which are essential for adding meaning to the pieces of information analysed. In virtual teams, members are often alone, and thus, they must have high interpreting skills to add meaning to the pieces of information gathered. Thus, the interpreting skill was added to Rahman's list of critical thinking skills.

In addition to the abovementioned critical thinking skills, a McKinsey and Company (Dondi et al., 2021) study stressed the need for noticing and understanding biases, which can also be labelled as reflective judgement. King and Kitchener (originally King et al., 1994, as cited in Dweyer, 2017, p. 2) explained reflective judgement as an "*individuals' understanding of the nature, limits, and certainty of knowing and how this can affect how they defend their judgments and reasoning in context; as well as an individual's acknowledgment that their views might be falsified by additional evidence obtained at a later time".* In a virtual teamworking context, where it is almost impossible to see the context of other people, it is especially important to become aware of one's own biases, especially when interpreting the (written) pieces of information from the other party.

In addition to observing and critical thinking, Krumm and colleagues (2016) explained how working in virtual teams requires its members to be both *creative* and *flexible*. Virtual teamwork can lead to many unexpected situations that need to be solved quickly without external help. Thinking creatively and coming up with novel yet working solutions are thus vital in these critical situations. Previous studies have shown that strict adherence to rules can hinder performance in a virtual team, since it does not support ad hoc problem-solving and flexible adjustment to new situations. Thus, *valuing flexibility* is an essential aspect of problem-solving in virtual teams. Rios (2020, p 23) defined creativity as the *"ability to generate new ideas, a novel integration of existing ideas, and application of new ideas in a real-world setting".*

Based on the McKinsey and Company report (Dondi et al., 2021) and the definition of creativity (Rios, 2020), it can be derived that being creative requires the skill of synthesising (combining several pieces of knowledge in a new way) and a willingness to *experiment with new solutions*. In addition, studies have shown that creativity is highly correlated with openness to experience (Simonton, 2012). Interestingly, a study by MacDonnell and colleagues (2009, seen in Krumm et al., 2016) showed that openness to experience correlates positively with team cohesion in virtual teams and negatively with cohesion in traditional teams. Thus, *openness to experience* is important in a virtual team context and can be combined with creative thinking.

Another interesting finding regarding creativity is the typology of creativity developed by Unsworth (2001). The typology of creativity highlights the differences among *expected* creativity (creating artwork), *responsive* creativity (being part of a think tank), *proactive* creativity (volunteering to solve a discovered problem), and *contributory* creativity (contributing to solving a problem without being asked to). It could be argued that virtual teams benefit not only from their members' responsive creativity (e.g. solving problems when they occur) but also from proactive and contributory creativity, which means that virtual team members are ready to step up and volunteer to solve problems even if they are not asked to. Therefore, it can be

concluded that virtual team members should like to contribute and proactively solve problems.

Both proactive and contributory creativity require individuals to have a creative mindset. Individuals with a creative mindset can be described as individuals who *"regularly imagine new ideas, concepts, procedural steps, and products, without being asked to be creative"* (Dondi et al., 2021). Proactive and contributory problem-solving also require individuals to notice an opportunity for problem-solving – for example, detecting stimuli that others might find irrelevant (Simonton, 2012). Although *opportunity recognition* is often connected with entrepreneurial capabilities, the same term is used here, as it has been found to best capture the individual ability (and personal drive) to notice opportunities for creative problem-solving (Dondi et al., 2021). Finally, it can be derived that contributory and proactive problem-solving requires individuals to value stimulation (Schwartz, 2006, 2012), as contributing to solving novel problems always means going outside traditional routines (tasks/roles, etc.).

Table 8. Summary of the competence attributes related to creative problem-solving (created by the author).

Creative problem-solving competence	
Competencies	**Values, attitudes, skills, and knowledge**
Observation	Knowledge and skills related to **gathering**, **processing,** and **critical analysis of information**; knowledge about **trusted sources;** knowledge and skill for **detecting source validity; reflective judgement** (skill); **foreign language skills, such as English.**
Critical thinking	Skills related to **analytical thinking, conceptualising, synthesising, logical reasoning, decision-making, application of knowledge, reflective judgement, and interpreting.**
Creative thinking	**Opportunity recognition** (skill), **synthesising** (skill), positive attitude towards **experimenting, creative mindset** (attitude), **openness to experience** (value, attitude), liking to **contribute and proactively solve problems** (attitude), values **stimulation, flexibility** (can be a skill, attitude, or both).

To summarise, a virtual environment poses unexpected and unique problems/obstacles that require its members to develop new solutions – or to combine existing solutions in a new way. Thus, creative problem-solving is a vital competency supporting effective virtual teamwork. Based on theory, creative problem-solving can be divided into three subcompetence areas: a) observation, b) critical thinking, and c) creative thinking. All three subcompetence areas include different competence attributes (knowledge, skills, attitudes, and values), summarised based on the theory and presented in **Table 8**.

5.3 Continuous learning and coping with change

Research has indicated the importance of *continuous learning*, or the so-called *growth mindset*, which is critical considering the pace of changes happening in workplaces today (technology development, etc.) (Rios, 2020; OECD, 2019a, 2019b; European Commission, 2018). In virtual teams, individuals work mostly independently and must take more responsibility for their learning. Correspondingly, a study by Schulze and Krumm (2017) highlighted the importance of staying curious and open to new ideas and experiences, seeking learning experiences, and promoting (driving) changes in virtual teams. These abilities can be considered positive attitudes towards change, new experiences, and learning. More specifically (using the *principle of compatibility* from attitudes theory), effective virtual team members can, for example, think in the following way: "I like new ideas, change, and opportunities to learn something new" or "I like to lead the change in our organisation, team, or field". Thus, there are two important categories regarding learning and change to consider in the virtual teamwork environment. These are *self-directed/lifelong learning* and *coping with change(s)*. Although dealing with change can also be considered part of a *self-management* competency, it is analysed in the current sub-chapter since change often requires individuals to learn new things.

Self-directed learning is the ability to knowingly identify learning opportunities or goals for oneself, direct oneself into new learning processes, and actively engage in the learning process through self-monitoring and reflecting on the learning experience after the activity (Loon, 2018; Li et al., 2021). DigComp also stresses capabilities regarding learning to learn, which include the awareness of one's learning process, the identification of learning opportunities, and the ability to overcome obstacles to learn successfully (Ferrari, 2013). A study by Loon (2018) also highlighted that self-directed learning requires learners to have specific skills, including goal setting, planning, acting, self-regulation, self-assessment, and self-reflection. These skills and others relevant to self-directed learning (discovered through the literature analysis) and the relationships between them are illustrated in **Figure 13** to aid the reader in understanding the complex relationships between the different skills within the process of self-directed learning.

Continue in the same loop (act, monitor, evaluate) and/or set a new learning goal

Set a goal

Develop an action plan

Act

Change what is not working or do more of what works

Monitor
(Requires self-assessment and self-reflection skills)

Evaluate and/or receive feedback
(Associated with analytical skills)
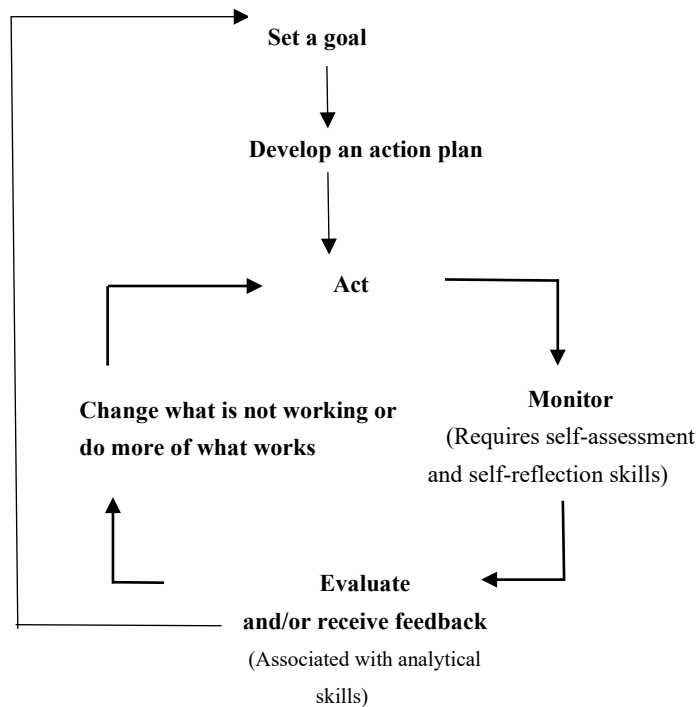
Figure 13. Illustration of the process of goal settings, planning, monitoring, and evaluating results (developed by the author based on the literature overview).

A growth mindset is one of the fundamental building blocks of lifelong and self-directed learning (Ng, 2018). A growth mindset is the belief that intelligence and skills are malleable and improvable (Ng, 2018). Thus, individuals with a growth mindset embrace challenges and believe that learning and practice can improve their intelligence and skills. Moreover, individuals with a growth mindset perceive constructive feedback and setbacks as necessary for learning (Ng, 2018). In addition, recent studies have highlighted the importance of intrinsic motivation related to the growth mindset, as intrinsic motivation is one of the drivers of self-determination and self-development (Ng, 2018). The following sections will investigate specific competencies and attributes related to self-directed learning in more detail.

Goal setting is the first step in self-directed learning. It consists essentially of two blocks: a) motivation, which determines and encourages the individual to set a goal, and b) the actual formation of a goal (Korchagina et al., 2019). Goal formation includes developing the specific parameters of a goal, such as specificity, measurability, reachability, relevance, timeframe, and indicators (Korchagina et al., 2019). The more specific the goals are, the easier it is to make plans for achieving

them and to measure whether they have been achieved (Korchagina et al., 2019). Studies have shown that goal-setting and planning skills help increase individuals' perceived well-being (MacLeod et al., 2007) and thus reduce stress related to changes coming from the external environment. Several tools are available for setting specific goals, with one of the most known probably being the SMART (specific, measurable, attainable, realistic, timely) method (Lawlor et al., 2012). An alternative approach to the SMART method is the well-formed outcome approach called the POWER (positive, ownership, what, evidence, relationships) method, which is based on neuro-linguistic programming (Day, 2011).

In the *planning* phase, individuals form active mental representations of target stimuli, for example, the goal (Sniehotta et al., 2005). The mental representations of the plan, such as its steps, make situational goals more easily accessible and critical situations detectable and avoidable. Thus, planning can be divided into two categories (Sniehotta et al., 2005):

1) action planning: a goal-directed activity to specify where, when, how, and what will be done; and

2) coping planning: a barrier-focused self-regulation strategy that helps with overcoming obstacles while following an action plan.

An easy example of *action planning* is a plan to go for a run after work. C*oping planning* happens when a person predicts an obstacle (e.g. being tired after work) and plans an appropriate response to this obstacle; for example: "If I am tired after work, I will go running immediately, without letting myself sit down on the couch at home." Therefore, planning is linked to both knowledge and skills, as it requires an individual to have the ability to divide a bigger goal into smaller and achievable tasks, analyse possible risks, and so on. The coping planning skill is supported by metacognitive skills, such as the ability to observe oneself, analyse previous experiences, and practise self-discipline. The better an individual can anticipate obstacles, develop appropriate responses, and act based on the coping plans, the more likely that individual is to follow the plan and thus move towards the intended goals (Sniehotta et al., 2005).

Self-assessment refers to an individual's ability to judge their performance before, during, and/or after the execution of a task (Loon, 2018)**.** Self-assessment is usually quantifiable and can be in a simple form (e.g. giving grades to oneself) or in a more complex form (e.g. giving rates or measuring percentages with rubrics) (Loon, 2018). Studies have shown that self-assessment is usually biased in favour of the individual; however, with time and development in experience, self-assessment also becomes more accurate (Loon, 2018). Self-assessment becomes more precise when the individual develops their metacognitive insight, knowledge about learning

methods and assessment types, and self-monitoring skills (e.g. the ability to recognise errors). One way to tackle the biases of self-assessments is to combine them with peer assessment. Studies have shown that, when self-assessment and peer assessment are used in combination, learners start to conduct more accurate and meaningful assessments of their behaviour and/or results (Asch et al., 1998). Self- and peer assessments are valuable tools for identifying strengths and weaknesses and developing further learning agendas (Asch et al., 1998).

Self-reflection refers to a self-monitoring learning activity and competency development (Loon, 2018). Self-reflection supports both self-monitoring and self- regulation. In contrast with self-assessment, self-refection is more open and qualitative, and the reflection measures cannot be and do not have to be directly compared to learning outcomes (Loon, 2018). Self-reflection is a process in which an individual inspects and evaluates their thoughts, feelings, behaviour, and insight (A. M. Grant et al., 2002). Self-reflection methods (e.g. learning diaries, self-retros, etc.) are useful for developing insights about self-identified strengths and areas for improvement (Loon, 2018). Moreover, self-reflection helps identify learning outcomes that might not have been intended. For example, while an individual engages in an activity to learn to use a new collaborative platform, they might learn something new about the best practices of written communication during the process. Thus, self-reflection is a central skill in the process of improving one's performance (A. M. Grant et al., 2002).

Self-monitoring has been defined as *"deliberate attention to some aspect of one's behavior"* and is considered an important self-regulative tool for learning (William, 1996, p 101). During a study carried out in 1996 among college students, students who were asked to monitor their learning behaviour performed better on the course tests than those who were not (William, 1996). In this study, one group of students recorded the frequency and intensity of their various learning activities, while another group evaluated the instructor's teaching, and the third group took the course without any extra tasks. The study results indicated that self-monitoring provides learners with a prototype or a protocol against which they can compare themselves, which triggers them to want to become their "better selves". Self-monitoring has also been reported to be positively related to challenge-seeking behaviour (William, 1996), while learners who have reached a certain desired learning outcome have been found to set new challenges for themselves. Therefore, self-monitoring helps indiviudals gradually set higher goals for their learning outcomes and thus make more progress.

Regarding *coping with change* - many of the same abilities and beliefs governing self-directed learning support dealing with changes. For example, a growth mindset has been found to increase the embracing of challenges and reduce the fear of failing (Ng, 2018). In addition, valuing *lifelong learning* can be assumed

to support coping with change, as people who value lifelong learning do not oppose learning opportunities. As mentioned earlier, studies have shown the positive impact of *goal-setting* and *planning skills* on individual well-being. Thus, it could be argued that, when changes happen, those individuals who can develop goals and plans to cope better with the change will be less stressed.

In addition to the abovementioned abilities, *emotional regulation* is also important in stressful circumstances (Woodward and Hendry, 2004); thus, individuals with higher emotional control are better at coping with change. The ability to deal with ambiguity (*epistemic cognition*) has also been found to be a factor that supports dealing with stress during changes (Ashford, 1988). Last but not least, *stable relationships* (which require social skills, e.g. hot cognitive skills) with colleagues have been found useful when dealing with changes (Woodward and Hendry, 2004).

However, coping with change is perhaps insufficient in today's turbulent working environment. Change is part of everyday work, and if one does not wish to move towards change but is constantly forced to do so, it will not work out well in the long run. The literature on lifelong learning has highlighted *aspiration*, which is the driving force behind changes, in relation to coping with the changes. According to Senge (1994, as cited in Singh, 2002, p. 318), *"Aspiration is the capacity of individuals, teams and eventually larger organizations to orient themselves toward what they truly care about, and to change because they want to, not just because they need to."* Hence, individuals who possess aspirations will not only cope with changes but become the driving force of changes.

Regarding the learning process itself, which relies on digital technologies now more than ever, DigComp highlights the following skills: a) the ability to use search engines and advanced search options to find information, b) critically checking and assessing the credibility and reliability of pieces of information found, c) storing information, d) making digital notes, e) using online communities and organisational communities of practice with learning purposes, and f) searching, enrolling, and participating in relevant online courses (Ferrari, 2013). The aforementioned can be labelled as skills for online information acquisition and learning and can be added as a third category, along with the themes of *self-directed learning* and *coping with change* (see **Table 9**).

Table 9. Summary of the competence attributes related to self-directed learning, coping with change, and online learning (created by the author).

Competencies	Values, attitudes, skills, and knowledge
Self-directed learning/lifelong learning	**Growth mindset** – belief that intelligence is malleable (knowledge, specifically the mental model); embracing **lifelong learning** (value and knowledge, specifically the mental model); **openness to new ideas, change, and opportunities to learn something new** (attitude); **awareness of one's own learning processes** (skill); **identification of learning opportunities** (skill); **goal setting** (knowledge and skill); **planning** (knowledge and skill); **actualising plans** (skill); **self-assessment** (skill); **self-reflection and self-analysis** (skills); **self-monitoring** (skill).
Coping with change	**Goal setting** and **planning skills** (skills); **growth mindset** (knowledge, specifically the mental model); embracing **lifelong learning** (value and knowledge, specifically the mental model); **ability to deal with ambiguity** (skill); **ability to develop stable relationships** (skill); **aspiration** (value or attitude or both).
Online information seeking and learning	**Ability to use search engines and advanced search options to find information** (knowledge and skill); **critically checking and assessing the credibility and reliability of pieces of information found** (skill); **storing information** (knowledge and skill); **making digital notes** (skill); **using online communities and organisational communities of practice with learning purposes** (knowledge and skill); **searching, enrolling, and participating in relevant online courses** (knowledge and skill).

To summarise, self-direction combined with a growth mindset can be considered a vital part of virtual teamwork–related competencies, as this supports learning independently. Today's working environment, including virtual teamwork, includes many changes, and coping with changes is an important competency that can improve individual performance in virtual teams. Finally, finding and participating in relevant online training is a useful competency in virtual teamwork, as it supports individual learning and coping with changes. All three competencies include different attributes (knowledge, skills, attitudes, and values), summarised based on the theory and presented in **Table 9**. The next section will focus on competencies related to ethical thinking.

5.4 Competencies related to ethical thinking

According to the literature, recent scientific and technological advances pose many ethical questions, which puts ethical and sustainable thinking high on competence frameworks (OECD, 2019a; European Commission, 2018; Rios, 2020). In a virtual environment, members need to make many decisions independently, without the opportunity to discuss them with others. Therefore, knowledge and skills related to *business ethics and sustainability* must be divided evenly among virtual team members. The virtual context makes it much easier to take credit for someone else's work or show disrespectful behaviour. Therefore, *online* or *e-ethics,* for example,

about how people collaborate in a virtual environment, should be discussed. Finally, a virtual collaborative environment means that there are many more risks related to the exposure of sensitive data. Hence, knowledge and skills regarding *data protection* can be considered necessary.

According to the European Commission (2018, p. 5), business ethics reflects "how sustainable long-term social, cultural and economic goals are, and the course of action chosen and acting responsibly". To make ethical business decisions, virtual team members need to be competent in business ethics (Lee, 2009) and able to analyse topics from multiple perspectives, including a) the personal perspective and that of b) the professional team and c) the wider society. Thus, business ethics require virtual team members to have knowledge of global ethics and business standards (globally and internally in the company) (Kasper-Fuehrer and Ashkanasy, 2001) and the ability to use reflective judgement before jumping into action (Dweyer, 2017). One of the underlying values – universalism (the understanding, appreciation, tolerance, and protection of the welfare of all people and nature) – has also been positively connected to behaviours that support ethical and environmentally friendly decisions.

The actions and decisions made by virtual leaders and members range from broader business-related decisions to more day-to-day issues – such as decisions regarding where and when to work. For example, working from home or virtual conferences can significantly reduce carbon emissions. However, it is sometimes better to meet face to face to be able to build trust and rapport. Making judgements regarding working from home or commuting to a face-to-face meeting governs the daily work of every virtual team member. This type of reasoning can be captured with the label "ethical reasoning", which is highlighted in the Review of Future Skills frameworks (Kotsiou et al., 2022) and is a foundation for analysing situations from many different aspects (environmental, collegial, self-interests, etc.).

In addition to broader ethical thinking (towards the community as a whole), research has indicated that virtual teamwork requires members to have knowledge and skills related to *e-ethics* (Lee, 2009). As mentioned earlier, a virtual environment poses interpersonal communication and behavioural challenges. To overcome these issues, research has suggested developing team charters, which highlight the code of conduct for collaboration in the team (Lee, 2009). Both organisational- and team-level charters (agreements) work well to promote good collaboration practices (Lee, 2009). However, some studies have found that team charters have an effect only in teams in which members exhibit less accountable and responsible behaviour (Courtright et al., 2017). Thus, team charters might bring less value to teams in which members are already accountable and respectful to other members. However, regardless of team charters, ethical codes regulate behaviour (Lee, 2009) and can either positively or negatively affect trust, which is fragile in virtual teams.

Therefore, general net etiquette (netiquette) is considered important in virtual teams (Brockner et al., 2006; Ferrari, 2013). Netiquette includes knowing the guidelines and good conduct for sending written messages (Ferrari, 2013). Since there is a high risk in virtual teams that written text can be misinterpreted, it is important to carefully create and read correspondence before pressing the send button. In virtual teams, it is also vital that members express the otherwise implicit norms and role expectations explicitly to new members. Being explicit about norms helps new members quickly adapt according to the team's guidelines (Johnson et al., 2001). New members are also expected to adapt quickly to the norms of virtual teams (Johnson et al., 2001). In addition, according to the DigComp framework, netiquette means that individuals should be able to protect themselves and others from possible online dangers (e.g. cyberbullying) (Johnson et al., 2001). In addition, virtual team members are expected to respect their fellow team members' privacy (Lee, 2009), diversity of ideas, behaviours, and so on (Brockner et al., 2006; Ferrari, 2013).

Electronic communication in different channels often means that it is necessary to consider what behaviour is ethical in accessing, sharing, and *protecting data*. Virtual collaboration implies that individuals have more access to personally sensitive data (e.g. other people's homes, children, and pets). Working from public places also means that some organisationally sensitive data might be at risk of being overheard or overseen. According to DigComp, it is essential that individuals consider ethical principles regarding the use and publication of information and know which content/knowledge/resources can be publicly shared (Ferrari, 2013). In addition, working in a virtual environment means that individuals are exposed to much more data, which is often fragmented or inconsistent. Thus, the individual's ability to cross-check and assess the validity and credibility of information (Ferrari, 2013) can be considered vital in a virtual teamworking environment.

Table 10. Summary of the competence attributes related to ethical consideration in virtual teamwork (created by the author).

Competencies	Values, attitudes, skills, and knowledge
Business ethics	Knowledge about **global, local, and intraorganisation business ethics**, standards, and sustainability issues; **ethical reasoning** (knowledge and skills); ability to use **reflective judgement** (skill); interest in ethical and sustainability-related issues (attitude); **universalism** (value).
E-ethics	**Respect towards others** (value); knowledge about the **code of conduct for (virtual) collaboration** (in organisation/team); knowledge about the **right to privacy** in a virtual environment; valuing and **respecting diversity**; knowledge and skills related to **netiquette; self-reflection** skills (noticing consequences of one's own behaviour in virtual collaboration/ communication and corrects behaviour); knowledge and skill of how to **protect oneself and others from online threats**; knowledge and skill to **express implicit norms and guidelines to new members**; ability to **quickly adapt to the norms** of new teams/organisations (skill).
Data protection	Knowledge about **copyright and licenses** (which content/knowledge/ resources can be publicly shared); **reflective judgement** skills (before sharing personally or organisationally sensitive data); knowledge and skill for **cross-checking data reliability and validity.**

To summarise, virtual teamworking requires members to make many more decisions on their own than in traditional teamwork. This kind of independence in decision-making requires a higher awareness of *business ethics, e-ethics* (including netiquette), and *data protection*. All three competencies include different attributes (knowledge, skills, attitudes, and values), which are summarised based on the theory and presented in **Table 10**. The following section will look more deeply into the competencies and competence attributes related to the social aspects of virtual teamwork.

5.5 Social competencies

A study by McKinsey and Company (Agrawal et al., 2020) on the effects of Covid-19 on organisations highlighted how advanced interpersonal *social skills* are needed in distance work to ensure that professional ties are kept strong. Other studies have also highlighted that virtual team members must have the appropriate characteristics and skills to communicate clearly (e.g. Schulze and Krumm, 2017; Lippert and Dulewicz, 2018; Morrison-Smith and Ruiz, 2020). For a better overview, *social skills* can be divided into three subcategories: a) communication skills, b) collaboration skills, and c) dealing with diversity. In real life, these competency areas are closely connected, and their attributes are transferrable across different areas. However, these categories are discussed separately in the following sections for the sake of clarity for the reader.

5.5.1   Communication

A study about virtual teamworking competencies by Schulze and Krumm (2017, p 69) highlighted communication competencies and described them as the ability to *"communicate effectively with dispersed team members, share knowledge skilfully and interpret messages appropriately"*. Communication competencies can be split into two areas (see **Table 11**): a) the quality of communication and b) the selection and use of IT (Schulze and Krumm, 2017; Krumm et al., 2016; Morrison-Smith and Ruiz, 2020). After careful analysis of the literature, it was decided to further divide these two areas into competencies and related activities/qualities, as can be seen in **Table 11**. According to this division, communication quality consists of two interrelated yet distinctive competencies: a) communication coordination, which refers to the quality and timeliness of communication, and b) communication quality, which refers to the quality and content of the communication. The selection of ICT was divided into two related activities – a) selection and b) use of ICT – to make it easier to analyse and present the literature regarding these issues. A detailed discussion of this division takes place after Table 11.

Table 11. Main group and subgroups of communication competencies (developed based on Schulze and Krumm, 2017; Krumm et al., 2016; and Morrison-Smith and Ruiz, 2020).

Main areas of communication competencies	Subareas of communication competencies	Communication qualities or activities supported by the competency
Communication Quality	Communication Coordination	frequency
		timeliness
	Communication Quality	quality
		content
Selection and Use of ICT		selection of ICT
		use of ICT

The *selection and use of ICT* refers to the ability to effectively select and use ICT tools to support the development of trust, decision-making, giving feedback, relationship building, building shared understandings, and avoiding conflicts, among other things (Morrison-Smith and Ruiz, 2020). According to Morrison-Smith and Ruiz (2020), the choice of ICT has a large impact on communication because the tools vary in how verbal and nonverbal cues are shared (Morrison-Smith and Ruiz, 2020). For example, the use of asynchronous tools allows for being in contact when there is a time difference in team members' working hours.

At the same time, asynchronous media has been found to increase delays in decision-making (Morrison-Smith and Ruiz, 2020). To support discussion, decision-

making, and getting to know each other, the use of tools that enable rich media, such as video, or occasional face-to-face meetings are recommended (Morrison-Smith and Ruiz, 2020). It has also been found that the complementary use of different tools for delivering repeated messages decreases perceptions of information overload compared to the repeated use of the same tools (Schulze and Krumm, 2017). It is therefore important that virtual team members know the benefits and limitations of different ICT and the important aspects of different communication processes (e.g. asynchronous vs synchronous communication) and can choose when to use media in single, sequential, and concurrent ways.

In addition to selecting the right tools, it is important to *know how* to use them effectively. Here, the focus is more on the hard skills, whereas the soft skills of virtual team–related communication will follow. It is intuitively logical that the more an individual knows the different possibilities and features of varying ICT, the more effectively they can communicate. Hard skills in the use of ICT include using emoticons to convey emotional responses, which allows for overcoming the absence of nonverbal cues. As many sources have stressed the importance of using rich media (e.g. video conferencing) (Morrison-Smith and Ruiz, 2020), it is important that virtual team members are not afraid or intimidated to use video tools during online conferences. Moreover, virtual communication benefits from presentation and visualisation tools to make information easier to grasp (Krumm et al., 2016). For example, in one study, virtual team members used capital letters to convey clarity and assertiveness in their messages (Schulze and Krumm, 2017).

In addition to hard skills, virtual communication relies heavily on soft skills. It could be argued that acquiring soft skills for virtual team communication is even more complex, as, for example, it takes only once to learn how to set up a video conference link. In contrast, learning how to convey messages effectively from one side to another in the virtual environment takes much more time and effort. To better understand what constitutes communication quality in virtual teams, Marlow and colleagues (2017) developed a conceptual map that includes four important aspects: communication frequency, quality, timeliness, and content. Communication frequency has been highlighted in several studies as one of the most important aspects of effective virtual team communication (Morrison-Smith and Ruiz, 2020). According to a review article by Morrison-Smith and Ruiz (2020), frequent communication supports the development of trust, relationships, shared understandings, mitigating conflicts, and so on. At the same time, a frequency of communication that is too high (e.g. sending many e-mails on different topics) may result in information overload. Thus, virtual team members must be able to critically assess the need for sharing information and, when it is found relevant, try to gather many pieces of information to send at once instead of sending small pieces of information separately or chopping one big topic into smaller pieces of information.

In addition, communication timeliness plays a critical role in effective virtual teamwork. Communication timeliness refers to the extent to which communication is sent or received on time (Marlow et al., 2017). Sharing information in virtual teamwork is already at risk of being delayed, as there are fewer opportunities for team members to meet with each other. What makes the situation even worse is when some team members do not share, receive, or respond to information on time. Timing communication effectively requires virtual team members to have time management skills and the knowledge of the status and aims of the project and other team members' roles – for example, to be able to evaluate what information should be sent asap and what can wait for the next team meeting. Schulze and Krumm (2017) called effective timing in virtual communication *a communication coordination skill*; thus, in the current study, both communication timeliness and communication frequency are merged under the umbrella of *communication coordination.*

The next topic – *communication quality* (which was also chosen as an overarching headline to cover all four topics) – refers to information clarity, effectiveness, accuracy, and completeness (Marlow et al., 2017). Regarding communication clarity, Rios (2020) pointed to two different skill sets: oral and written communication. According to Rios (2020, p. 23), oral communication skills stand for the ability to *"articulate thoughts, ideas clearly and effectively"*, and written communication skills refer to the ability to *"write memos, letters, and complex technical reports clearly and effectively"*. Both skills are important in all teamwork circumstances, but in virtual teams, where it is often not possible to read each other's body language, excellent oral and written communication skills are more crucial.

While what is meant by a clear, accurate, and complete presentation of information (oral or written) can be intuitively understood, the understanding of what constitutes "effective" remains a bit vaguer. Effective communication can include several different aspects, but the main idea seems to be that communication must be delivered in a way that serves its purpose (or the purpose of the sender). For example, Krumm and colleagues (2016) pointed out that virtual team members must be able to convey their messages confidently and positively. In addition, Krumm and colleagues (2016) highlighted that it is important to be able to convince virtual team members. Convincing can be done, for example, by presenting topics illustratively. Topic illustration can be operationalised in many ways that require different competencies. For example, virtual team members can use video, audio, or image development tools to illustrate their ideas. At the same time, it is also possible to use storytelling skills to bring more context and richness to a topic. Krumm and colleagues (2016) also referred to an ability to convince team members, which can be related not only to engagement, argumentation, and negotiation skills but also to social manipulation skills.

Not only is the quality of communication determined by the sender of the information, but the receiver also plays an important role. Marlow and colleagues (2017) and Morrison-Smith and Ruiz (2020) highlighted closed-loop communication as a useful tool in virtual communication. In closed-loop communication, the sender sends the information, and the receiver receives it and reflects/repeats back the way they understand it. After this, the sender usually agrees, disagrees, and/or refines their statement. Closed-loop communication, like traditional communication, benefits greatly from listening skills. In this line of thinking, Burrus (2021) highlighted strategic listening as one of the key competencies for future workplace success. According to Burrus (2021), strategic listening involves attention to phrases and words that uncover strategic and innovative insights. Strategic listening, accompanied by the skill of asking relevant questions, can result in much better solutions and answers to questions than traditional one-sided communication followed by passive listening (Burrus, 2021). Asking questions is key to information seeking and critical thinking and is an effective way to build relationships with teammates (Quagliata, 2020).

Finally, Marlow (2017) highlighted *content* as an essential element of quality in a virtual communication. According to Marlow (2017), communication content varies, first, based on its orientation – either task- or relationship-oriented. Switching between both communication styles is essential to ensure smooth task completion and relationship building. In virtual communication, where it is more difficult to read each other's tone of voice, body language, and so on, it is especially important to fine-tune communication content so that it will not be taken as an offense. Thus, as mentioned previously, virtual team members can use emoticons and unconventional orthography (e.g. "yessss" for missing auditory information) (Krumm et al., 2016; Schulze and Krumm, 2017). In addition, during virtual conferences, where hands are usually hidden, it is possible to substitute hand-and-body expressions with facial expressions (e.g. smiling more often) (Song and Thompson, 2011). Careful consideration of text in written communication also helps avoid misunderstandings by, for instance, using precise clear language, avoiding slang, using complete sentences (with clear beginnings and endings), and restating and clarifying the meaning of words (Schulze and Krumm, 2017). Although not often discussed, language skills also affect the content and, thus, the quality of virtual communication (Schulze and Krumm, 2017). When language barriers still occur, a good tip is to place more weight on asynchronous communication, which leaves time for reading, translating, and formulating the answer (Schulze and Krumm, 2017).

In virtual communication, it is also more vital than ever to develop a shared understanding, or "common ground", with the rest of the team members. Morrison-Smith and Ruiz (2020) posited that shared cognition and common ground can be developed through frequent and consistent communication. In addition, sharing

contextual information – such as local holidays and customs, site-specific processes and standards, competing responsibilities, the current situation in one's personal life, and mood – helps build common ground with teammates. Several studies have also highlighted that sharing contextual information helps with coordinating work effectively (Schulze and Krumm, 2017). Frequent communication also helps build social relationships. Another skill that helps boost common ground and relationships is virtual identity building (both individual and team identity) (Ferrari, 2013).

Since virtual communication (and collaboration, which will be discussed hereafter) has proven to be a dense topic, it was decided to present the summarising tables separately after finishing the discussions about each of them. **Table 12** summarises the main categories of virtual communication and related competency attributes found in the literature.

Table 12. Communication competencies and related attributes (developed by the author).

Area	Competency	Competency subgroup	Description	Related attributes
Communication Quality	Communication Coordination	Frequency	Extent to which information is shared frequently while at the same time not overloading colleagues.	Knowledge about **project goals, status, roles of team members**, etc.; **sharing and responding to information in a timely manner** (knowledge, skill, and attitude); **critically assessing the need for sharing information** (knowledge and skill).
		Timeliness	Extent to which the communication is sent, received, and responded to on time.	**Time management** skills; **knowledge about project goals, status, roles of team members**, etc.; ability to **develop a shared understanding** within the group (knowledge and skill); **best practices of virtual communication** (knowledge).
	Quality of communication	Quality	Clarity, effectiveness, accuracy, and completeness of the communication.	**Manipulation, argumentation,** and **negotiation skills; storytelling** skills; **closed-loop communication** skills; **strategic listening** skills; **presentation** and **visualisation** skills (using different options: video, presentations, images, charts, etc.); the skill of **asking good questions**; excellent **oral and written communication** skills.
		Content	Degree to which communication content is relevant to the situation, clear, and carries positive "vibes".	**Foreign language** skills; skill for **substituting emotional cues** (e.g. body language with emoticons); ability to **switch between task-oriented and relationship-oriented communication** (knowledge and skill); ability to **produce clear and concise messages** (knowledge and skill); **sharing contextual information explicitly** (knowledge and skill).
Selection and Use of ICT	Selection of ICT		Ability to effectively select and use ICT tools to support the development of trust, decision-making, feedback giving, relationship building, etc.	Knowledge about **communication processes;** knowledge about **ICT tools;** knowledge and skill for **using ICT effectively.**
	Use of ICT of ICT		Ability to use different ICT to convey the message.	Knowledge and skill for **using ICT effectively;** skills for using **presentation and visualisation tools.**

As seen in **Table 12.**, communication competence was divided into two main areas: a) communication quality and b) the selection and use of ICT. The second area – the selection and use of ICT – includes competencies and attributes needed in virtual teams to leverage the virtual communication tools most effectively. The first part – communication quality – refers to the ability to maximise communication effectiveness by, for example, using the right time and frequency for communication and developing and sharing high-quality content persuasively through virtual means. Communication competencies are strongly connected with collaboration competencies since, for example, effective communication requires individuals to have the ability to read each other's emotions and control one's own emotions. Still, for clarity, it was decided to keep all emotion-related competencies under the collaboration topics, which will be discussed next.

5.5.2 Virtual collaboration

There are numerous definitions of collaboration, but most of them outline the following features: a) working towards a common goal, b) being interdependent with each other, c) parity or equality, and d) voluntary participation (Slater, 2004). According to Scoular and colleagues (2020), collaboration involves several activities to complete the tasks, including a) building a shared understanding, b) contributing collectively, and c) regulating, for example, resolving differences and adapting behaviours. According to the Australian Council for Educational Research (ACER's) collaboration skills model (Scoular et al., 2020), all three categories include 2–3 skills (see **Table 13**). These skills are adapted and complemented to the virtual teamwork context in the following discussion.

Table 13. Division of collaboration competencies according to ACER's model (Scoular et al., 2020).

Collaboration competency	A person holding such competency can…
Building a shared understanding	Communicate with others; Pool resources and information Negotiate roles and responsibilities.
Contributing collectively	Participate in a group; Recognise the contributions of others; Engage with one's given role and responsibilities.
Regulating	Ensure that one's own contributions are constructive; Resolve differences with others; Maintain a shared understanding within the group; Adapt one's own behaviour and contributions according to that of others.

The ability to *build shared understanding* builds on the communication skills mentioned in the previous section – that is, the quality of communication,

coordination of communication, effective use of ICT, and so on. Perhaps a new aspect to add is the emotional side of communication regarding relationship building. Relationship building requires more than effective information exchange. Individuals' social skills are also necessary. The literature on social skills often mentions emotional intelligence (EI), and the literature on future skills considers EI one of the most critical future competencies at work (Burrus, 2021). Mayer and Salovey (1993, p. 433) have defined EI as *"the ability to monitor one's own and other's feelings, to discriminate among them, and to use this information to guide one's thinking and action"*. EI can be broken into four proposed abilities that are distinct yet related (Salovey and Grewal, 2005): a) perceiving emotions, b) using emotions, c) understanding emotions, and d) managing emotions. Descriptions regarding each competency area within EI can be seen in **Table 14**.

Table 14. The competency areas of emotional intelligence (EI) (Salovey and Grewal, 2005, p 281–282).

Competencies related to EI	Description of the competency
Perceiving emotions	*"…the ability to detect and decipher emotions in faces, pictures, voices, and cultural artifacts. It also includes the ability to identify one's own emotions."*
Using emotions	"…the *ability to harness emotions to facilitate various cognitive activities, such as thinking and problem-solving".* For example, a happy mood can stimulate creative thinking and problem-solving.
Understanding emotions	The ability to comprehend language and *"appreciate complicated relationships among emotions".* For example, differentiating between happy and ecstatic.
Managing emotions	*"…ability to regulate emotions in both ourselves and in others".*

EI is largely transferrable and can be used in any context. However, in virtual teamwork, the operationalisation of some aspects will be slightly different than in traditional face-to-face circumstances. As previously mentioned, the lack of physical cues in virtual teamwork stresses the need to use other complementary tools and techniques (e.g. emoticons, etc.) to convey one's emotional responses. At the same time, virtual teamwork also requires the ability to "read" other people's emotions from cues other than the usual. Thus, small cues (e.g. turning one's head in a virtual meeting, communication frequency, etc.) can tell about the other person's emotional state. Closed-loop communication and the ability to ask questions are essential for understanding how other people are doing emotionally. Thus, those who are more extraverted in nature (e.g. share their feelings and reach out to other people to learn how they are doing; see Big Five personality traits) will probably better adapt to social communication in a virtual context (Kautz et al., 2014; Zhang, 2003).

According to the theory, contributing collectively (e.g. actively and on time for your tasks and responsibilities) helps build and maintain trust. Therefore, conscientiousness – the tendency to be organised, responsible, and hardworking (see Big Five personality traits) – is an extremely important personality trait in virtual teams (Kautz et al., 2014; Zhang, 2003). Rios (2020) used the term professionalism to describe a person's ability to *"demonstrate personal accountability and employ effective work habits".* In addition to these personality traits, it is also vital to share one's work progress frequently and in a timely fashion (also discussed under communication competencies) to reduce the uncertainty of others and enhance coordination of work processes, trust, and more (Schulze and Krumm, 2017). Competencies related to giving and receiving feedback (Ferrari., 2013) are also beneficial, as they help improve one's contribution and, thus, the overall team outcome. In virtual environments, it is more difficult to gain feedback on one's work; therefore, it is extremely important to know the importance of constructive feedback and be able to share and receive it. Rios (2020) added that an individual's ability to adapt is vital to responding effectively to feedback.

Empathy and behavioural flexibility have been found to be positive factors related to virtual team performance (Clark et al., 2019). Studies have shown that benevolence values can be associated with helping others, sharing constructive feedback, and expressing readiness for social contact with new people (Arieli et al., 2014). In addition, from the Big Five personality traits model (see **Table 2** in subchapter 3.3.2.2), agreeableness, *the tendency to act cooperatively and unselfishly* (Kautz et al., 2014; Zhang, 2003) can be considered important when collaborating in virtual teams. From the knowledge side, knowledge about the dynamics of collaborative processes is highlighted in the DigComp framework (Ferrari, 2013). In the current research context, this knowledge would benefit from including knowledge about the challenges and best practices related to virtual teamwork.

The third aspect of ACER's model will be examined here from a more conflict management perspective, as other aspects (building a shared understanding, contributing) have already received attention. A study by Krumm and colleagues (2016) highlighted the ability of virtual team members to detect conflicts and solve them effectively. According to Morrison-Smith and Ruiz (2020), conflict can be divided into relationship-based conflicts and task-based conflicts. Relationship-based (but also task-based) conflicts are best solved by building good relationships (Schulze and Krumm, 2017). Morrison-Smith and Ruiz (2020) also pointed out the benefits of occasionally meeting face-to-face due to the benefits of face-to-face meetings in identifying and handling conflicts. In addition, feedback-seeking behaviour, positive reinforcement (appreciation), openness, and humility have been found to be effective measures in mitigating conflicts (Ayoko et al., 2012). Finally, it is good if virtual team members can solve their own conflicts, but even better if

they are able to mediate and mitigate conflicts between their team members (Ayoko et al., 2012).

Task-based conflicts are best avoided using asynchronous communication technologies (such as chat, memos, e-mails) that document the team's agreements regarding tasks and responsibilities (Ayoko et al., 2012). However, if task-based conflicts emerge, the use of synchronous communication tools (e.g. phone calls, video conferencing, face-to-face meetings) is better, as these are known to facilitate a better understanding among team members (Powell et al., 2004). Regarding personal traits, agreeableness and emotional stability (predictability and consistency in emotional reactions, with the absence of rapid mood changes) (Kautz et al., 2014; Zhang, 2003) can both be expected to be useful in managing conflicts in virtual teams. Apologising for any inconveniences, explaining one's own behaviour, and being transparent (not in an offensive way) can also help solve conflicts that have emerged (Ayoko et al., 2012). Finally, creating rules and norms for communication and collaboration between team members in the beginning of teamwork can also build swift trust (Blomqvist and Cook, 2018) and increase performance by avoiding misunderstandings and thus conflicts (Morrison-Smith and Ruiz, 2020).

5.6   Dealing with diversity

Diversity in values, orientations, working styles, and conventions has often been associated with misunderstandings and conflicts between virtual team members (Schulze and Krumm, 2017). Therefore, it was decided to spend extra effort in the current study to understand the competence mechanisms behind dealing with diversity, as they form an important part of virtual team collaboration. In general, openness to experience has been found to positively influence coping with diversified people, as it has been shown to increase *"the tendency to be open to new aesthetic, cultural or intellectual experiences"* (Kautz et al., 2014; Zhang, 2003). In addition, the OECD Skills for 2030 report (OECD, 2019b) highlights global competency, as it fosters a more inclusive and reflective attitude towards diverse cultures and societies. Rios (2020, p 23) called this type of global competence *"cultural sensitivity"* and described it as the *"ability to learn from and work collaboratively with individuals representing diverse cultures, races, ages, gender, religions, lifestyles, and viewpoints"*. Schulze and Krumm (2017) mentioned cultural intelligence and connected it with knowledge about similarities and differences among different cultures. The DigComp framework refers to an attitude in which individuals accept and appreciate diversity (Ferrari, 2013).

Virtual team members are expected to be aware of cultural differences and accept diversity of ideas, behaviours, and so on (Brockner et al., 2006; Ferrari, 2013). This knowledge includes breaking cultural stereotypes (Brockner et al., 2006). Schulze

and Krumm's (2017) study also highlighted the ability to use various ICT in such a way that the negative effects of differences among cultures and languages are mitigated. For example, when language difficulties arise, it is best to turn to e-mails, as they allow time for translation and keeping track of what has been said. Several studies have also highlighted cross-cultural communication skills, which represent the ability to display appropriate verbal and nonverbal behaviours in cross-cultural settings (Krumm, 2017). Moreover, precise and concise communication skills (both verbal and written) and quality language skills help avoid misunderstandings (Krumm, 2017). DigComp also includes netiquette, which refers to being sensitive to cultural differences in online communication (Ferrari, 2013).

To summarise, it was decided that, in the virtual teamworking context, the following competence areas regarding virtual collaboration are most vital (see **Table 15**): building shared understanding, contributing collectively, conflict resolution, and dealing with diversity. Each competence area includes specific attributes that, in symbiosis, allow for acting in a competent way. Both communication and collaboration competencies are important because they enable a person to work effectively in virtual teams and impact the whole collaborative climate and culture (e.g. the situational context) in which all team members operate. This type of collaborative climate is one aspect of the situational context that can enhance the actualisation of competencies by all team members.

Table 15. Collaboration competencies (developed by the author).

Competency	Description	Competency attributes
Building shared understanding	Ability to develop relationships and contextual knowledge in virtual environments	**Virtual communication** skill**; extraversion** (hot cognitive skill)**; valuing good relationships** and **equality; empathy and unselfishness** (hot cognitive skills); ability to **monitor and respond to one's own and other's feelings** (virtually) (hot cognitive skill).
Contributing collectively	A quality contribution made timely while considering team goals and members' roles and responsibilities.	**Conscientiousness** (engage with given role and responsibilities; demonstrate personal **accountability** and employ effective work habits) (hot cognitive skill); **communication competence**, knowledge and skills related to **giving, receiving, and adapting to constructive feedback;** knowledge about the **dynamics of collaborative processes**, challenges and best practices of virtual teamworking; empathy and **behavioural flexibility** (hot cognitive skill); **agreeableness** (hot cognitive skill), **professionalism** (accountability); skills for **negotiating roles and responsibilities**.
Conflict resolution	Ability to mitigate and solve conflicts in virtual teams	**Emotional stability** (hot cognitive skill); knowledge and skills for creating **team agreements; virtual communication competence;** skills for **using ICT in managing conflicts; openness to diversity** (attitude); skills for **mediating conflicts between others;** skills to **express appreciation;** skills for **apologising;** skills for **developing strong relationships with colleagues virtually**.
Dealing with diversity	Ability to deal with diversity (different cultures, working styles, etc.)	**Cultural intelligence** (knowledge about different cultures); **netiquette** (sensitivity to cultural differences while using ICT); **cross-cultural communication skills;** clear communication skills (verbal and written); skills for **using ICT in mitigating** cultural differences; **valuing diversity; valuing new experiences** (e.g. new ideas, meeting new people, etc.).

Another important topic that should be considered in the virtual teamwork context is self-management. The following discussion will explain what can be considered competencies regarding self-management and why these competencies are essential in virtual teamworking.

5.7   Self-management

As mentioned earlier, virtual team members must act consciously and accountably to build and maintain task-based trust in virtual settings. Consciousness means finishing work tasks by the deadline, responding to colleagues' requests on time, and so on. Working outside of the office means that there is no one else to help virtual team members be self-disciplined but the virtual team members themselves. According to Nurmi (2011), self-management skills, such as setting clear personal

and professional limits and prioritising tasks, have been proven to have positive impacts in helping team members cope with independent work in a distributed team (Nurmi, 2011). According to Schulze and Krumm (2017), studies on virtual teams have shown that highly conscientious individuals engage more readily in self-management tactics (e.g. scheduling work activities) when performing distributed work. In addition to traditional time management tactics (e.g. merging similar activities), shifting work time has been found to positively impact the creation of windows for interacting with others in distributed teams. Thus, time management skills emerged strongly as part of effective self-management in virtual teams. Rios (2020, p 23) defined time management skills as the *"efficient use of time and management of workload"*. This definition also captures the ability to set boundaries and thus develop a sustainable work–life balance.

Krumm and colleagues (2016) found organising and executing competence to be an important cornerstone of effective self- and work management in virtual teams. Based on the description of Bartram's Great Eight competence framework, Krumm and colleagues (2016, p 135) described organising and executing in virtual teams as an ability to

- *work on many things at the same time,*
- *set own goals,*
- *manage one's own time effectively,*
- *structure own tasks clearly,*
- *work systematically and in a structured way,*
- *finish tasks reliably,*
- *adhere to orders,*
- *monitor the quality and progress of one's tasks,*
- *coordinate one's tasks with others,*
- *improvise in difficult situations.*

As can be seen from this list, many skills resonate with self-directed learning skills, such as goal setting, planning, organising, and monitoring. The list also includes abilities that resonate with creativity and complex problem-solving, such as the ability to improvise in difficult situations. All of the aforementioned abilities can be aggregated under the term *executive functioning* (Salthouse, 2005). According to Lezak, 1995 (as cited in Salthouse 2005, p. 532), *"the executive functions consist of those capacities that enable a person to engage successfully in independent, purposive, self-serving behavior"*. In addition, executive functioning has been found to support complex cognitive skills and problem solving (Salthouse, 2005). Krumm and colleagues (2016) also highlighted collaboration skills (adhering to others), which were previously discussed in the collaboration section (5.5.2).

What has not yet been mentioned in the previous sections is reliability/accountability. According to the Big Five personality traits model, accountability and reliability could be merged into a personality trait called "conscientiousness", which refers to the likelihood of being responsible, organised, and hardworking (Salas, et al., 2005). According to the same model, people are conscientious and tend to act in "*purposeful, strong-willed, responsible, and trustworthy*" ways (Salas, et al., 2005). In addition, the Big Five model connects consciousness with a skill called *impulse control* (Salas, et al., 2005).

In addition, a review of the Future Skills framework (Kotsiou et al., 2022) highlights self-management–related capabilities/personal traits, such as self-awareness, resilience, EI, positive attitudes, and confidence. According to Kautz and colleagues (2014, p. 2), "*non-cognitive skills such as perseverance ('grit'), conscientiousness, self-control, trust, attentiveness, self-esteem and self-efficacy, resilience to adversity, openness to experience, empathy, humility, tolerance of diverse opinions, and the ability to engage productively in society*" are valued in the labour market, in school, and in society at large. From the abovementioned, resilience is an aspect that has not been mentioned in previous sections. According to the Oxford online dictionary (Oxford Learners Dictionary, n.d.), resilience refers to the ability *"of people or things to recover quickly after something unpleasant, such as shock, injury, etc."* Resilience, in the eyes of the current author, is perhaps related more to personal (or professional) crisis management. Thus, although useful, it is perhaps too strong to use in the virtual teamwork context. However, "grit" – which, according to the Oxford online dictionary (Oxford Learners Dictionary, n.d.), is "*the courage and strength of mind that makes it possible for somebody to continue doing something difficult or unpleasant*" – is something that would help individuals find solutions and continue working when facing problems in virtual teams.

A Future Skills review (Kotsiou et al., 2022) also highlighted *flexibility*, including *adaptability, multitasking, agility,* and *executive functioning*. These abilities overlap significantly with the coping capabilities discussed in the section on "Continuous learning and coping with change" (5.3). At the same time, agility, which was not discussed in previous sections, deserves extra attention to understand its meaning. In a recent article, Müceldilis (2020, p. 39) defined personal agility as *"the ability of employees to react and adapt to changes in the workplace".* Müceldilis (2020, p. 42) added that "*employees with high agility performance are at ease with change, innovation, and new technologies and display a commitment to continuous learning".* In addition to learning, adaptability, and knowledge about agile processes, which, based on its definition, can be seen as the foundations of personal agility, Müceldili (2020) highlighted creativity as an important driver of personal agility. As curiosity has been shown to reduce uncertainty and support

employee proactivity, adaptability, and resilience, it is worthwhile to add curiosity and personal agility to the virtual teamwork competence framework.

A McKinsey and Company report (Dondi et al., 2021) highlighted the *self-motivation ability*, *understanding one's own emotions and strengths* (self-monitoring), *courage and risk taking* (entrepreneurial mindset), *energy, passion,* and *optimism, breaking orthodoxies* (openness to new), *ownership* (consciousness), *decisiveness,* and *achievement orientation* as essential employee characteristics. All of these factors can be considered important in virtual teams. For example, virtual team members must often self-motivate themselves (to start working or take breaks). Additionally, virtual team members must often make quick decisions on their own, without the opportunity to discuss them with colleagues. Energy, passion, and optimism can be useful noncognitive skills since they boost individual and team performance, help maintain motivation and positive energy towards work, and make it more pleasant for others to work with each other. At the same time, achievement can be a double-edged sword, as it might increase the risk of solo performance and not considering team members. Thus, achievement orientation could be accompanied by the word "team". Openness to new technologies and ways of working can also be seen as an essential attitude in a virtual teamwork context.

To summarise, **Figure 14** illustrates all of the competence attributes related to self-management that have been revealed with the help of theory. Notably, competence attributes for self-management include many attributes highlighted in the "Continuous learning and coping with change" section (5.3). Thus, self-management competence can be seen as vital for effective self-directed learning and coping with changes. However, learning can also help an individual manage oneself. For example, if a person is missing time management skills, they can improve these skills by learning and thus increase their self-management competence. Thus, the competences of self-management, coping with change, and self-directed learning can be said to have very strong linkages.

Figure 14. Competencies and competence attributes related to self-management.

Leadership, highlighted in the next section, is the last topic to discuss in the context of virtual teamwork competence.

5.8   Leadership

It is intuitively clear that effective virtual team leaders are role models in all previously mentioned aspects, such as effective collaboration, communication, problem-solving, and learning. For example, studies have shown that a positive team perception of leadership communication results in members' positive perceptions of the virtual team's performance (Morrison-Smith and Ruiz, 2020). Moreover, suppose it is expected that virtual team members will be prone to experimenting and trying new ways of working, new technologies, and so on. In this case, virtual team leaders should show examples by themselves. However, team leaders generally are those for whom expectations are slightly higher compared to team members. For example, it is expected that team leaders can (Morrison-Smith and Ruiz, 2020):

- facilitate relationship building,
- facilitate quality leader–member and member–member interactions,
- foster creativity,

- provide training, guidance, resources, and coaching,
- facilitate knowledge sharing and the building of shared mental models,
- demonstrate empathy and understanding,
- monitor and reduce tensions, and
- bridge co-located and remote team members to promote team effectiveness, and so on.

The literature on the success factor of virtual team leadership can be divided roughly into two categories: a) studies that look at leadership style and b) studies that look more closely into managerial activities. Both streams of the literature have found some interesting results. For example, studies have found that the *transformational leadership style* works best in slightly virtual teams (Morrison-Smith and Ruiz, 2020). However, when team virtuality increases, transformational leaders might be perceived as *"too far removed"* by the team members (Morrison-Smith and Ruiz, 2020). *Empowering leadership* has been found to positively impact virtual team members' collaboration behaviours and individual performance (Morrison-Smith and Ruiz, 2020). Although empowering leadership has been found to also work in a high virtuality context, it requires team members to have basic situational judgement skills (self-reflection, analytical skills, etc.) to have a purposeful effect (Morrison-Smith and Ruiz, 2020).

Finally, *shared and emergent leadership styles* have been found to provide virtual teams with many benefits, such as emotional stability, agreeableness, and positive effects on the relationship between team composition and team performance (Morrison-Smith and Ruiz, 2020). At the same time, shared leadership requires informal communication opportunities, which are often lacking in virtual teams (Morrison-Smith and Ruiz, 2020). Moreover, studies have shown that centralised authority may positively impact team performance, but it also has many adverse effects, for example, on team innovation and learning (Morrison-Smith and Ruiz, 2020).

Purvanova and Kenda (2018) found that virtual team leaders are more successful if they adopt the *both-and* lens. This means that successful virtual team leaders combine nonhierarchical leadership styles with managerial activities. Purvanova and Kenda (2018) referred to this type of leadership as a *synergetic leadership style*. Synergetic leaders embrace the benefits that virtual teamwork brings while, at the same time, acknowledging the challenges and obstacles arising when virtuality increases. To overcome the paradoxes of virtual teamwork, synergetic leaders a) monitor productivity while inspiring performance beyond expectations, b) set clear goals and form meaningful relationships, and c) manage processes while encouraging individuality and flexibility (Purvanova and Kenda, 2018).

The literature also generously describes managerial activities that have been found useful in virtual leadership. Based on these activities (and their descriptions), it is possible to derive virtual team leadership competencies and competency attributes. After careful analysis, these activities were divided into five competence areas: *virtual project management, virtual team building*, *strategic virtual communication*, *human psychology*, and *diversity*. All of the activities in these categories and related competence attributes can be seen in **Table 16**. It must be acknowledged that, while some competence attributes came from previous sections, some are based on the author's interpretation, as the literature on virtual teams provides very limited examples of virtual team leadership competencies. For example, the theory describes how effective virtual team leaders take meeting minutes and ensure that everyone knows what to do after the end of the meeting (Malhotra et al., 2007). This activity was transformed into the "virtual meeting management skill".

To summarise, the literature has looked at effective virtual leadership mainly from two angles: a) leadership styles that work in virtual teams and b) leadership activities that work in virtual teams. However, a competency-based approach to virtual team leadership can lead to interesting and practically useful results since there is an opportunity to merge leadership style issues and managerial activity–related issues into one model. The above proposition is supported by the findings by Purvanova and Kenda (2018) that virtual teams benefit most from a *mindset* that sees contemporary leadership styles and more traditional managerial activities as mutually supportive (not exclusive) mechanisms (Purvanova and Kenda, 2018). Before closing the current chapter, a short discussion is presented on how general values can work as predictors of individual success with virtual teamwork.

Table 16. Competencies connected with virtual team leadership activities (developed by the author).

Competency	Related activities	Related competency attributes
Virtual project management	Clearly articulating goals, roles, and relationship expectations (review article by Morrison-Smith and Ruiz, 2020); taking meeting minutes; making sure that everyone knows what to do after the end of the meeting (Malhotra et al., 2007).	**Project management** skills; **(virtual) meeting management** skills; knowledge about **best practices of virtual team leadership.**
	Monitoring progress (Berry, 2011) and making the monitoring process explicit through the use of virtual collaboration tools.	Knowledge about the **systems and strategies for monitoring and process sharing by using ICT.**
Virtual team building	Facilitating an early face-to-face meeting between team members (Morrison-Smith and Ruiz, 2020).	Knowledge about **team-forming processes** and team dynamics.
	Setting norms on behaviours, communication, etc. (Morrison-Smith and Ruiz, 2020).	Knowledge and (cognitive) skills for **developing team agreements.**
Strategic virtual communication competence	Facilitate a high level of consistent communication in all directions (Morrison-Smith and Ruiz, 2020), for example, different channels for task-based and relationship-based communication (Berry, 2011).	Knowledge about **effective communication tools and strategies in virtual teams.**
	Providing quality ICT tools; ensuring that the technology used by all team members is fully compatible among users and with their out-of-the-office working environments (Ford et al., 2017).	Knowledge about **different ICT tools available;** knowledge about the pros and cons of different ICT tools available; **ability to use the basic features of the main ICT tools** (skill); **ability to choose the right ICT tools** providing the best technology–task fit (skill).
	Organising effective one-to-one meetings with team members at least weekly (Ford et al., 2017).	**Coaching and mentoring** skills; knowledge about **best practices of virtual team leadership;** ability to **analyse behavioural cues to understand how team members are doing** (skill).
	Creating a sense of importance and significance for virtual work (Berry, 2011); engaging members through virtual meetings (Malhotra et al., 2007).	Ability to **engage individuals using ICT** (skill); knowledge about different **interactive check-in and warm-up activities.**
	Recognising and rewarding team members (Malhotra et al., 2007); ensuring the visibility of virtual team members among the team (Malhotra et al., 2007).	Knowledge and skills about **giving feedback,** knowledge about **best practices of virtual team leadership.**

Competency	Related activities	Related competency attributes
Human psychology and competence-related knowledge and skills	Demonstrating empathy and understanding.	Values **benevolence;** is **empathetic** and **understanding** (noncognitive skill); **values team members.**
	Providing training (Morrison-Smith and Ruiz, 2020).	Knowledge about **virtual teamwork–related competencies** and **future competencies;** positive attitude towards **inspiring and empowering team members; likes to empower employees.**
	Carefully selecting team members based on their personality traits (Morrison-Smith and Ruiz, 2020).	Knowledge about **human psychology and personality type indicators** (Big Five, DISC*, Belbin, etc.); ability to **analyse behavioural cues** to understand which people represent which types (complex cognitive skill); knowledge about **team dynamics.**
Diversity-related competence	Ensuring that diversity is valued and appreciated; allowing diverse opinions to be expressed through the use of ICT (Malhotra et al., 2007).	Skill of **selecting ICT tools for mitigating conflicts** coming from diversity; knowledge about the importance of **embracing skills; knowledge that everyone brings some value to the team** (value).

All the previously mentioned attributes and activities are best facilitated by those virtual team leaders who can apply a **synergistic leadership** style – meaning that they can apply explicit managerial techniques in combination with nonhierarchical leadership styles, such as **transformational, empowering, and emergent/shared leadership.**

* DISC=Dominance, Influence, Steadiness, Consciousness. DISC is a personality tool that provides personal insights into individual behavior (authors remark).

5.9 Relationship between general values and effectiveness in virtual teamwork

Some global values underlying virtual teamwork can be derived by using the universal value framework developed by Schwartz (2006, refined in 2012) and the previous analysis of competencies applicable to the virtual teamwork context. Based on Shwartz's universal values model, it could be argued that individuals who value benevolence, universalism, self-direction, and stimulation (see **Figure 15** and Schwartz's universal values in **Table 6** in chapter 3.3.4) are better fitted to virtual teamwork than those who value conformity/tradition, security, and power above most. This argument is supported by Shin's (2004) article, in which she proposes that people who value autonomy will often experience greater satisfaction in virtual teams with high levels of physical and temporal dispersion. At the same time, people who value autonomy less might feel better suited to teams with lower spatial and temporal dispersion levels (Shin, 2004).
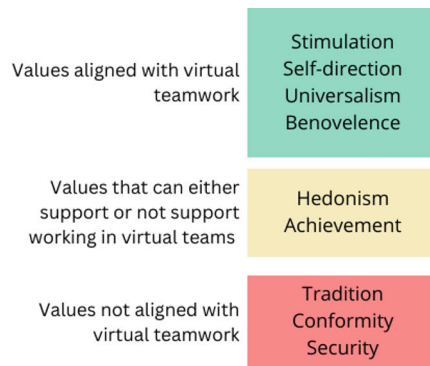
Figure 15. General (global) values and their possible relationships with virtual teamwork (developed by the author).

Similar to the current study, Shin (2004) differentiates between values and other capabilities (e.g. skills, knowledge), stating that values support employees' self-motivation and self-directedness and their capabilities (skills) regarding their ability to decide their own work schedules, methods, and pace. However, Shin (2004) does not take into account the possibility that their values (their hierarchy) will change with the development of skills and knowledge. Although not studied extensively, some indications in the literature suggest that developing skills and knowledge can lead to a change in values. For example, in their longitudinal study, Kohn and Schooler (1982) found that employees whose jobs required self-directed work showed an increase in self-directive orientations 10 years later. Bardi and Goodwin (2011) connected these results mainly to long-term exposure to certain values in the

environment. However, these long-term changes can also result from the development of certain skills. In the example provided by Kohn and Schooler (1982), employees' development of knowledge and skills related to self-management and decision-making could have led to long-term changes in their values. Rohan (2000) also mentioned skill development as an important factor in value changes.

Therefore, it can be proposed that developing employee competencies may help move values such as autonomy, benevolence, universalism, self-direction, and stimulation higher in their value list and thus help them better adjust to virtual teamwork, especially in teams in which the level of virtuality is high. According to Albrecht and colleagues (2020), "values at work" can provide a good basis for identifying values that may help increase certain values in the value hierarchy. For example, the authors connected self-direction with such work-related examples, such as: "*To make my own decisions at work; To decide what I will do at work; To determine how I spend my day; To be able to direct my work; To decide my priorities at work*" (Albrecht et al., 2020, p 536–537). Based on these examples, it can be theorised that developing skills related to time management, planning, goal setting, prioritising, and creative problem-solving may help individuals better adjust to virtual ways of working and thus start to value self-direction more than before.

To summarise, the current chapter and its subchapters highlighted the underlying competencies that can help individuals thrive in virtual teamwork. As mentioned earlier, these findings resulted from comparing competence theory with the constraints that were derived from the theoretical analysis in Section 2.3. However, since the current study has taken an iterative approach, in which theory and data are used in the iterative process when developing knowledge (not as a sequential process), interviews also shed light on which competencies could be potentially relevant in the virtual teamworking context. In other words, when the competencies and their related attributes came from theory, the decision to integrate certain competencies into the virtual teamworking competence model was made based on the insight from theory and interview data. The following section summarises the virtual teamwork–related competencies identified from the theory.

5.10   Initial virtual teamworking competence framework based on theory

The results from the theory allowed the development of an initial virtual teamworking competence framework. In doing so, the competence areas and related competence attributes were looked over, reworded (to make wordings shorter), reorganised, or merged, to avoid doubling the same attributes. For example, since online learning–related competency attributes came out in the digital competence

and self-directed learning perspectives, it was decided to keep this under one topic: self-directed learning.

The results are presented so that each competence area is divided into subareas (competencies). For example, "digital competence" was divided into competencies related to "information management", "safety", and "digital problem-solving". Competencies were again divided into groups of skills and knowledge, attitudes, and values. Some of the rows were left blank since the theory did not explicitly state related attitudes or values. After analysing the interview results and looking at the theory and interview results together, these gaps will be filled. In addition, based on the data results, the need might arise to reclassify certain parts of the theory-based model, which is seen as one of the contributions of the empirical data to the theory in the current study.

After the findings were analysed based on the theory, it was decided that skills and knowledge would be treated together to avoid repetition and fragmentation of the developed tables. Moreover, since the theory highlighted the importance of values and attitudes (because they can work as good predictors of behaviour, even though the literature often overlooks them), it was decided to highlight attitudes and values more strongly in the model in **Table 17**. It was also found that values and attitudes can be presented as overarching themes that govern all competencies within one competence category.

The following main categories of competencies remained the same as when presented at the beginning of the current section. However, in some headlines, the word "virtual" has been added to highlight even more that these are competencies selected for the virtual context based on their unique characteristics and impacts on virtual team members:

1) digital competences
2) creative problem-solving
3) continuous learning and coping with change
4) competencies related to ethical thinking
5) virtual social competencies
6) self-management–related competencies
7) virtual leadership competencies

Table 17 Initial virtual teamworking competence framework summarises the competencies related to virtual teamwork based on the previous discussions and the synthesis of the theory.

To summarise the main findings from the theory regarding virtual teamwork related competencies: an effective virtual team member can solve problems creatively, think about and analyse different aspects from an ethical point of view, cope well with changes, and exercise self-directed learning strategies. *Creative*

problem-solving means that virtual team members use different methods (observing, critical thinking, and creative thinking) to find new solutions to existing problems or combine existing solutions in novel situations. The most effective virtual team members not only *react* to problems but also *proactively contribute* to problem mitigation. Since technologies develop quickly, being able to cope with changes is crucial. A lifelong learning mindset, self-directed learning strategies, and the ability to create healthy and stable relationships are good predictors of the ability to adapt to changes. Virtual team members must often come to conclusions on their own, meaning that the ability to analyse things from different viewpoints (reflective judgement and ethical reasoning) helps an individual come to conclusions that better serve different interests and viewpoints.

People with *digital competencies* can solve problems, manage information, and protect themselves and others from online threats while using digital tools. Digitally competent individuals believe they can learn to use new technologies and can see the possibilities and benefits to career and personal growth of developing and applying new technologies. These people can analyse their own needs regarding technological resources and competencies. They can find the right tools for the tasks and learn to use them. They have a proactive attitude towards information sharing. They know and can apply general and corporate safety measures to protect themselves and sensitive data from leaks.

Table 17. Initial virtual teamworking competence framework.

DIGITAL COMPETENCIES

Values *Values…*	digital innovation
Attitudes *Likes to…*	share knowledge, content, and resources by using ICT tools; share information in a proactive way
Knowledge and skills *Knows and can…*	INFORMATION MANAGEMENT: access and search information online; select resources effectively; gather, process, understand, and critically evaluate information; store and organise information for easier retrieval; share with others the location and content of information found; use appropriate citation practices; integrate new information into an existing body of knowledge; deal with the data that are produced through several accounts and applications	SAFETY: protect one's own devices; understand online risks and threats; knows about individual and organisational safety and security measures	DIGITAL PROBLEM-SOLVING: assess one's own needs in terms of resources, tools, and competence development; match needs with possible solutions; adapt tools to personal needs; critically evaluate possible solutions and digital tools; open digital mindset; install and modify applications

CREATIVE PROBLEM-SOLVING

Values *Values…*	flexibility (contrary to following traditions/rules strictly); stimulation
Attitudes *Likes to…*	experiment; contribute voluntarily to solve problems; proactively solve (avoid) problems
Knowledge and skills *Knows and can…*	OBSERVATION: gather, process, store, and analyse information (using ICT); assess source validity; use reflective judgement; use foreign languages	CRITICAL THINKING: think analytically; conceptualise, synthesise and use logical reasoning; make decisions independently; apply knowledge (in new settings); use reflective judgement; interpret pieces of knowledge	CREATIVE THINKING: recognise opportunities for problem-solving; synthesise; apply a creative mindset

CONTINUOUS LEARNING AND COPING WITH CHANGES

Values Values…	lifelong learning; flexible and modern ways of working; effective teamwork; etc.		
Attitudes Likes to…	new ideas; change and opportunities; learn new things (e.g. new ways of working); be challenged		
Knowledge and skills Knows and can…	COPING WITH CHANGE: apply growth mindset; deal with ambiguity; develop stable relationships	SELF-DIRECTED LEARNING: identify learning opportunities; set (learning) goals; plan and actualise learning goals using relevant means; monitor one's own learning processes (including self-assessment, self-reflection, self-analysis)	ONLINE LEARNING: seek opportunities for self-development and empowerment in using technologies and digital environments; use online communities and organisational communities of practice with learning purposes; search, enrol, and participate in relevant online courses; make digital notes

ETHICAL THINKING

Values Values…	universalism, diversity; respect for other people		
Attitudes Likes to…	learn and think about ethical and sustainability-related issues		
Knowledge and skills Knows and can…	BUSINESS ETHICS: global, local, and intraorganisation business ethics and standards; sustainability-related issues; ethical reasoning; reflective judgement; knowing the impact of ICT on the environment	E-ETHICS: code of conduct for (virtual) collaboration (in organisation/team); privacy-related rights in the virtual environment; netiquette; analyse and adapt one's own behaviour in virtual collaboration/ communication; explicitly express implicit norms and guidelines to new team members; adapt to the norms of new teams/organisations; protect oneself and others from possible online dangers (e.g. cyberbullying); develop active strategies to discover and report inappropriate behaviours	DATA PROTECTION: knowingly and ethically share content publicly; copyright and licence– related issues; apply reflective judgement; assess source validity

VIRTUAL SOCIAL COMPTENCIES

Communication

Values Values…			
Attitudes Likes to…	share knowledge, content, and resources by using ICT tools; proactively share information; use video		

Knowledge and skills *Knows and can…*	COORDINATING COMMUNICATION: know about project aims, status, roles of team members, etc.; maintain shared understanding within the team; critically evaluate the need for sharing information; share and respond to information in a timely manner; manage time effectively	QUALITY OF COMMUNICATION: apply manipulation, argumentation, and negotiation skills; apply storytelling skills; use closed-loop communication; listen strategically; clearly present and visualise information (using different options: video, presentations, images, charts, etc.); ask good questions; apply excellent oral and written communication skills; communicate in foreign languages; switch between task-oriented and relationship-oriented communication; produce clear and concise messages; share contextual information and implicit information explicitly	SELECTION AND USE OF ICT: select appropriate means for communication (face-to-face, asynchronous, synchronous); interact through a variety of digital devices and applications; participate in communities/teams through online engagement; express creatively through digital media and technologies; substitute emotional cues (e.g. body language with emoticons, unconventional orthography, such as "noooooo", or facial expressions, such as smiling more often); create, edit, and improve the content in different formats, including multimedia

Collaboration

Values *Values…*	behavioural flexibility; collaboration; professionalism (accountability), effective virtual communication; other people; equality; benevolence; good relationships; diversity; empathy		
Attitudes *Likes to…*	act cooperatively and unselfishly; new experiences (e.g. new ideas, meeting new people, etc.); participate voluntarily in new projects/tasks; give and receive constructive feedback		
Knowledge and skills *Knows and can…*	RELATIONSHIP BUILDING AND NETWORKING: reach out to people; monitor one's own and other's feelings (virtually) and use this information to guide one's behaviour; know the dynamics of collaborative processes (in virtual teams); challenges and best practices of virtual teamworking; create, adapt, and manage one or multiple digital identities; protect one's e-reputation; engage in online teams and communities	CONTRIBUTING COLLECTIVELY AND BUILDING SHARED UNDERSTANDING: engage with given roles and responsibilities; demonstrate personal accountability; employ effective work habits; give and receive constructive feedback; respond to feedback; negotiate roles and responsibilities; build a shared understanding within the virtual team	CONFLICT RESOLUTION: develop good relationships with colleagues; maintain emotional stability; create and follow team agreements; select the right tools for solving conflicts; mediate conflicts between others; express appreciation; apologise DEALING WITH DIVERSITY: apply cultural intelligence (knowledge about different cultures); learn from and work collaboratively with individuals representing diverse cultures, races, ages, gender, religions, lifestyles, and viewpoints; apply netiquette (be sensitive to cultural differences in virtual communication and adjust communication style while communicating with people from different cultures; communicate precisely (to avoid misinterpretations); choose and use ICT to mitigate cultural differences

SELF-MANAGEMENT COMPETENCES

Values	team and personal goals; new technologies, ways of working, etc.
Attitudes *Values… Likes to…*	demonstrate positive attitudes towards everyday tasks and activities; learn new things
Knowledge and skills *Knows and can…*	prioritise and manage workload; apply project management skills in personal work life; set goals and execute plans; apply self-assessment, self-reflection, self-monitoring, and self-analysis skills; control impulses; demonstrate grit; apply emotional intelligence; demonstrate self-confidence and personal agility; self-motivate; make decisions independently; apply energy, passion, and optimism to everyday activities; avoid health risks related to the use of technology in terms of threats to physical and psychological well-being

VIRTUAL LEADERSHIP COMPETENCES

Values	diversity; nonhierarchical leadership styles; benevolence; empathy; employee development; employee autonomy		
Attitudes *Values… Likes to…*	try out new ways of managing virtual teams; try new technological tools in virtual collaboration; give and receive constructive feedback; inspire and empower team members		
Knowledge and skills *Knows and can…*	VIRTUAL PROJECT MANAGEMENT AND TEAM BUIDING: apply a synergetic leadership style (e.g. combine explicit managerial activities with nonhierarchical leadership styles); apply project management skills (e.g. by setting clear goals and making sure that everyone understands them in the same way); form meaningful relationships with employees; facilitate virtual meetings (prepare, engage with, and finish clear task division); best practices of virtual team leadership; monitor team and individual progress; create a common understanding about team progress; know team-forming processes and team dynamics in virtual environment (e.g. facilitates early face-to-face meeting or virtual kick-off) between team members; select ICT tools for mitigating conflicts; embrace (explicitly) skills and knowledge that everyone brings to the team	DEVELOPMENT OF VIRTUAL COMMUNICATION STRATEGIES: develop team agreements; select appropriate communication tools; develop an effective communication strategy for communication (where, with whom, and when to share information); facilitate a high level of consistent communication within the virtual team; apply coaching and mentoring tools; analyse behavioural cues to understand how team members are doing; engage individuals while using ICT; apply different interactive check-in and warm-up activities to increase engagement during virtual meetings; monitor how team members are doing (e.g. through one-to-one meetings)	SELECTING AND TRAINING: know virtual teamwork–related competencies and future competencies; apply human psychology and personality type indicators (Big Five, DISC, Belbin, etc.); analyse behavioural cues to understand which people represent which types and thus combine effective teams; give employees motivating tasks

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Individuals with *virtual social skills* can communicate and collaborate effectively in virtual circumstances. Effective communication means that communication is timely, frequent, and clear. Individuals working in virtual teams must also be acquainted with modern communication and collaboration technologies and use them effectively to convey their messages. It is important to note that, in virtual communication, individuals must possess competencies in making implicit things explicit, such as adding contextual information to messages. In virtual teams, effective information receivers can, for example, listen carefully and use questions for clarification. Virtual collaboration competencies include the ability to create relationships and shared understandings virtually. It is also important to not only solve one's own conflicts but also mitigate conflicts between other team members. Virtual team members are expected to work with people from diverse backgrounds and make quality contributions to achieving the team's goals.

Effective *self-management* in virtual teams, means that individuals can take care of both their work-related tasks and their mental and physical well-being. They can monitor themselves using self-reflection tools. Based on self-reflection, virtual team members decide whether they need to take some time off, practise more self-discipline, learn new competencies, or go out with friends to let off some steam. Virtual team members value team goals in addition to personal goals. Virtual team members also value new technologies and new ways of working. They like to try out and learn new things. In virtual teams, where team members are often alone, individuals need to possess the ability to self-motivate themselves. Having a positive attitude towards everyday activities helps with developing and maintaining motivation. Effective virtual team members can demonstrate grit, self-control, EI, and personal agility. While they recognise and value team expertise, they also possess self-confidence, which supports independent decision-making when needed.

Effective *virtual team leaders* use synergistic leadership styles – meaning that they can apply explicit managerial techniques in combination with nonhierarchical leadership styles, such as transformational, empowering, emergent, and shared leadership. They acknowledge the benefits and disadvantages of virtual teamwork and use managerial activities (e.g. developing a common understanding of goals, roles, and tasks) to overcome the problems related to virtual teamwork. Virtual team leaders can develop effective communication strategies and thus facilitate a consistent communication flow within the team. Virtual team leaders generally trust their employees and value employee autonomy and growth. It is interesting to note that virtual leadership–related competencies also help create an environment that supports the application of competencies by virtual team members. The next chapter will look into leadership activities and other aspects that can help individuals apply their virtual teamwork–related competencies.

6   Theory-Based Situational Aspects Supporting Actualisation of Virtual Teamwork-Related Competencies

Research has long been concerned with understanding and predicting human behaviour in organisational settings. Research on human behaviour has traditionally taken two routes: the *individual difference approach* and the *situational approach* (Chatman, 1989). According to the individual difference approach, individual behaviour can best be predicted based on a person's personality traits, values, motives, and abilities (Chatman, 1989). In contrast, the situational approach is concerned with analysing the situational factors that affect individual behaviour (Chatman, 1989)*,* such as job design or social information processing (Staw and Ross, 1985)*.* According to Fischer (2020, p. 277), *"In situations where individuals have little choice about the behavior – which is common in organizational settings where tasks are assigned to individuals […] focusing on prototypical trait structures irrespective of the situation and culture may miss the important nuances that organizations need to manage their global workforce."*

By now, it has been generally agreed that both *individual* and *situational* aspects impact individual behaviour. Moreover, *congruence* between situational and individual characteristics (also known as P-E fit) enhances employee performance and well-being (Shin, 2004). For this reason, in the current study, individual differences (e.g. competencies) and contextual factors will be analysed together to better understand how firms can develop successful virtual teams and support their employees in competence actualisation. The following chapter focuses on the theory explaining contextual factors supporting the actualisation of individual competencies.

The topic – competence actualisation – is a rather unexplored research area. To some extent, competence implementation is discussed in OL theories (Pedler, 2019; Doyle and Johnson, 2019). However, OL theories usually focus on organisations as the central aspect under study and are not so much concerned about the individuals and the complicated processes related to individual competence actualisation. OL theories treat individuals as passive agents under the influence of leadership and other organisational relationships (Pedler, 2019). This predominant trend of

overlooking individual agency has led to several problems, such as the models and tools provided by OL theories not working or partially working (Pedler, 2019). As such, the OL literature itself calls for new research that

- considers individual agency and its influence on one's own learning (and competence application), but also on the learning (and competence application) of others (Pedler, 2019); and
- provides HR managers with tools that can help equip employees with the necessary competencies, implement learning, and offer supporting interventions for learning and competence application, especially in the virtual environment (Doyle and Johnson, 2019).

The existing gap in the literature between individual competencies and their implementation is expected to be filled by the current study, with the help of the SDT model. SDT was a useful tool in this study for providing a macro-level framework for understanding which *external* and *internal* aspects impact employee competence actualisation. Although the theory was originally developed to understand what drives individual motivation and well-being, it can be extended to explain employee behaviour in virtual teams. According to SDT, individuals achieve high performance when certain prerequisites are met (Deci et al., 2017). These include aspects related to workplace context, individual differences, basic psychological needs, and motivation (Deci et al., 2017). The author proposes that the same aspects influence competence actualisation in virtual teams (and in firms generally) (see **Figure 16**). SDT is used in the current study as an umbrella theory to analyse supportive mechanisms for competence actualisation in virtual teams. Each mechanism is further elaborated using examples from theories such as psychological safety (Edmondson, 1999), the Big Five framework (Kautz et al., 2014), and many more.
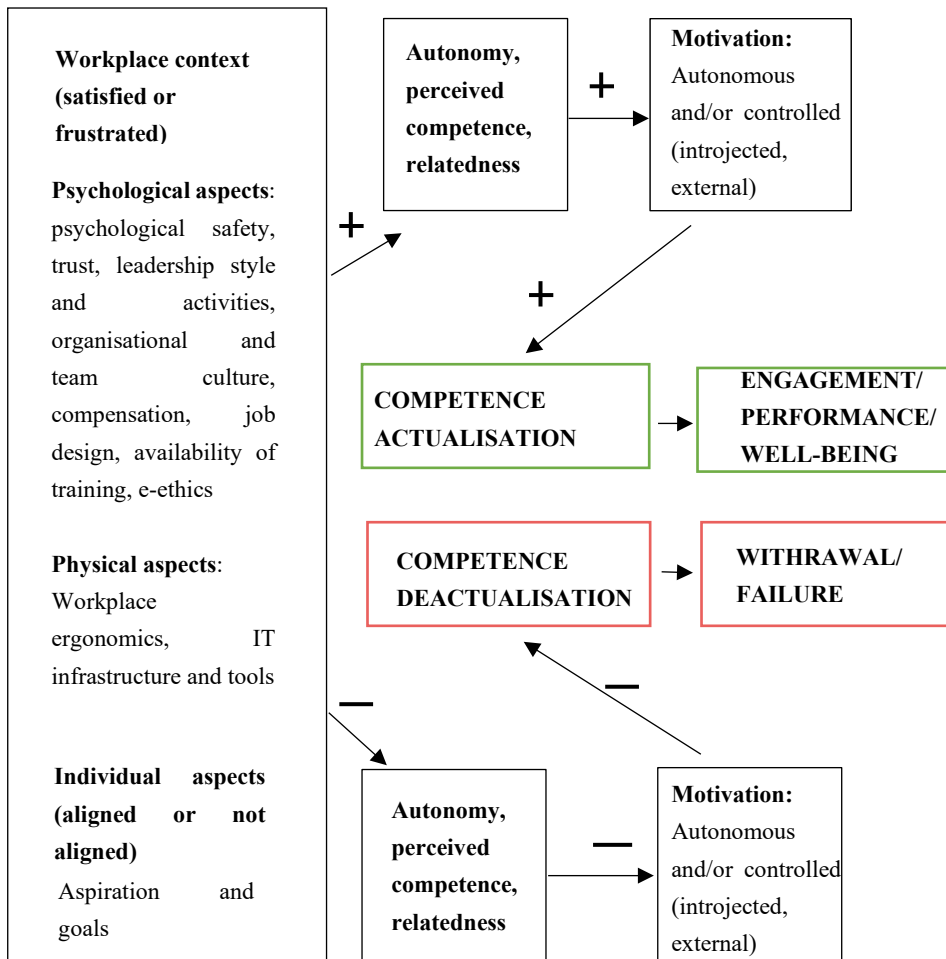
Figure 16. SDT model modified to explain the support mechanisms for competence actualisation (developed by the author based on Deci et al., 2017).

The figure above illustrates the relationship between external and internal aspects in the process of supporting competence actualizations. To summarise, the SDT model poses that if individual expectations and needs regarding external aspects (organizational setting, team setting, etc.) and internal aspects (autonomy, positive relationships with others, feeling of being competent) are met, then the individuals feel more motivated to work in the current team and task at hand. Current research extends the SDT theory by proposing that *being motivated* is a trigger that leads the person to look for ways to a) *apply* their *existing competencies* to achieve higher performance and wellbeing; and/or b) to *develop* their *existing competencies* if there is a gap with the existing competencies and the task at hand.

6.1   Workplace context

SDT starts by explaining that workplace-related aspects need to be satisfied to support employee productivity and well-being. For example, an employee needs to be satisfied with the leadership style within the team (organisation), the organisational culture, and the team culture, among other factors. In SDT, satisfaction with workplace context–related aspects leads to the satisfaction of psychological needs (discussed further in the current chapter) and motivation, which, in turn, lead to higher engagement, productivity, and well-being. In the current study, one additional layer was added before performance and well-being: competence actualisation. It is argued that satisfaction with workplace context–related aspects leads to the fulfilment of basic psychological needs, which, in turn, increases motivation, which leads to the actualisation of one's competencies, which ultimately leads to engagement, performance, and well-being. After careful analysis of the many potential (external) workplace-related aspects, the author decided to divide them into two categories: *physical* (e.g. furniture, laptops) and *psychological* (e.g. leadership, organisational culture) aspects. It can be concluded that the list of workplace context–related aspects developed by the author is inconclusive but is sufficient to explain the mechanisms between workplace context and competence actualisation.

6.1.1   Physical workplace–related aspects

Studies have shown that virtual teamwork increases reliance on computers, which, in turn, may increase negative physical effects, such as dry eyes, headaches, poor-quality sleep, and musculoskeletal disorders (Trindade, 2021). Studies have also shown that 40% of people who work remotely have less rest time than 11 hours (Eurofound and the International Labour Office, 2017). The problems mentioned above may escalate and lead to decreased productivity, which means that an individual loses the energy and ability to maximise their competencies. In addition, working from different locations may affect workplace ergonomics, negatively impacting productivity. Last but not least, noise and distributive factors (e.g. children, who are at home) can negatively affect productivity and, thus, competence actualisation. Therefore, virtual team members must have a good work–life balance and the opportunity to work in ergonomic and peaceful workplaces. These are factors that positively impact productivity, which means that individuals are most probably maximising their competencies.

Organisational leaders can support individuals by increasing their awareness of the importance of rest time. For example by organising seminars on these topics and some playful interventions to improve the physical activity of team members. It is quite common for organisations in Scandinavian countries (e.g. Finland, Sweden)

and in the Netherlands to cover the expenses of buying ergonomic tables and chairs for the home office (Netherlands Enterprise Agency, RVO, n.d.) and to ensure fast internet at home Bishop, 2020). IT and telecom organisations provide such compensative methods, as these compensations work, in part, to develop their organisational brand. Still, compensating for the furnishing and IT infrastructure of home offices is in its infancy in many countries and organisations. Reasons for not paying for home office furniture and tools may be local (or organisational) culture, low awareness of such issues, and local policies that make such compensation methods expensive and complicated for the organisation (e.g. the special incentive tax in Estonia).

To be able to take part in virtual meetings effectively and use cloud-based services, virtual teamwork requires fast internet. In addition, according to studies, the richness and availability of communication tools are one of the direct success factors in virtual teamworking performance (Clark et al., 2019; Garro-Abarca et al., 2021). Communication tools are considered here the hardware (laptop, headphones, etc.) and software (applications) used. If the IT infrastructure and tools do not support effective participation in virtual teamwork, it would be very hard for an individual to materialise all their virtual teamwork competencies. Of course, one of the individual teamwork-related competencies is the ability to tackle these issues (discussed earlier in the virtual teamworking competencies chapter). However, an organisation can support individuals in this regard, for example, by making sure that everyone has *equally* good access to fast internet and IT tools.

Buying IT tools (especially laptops) is probably one of the most common support mechanisms in today's organisations. However, since virtual team members are very often on the move and much of today's work (e.g. e-mail, collaborative applications) has moved from laptop to phone, also covering the purchase of a quality phone makes sense. Bigger screens can increase productivity and reduce virtual teamwork–related physical risk factors (such as eye problems, headaches, etc.). Moreover, quality headphones help reduce disturbing factors (such as noises) and can improve the overall virtual meeting experience (one can hear others better, and vice versa). Finally, access to and licences for communication and collaboration applications can be considered must-have support mechanisms in virtual teams. Access to different support mechanisms plays a vital role in employee competence actualisation.

6.1.2   Physiological workplace–related aspects

One aspect that influences competence actualisation is the *nature of work*, for example, the complexity of the tasks. According to research, task complexity is a critical factor affecting performance in virtual teams (Morrison-Smith and Ruiz, 2020). From an individual point of view, tasks need to be challenging enough to

allow for operationalising individual competencies. Tasks that are too simple or too complex may lead to a loss of motivation and thus negatively impact competence actualisation. From a teamwork perspective, research on virtual teams has found that complex tasks tend to increase the need for effective communication and collaboration (Morrison-Smith and Ruiz, 2020). For example, the more complex and/or urgent the task, the more it requires members to communicate and collaborate effectively, which, by itself, requires members to actualise virtual social competencies. Moreover, tighter collaboration among team members may lead to more innovative solutions and therefore provide opportunities for operationalising competencies that otherwise would have been left aside. However, when someone from the team fails to deliver on time, this may inhibit the opportunity for others to proceed with their work and materialise *their* individual competencies.

Organisational culture can also be considered an aspect that influences competence actualisation. For example, virtual teams most likely succeed in an adaptive, technologically advanced nonhierarchical organisation compared to a highly structured, control-oriented organisation (Johnson et al., 2001). The key to developing a culture that supports virtual teamwork lies in the hands of leaders. According to Johnson and colleagues (2001), leaders must establish a culture that values communication, learning, teamwork, and diversity. The latest pandemic showed that one of the biggest challenges is creating an inclusive culture when there is no opportunity to see each other face to face (Feitosa and Salas, 2021). Feitosa and Salas (2021) concluded in their study that, rather than missing face-to-face meeting opportunities, leaders could dedicate more time and energy to letting team members get to know each other better on the platforms used for communication. Studies have also shown that employees are more likely to share their skills or cover for each other in organisations that promote *cooperative* rather than *competitive cultures* (Morrison-Smith and Ruiz, 2020). Different methods, such as dedicating more time to discussing different ideas, can enhance virtual team members' understanding of each other's perspectives, thus allowing them to find more commonalities (Feitosa and Salas, 2021). A higher collaborative climate and stronger relationships in teams will most likely increase competence in employee actualisation since employees will take more risks.

The abovementioned factors lead to *psychological safety* (Edmondson, 1999) within organisations and teams, which can be argued to affect competence actualisation. Namely, applying competencies takes individuals to unknown territories. For example, when a team member pursues inspiring training and wishes to apply new learning, they might be faced with resistance from other members, which may inhibit actualising their newly acquired competencies. A psychologically safe environment means that voicing new ideas and experimenting with new ways of doing things is generally accepted and appreciated by colleagues and leaders

(Newman et al., 2017). Moreover, Edmondson's (1999) original works highlighted the need for team members to accept each other's competencies. According to Edmondson (1999, p. 361), in a psychologically safe work environment, employees feel *"that others won't reject people for being themselves, that team members care about and are interested in each other as people, that other members have positive intentions, and that team members respect each other's competence"*.

In addition to organisational culture, team culture, as a common culture, is important to develop, as it "unites the team members together, develops a feeling of belonging, and enhances morale by increasing acceptance, tolerance, and understanding towards and among all the members" (Rusu, 2022, p.. 4). Similar to psychological safety, team culture enhances acceptance and tolerance among team members. Thus, people will also accept that everyone in the team has different competencies and will acknowledge the importance of embracing their competencies to become stronger as a team. Again, team leaders are the most important key to developing a strong team culture (Rusu, 2022). It has been found that, through leadership activities, team leaders can "develop values like cooperation, support, mutual understanding, and even empathy and tolerance" (Rusu, 2022, p 5). In addition to team culture, it is also important that everyone in the team knows the roles, tasks, and targets that are assigned to them (Rusu, 2022). It can be assumed that knowing one's own role, goals, and tasks maximises the potential of materialising competencies.

Another thing that has been highlighted in the literature is the cornerstone for good performance in virtual teams is *trust*. Trust is often connected to team performance; however, it can be linked to individual performance and thus competence actualisation. Trust has been found to determine whether team members share feedback, ask each other for help, and discuss issues and conflicts (Morrison-Smith and Ruiz, 2020). The higher likelihood of asking for feedback can positively impact one's performance (especially from the qualitative side), which can be connected positively to the actualisation of one's competencies. Studies have also shown that, in low-trust teams, team members are less likely to use their (newly adopted) skills (Song and Thompson, 2011). Moreover, when team members do not trust each other, they spend more time monitoring one another instead of devoting their time, effort, and competencies to solving the primary tasks (Song and Thompson, 2011). One's commitment to a team and its goals has been found to be greatly influenced by trust (Morrison-Smith and Ruiz, 2020). Thus, low trust can lead to a decrease in one's commitment, thus affecting one's readiness to spend time, effort, and competencies on tasks related to a particular virtual team.

Trust, especially affective trust, is very much connected to *relationships*. While virtual team members do not know each other well, they form their opinions about each other based on the available cognitive information (such as competency,

availability, communication style, etc.) (Song and Thompson, 2011). This type of trust is called swift trust and is very fragile. Swift trust may be significantly affected as soon as someone forgets to respond to a message or is late with their work. In contrast, affective trust is steadier and allows team members to make small mistakes that will be forgiven (Song and Thompson, 2011). For affective trust to emerge, team members must get to know each other personally (Song and Thompson, 2011). Studies have shown that relationship building takes more time in virtual teams; however, it is doable when the proper techniques are used. Some of the techniques for building trust in virtual teams include organising physical or virtual nonformal events, taking time to share non-work–related information, and using collaborative tools and social media. Relational bonds with team members have been found to increase individual commitment to the whole team and its goals and are thus also likely to increase one's readiness to actualise their competencies (Song and Thompson, 2011).

One aspect that can affect trust is e-ethics, or the code of conduct of how individuals communicate and collaborate. A *code of conduct for communication* can be seen as part of an effective organisational and team culture. For example, when an individual sends out an e-mail and colleagues do not reply for several days, it can negatively impact trust. In contrast, communication behaviour that includes timely responses, in-depth feedback, and open communication has been shown to enhance trust in virtual teams (Henttonen and Blomqvist, 2005). This is in line with Kant's ethical guidelines, which emphasise the universal standard of behaviour in which individuals are treated with respect and never exploited (Lee, 2009). Thus, in virtual teams, where most of the communication is held through digital channels and thus misunderstandings are more likely to develop, communication must be especially respectful, attentive, and considerate. One way of ensuring respectful communication is the development of communication agreements, which has been shown to have many benefits, including increasing swift trust (Blomqvist and Cook, 2018).

Studies on virtual team leadership have found that the *transformational leadership style* works better in virtual team contexts than the traditional hierarchical leadership style (Morrison-Smith and Ruiz, 2020). Under the transformational leadership style, leaders lead mostly through inspiring, encouraging, stimulating, and empowering (Deci et al., 2017). Given the nature of virtual teams, in which individuals bear much more responsibility for solving everyday work-related tasks, such a leadership style may encourage members to rely on their own competencies while solving problems. Furthermore, studies based on SDT have found that transformational leadership is related to the satisfaction of employees' basic needs (including feeling competent) and autonomous motivation, which are both important elements in driving individual competence actualisation. In addition,

transformational leadership (especially involving employees in decision-making) has been found to positively impact both trust (Henttonen and Blomqvist, 2005; Akhtar et al., 2019) and psychological safety in teams (Akhtar et al., 2019). *Shared leadership* has also been reported to positively influence performance in virtual teams, as shared leadership increases the responsibilities of each team member (Morrison-Smith and Ruiz, 2020). Therefore, shared leadership increases the likelihood of maximising one's competencies through taking on more responsibility and tackling more challenging tasks.

Different *leadership activities*, such as planning, clarifying roles, and providing feedback, have been found to positively impact individual performance in virtual teams (Braun and Clarke, 2013). Setting clear and high expectations regarding work outcomes (both individual and team) requires team members to perform using all of their competencies. The goals, expectations, and roles must be communicated to the team members effectively by ensuring that everyone understands them in the same way (Braun and Clarke, 2013). Effective communication from the leader provides clear directions and facilitates coordination and collaboration among team members, allowing them to become more engaged and effective (Newman et al., 2017). Moreover, effective communication from the leader (Newman et al., 2017), combined with a positive and dynamic leadership style (Alaiad et al., 2019), has been found to nurture teamwork in which members support each other. Strong relational bonds with others and team feeling enhance individuals' engagement and motivation (Alaiad et al., 2019) and thus can be expected to positively impact competence actualisation.

Frequent feedback loops are another method that can help foster the maximisation of competencies. For example, a study by Bahar (2010) showed that teachers could better identify the problems related to their teaching and develop suggestions for improvement when they engaged in reflective discussions with other teachers. These types of discussions can be connected with a method – called retrospect - and used mostly in agile and Scrum processes. Originally developed and used mostly in IT development processes, this method has become useful in other areas, for example, to improve (virtual) teamwork (Dixon, 2005). Retrospect can be used in teams, in pairs, or individually; hence, the main idea is to look back and analyse what worked well and what could be done differently next time. Team, peer, or self-retrospection can be a concrete tool (out of many) to develop individuals' self-reflection skills. Team leaders can work towards developing those reflective competencies and opportunities for reflective discussions, which can help enhance competence actualisation.

It can also be assumed that, to actualise employees' virtual teamwork–related competencies, their *basic physical needs* must be met. According to Maslow's theory, only after basic physical needs are met can individuals start paying attention

to meeting their social and self-actualisation needs (Greene and Burke, 2007). One way of ensuring that individuals' basic physical needs are met is to provide job security and a competitive salary. If an individual feels insecure about their job, it is likely that they will be looking for other jobs and will not be maximising their full potential and competencies at current work. In addition, when individuals are underpaid, they are more likely to either look for a new job or engage in side projects, which means that they are not maximising their competencies fully in the given organisation and team.

After physical needs are met, one must also have the opportunity to have their social needs met (Greene and Burke, 2007). Healthy *social bonds* support maintaining a healthy mental state and, thus, the actualisation of one's competencies. The need to form relationships can be met, for instance, at home and with friends, as a good balance between work and private life is important. At the same time, relationships at work have also been found to play a critical role in virtual team members' engagement, commitment, and performance and in establishing trust. Strong relationships in teams allow for the development of affective trust and benevolence towards each other. Studies have shown that benevolence increases team members' willingness to devote time and energy to supporting their colleagues (Lippert and Dulewicz, 2018). Therefore, it can be concluded that benevolence increases one's readiness to go the extra mile for the team, which again facilitates the actualisation of not only one's own competencies but also those of colleagues.

Communication forms and tools have also been found to influence several aspects of virtual teams, including members' productivity (Alaiad et al., 2019). Communicating, coordinating, and sharing knowledge have been found to be critical for predicting efficiency and effectiveness in virtual teams (Garro-Abarca et al., 2021). Without effective communication (including all directions: bottom-up, top-bottom, and horizontal), there is a risk that virtual team members will spend a great amount of time trying to figure out what needs to be done or redoing what already has been done – thus not maximising the potential of their competencies. Therefore, establishing an agreement on communication, such as which communication channels to use and when and how to use them, is crucial in virtual teams (Lippert and Dulewicz, 2018). In addition to agreeing on the use of tools, the selection of the tools directly impacts communication effectiveness. Different team structures and tasks require different communication technologies to support both task-focused (formal) and informal communication and collaboration (Alaiad et al., 2019).

Finally, although it might sound tautological, to actualise competencies, one must possess competencies. According to Garro-Abarca and colleagues (2021), education, especially the opportunity to take part in online *training*, is one of the key factors for performance in virtual teams. Virtual leadership training that covers topics such as how to set goals and key performance indicators (KPIs), how to lead

virtual team meetings, how to monitor team progress, which technologies to choose for collaboration, how to establish team charters, and so on have been found very beneficial, especially in the early phases of forming virtual teams or moving from traditional to virtual teams (Brockner et al., 2006; Kilcullen et al., 2021). However, not only team leaders but also all members of virtual teams benefit from training related to several topics, including how to deal with diversity and different cultures (Presbitero, 2020), how to overcome challenges in virtual teams (Greenberg et al., 2007), how to use communication technologies, how to communicate effectively in the virtual environment, and how to establish trust and solve conflicts (Brockner et al., 2006). Organisations can thus support individuals in two ways: a) helping employees become aware of their learning potential and b) creating relevant learning opportunities.

6.2   Individual factors, basic psychological needs, and motivation

In addition to external workplace-related factors, internal factors, such as individual values and goals, influence individual behaviour (Sagiv et al., 2017; Arieli et al., 2020). For example, if individuals value independence, they will probably try to find work/roles/tasks that allow them to use independent decision-making. Additionally, if an individual has a goal to finish their master's studies, they will most probably look for a job that allows them to finish school. Greater amounts of research have focused lately on the subject of doing meaningful work. Meaningful work can be generally defined as *"work that is personally significant and worthwhile"* – in other words, work that is aligned with individual goals and values. Doing meaningful work leads to higher job satisfaction and increased worker well-being (Berkers, 2020). It can also be argued that doing work that is meaningful leads to higher employee competence actualisation, as, according to Berkers (2020, p 537), meaningful work involves the following:

1. *Pursuing a purpose.*
2. *Social relationships.*
3. *Exercising skills and self-development.*
4. *Self-esteem and recognition.*
5. *Autonomy.*

In addition, according to SDT, everyone possesses basic psychological needs, including the need to feel competent, the need to feel autonomy, and the need to feel related to other people (in short, competence, autonomy, and relatedness) (Deci et al., 2017). The satisfaction of basic psychological needs has many positive effects, such as decreased job exhaustion and increased well-being (Deci et al., 2017).

Studies have also indicated that individuals whose basic psychological needs are met are more likely to spend more effort finishing work tasks (De Cooman et al., 2013). Satisfying basic psychological needs has also been connected to the promotion of wellness and high-quality performance in organisations (Deci et al., 2017). Thus, it could be argued that the more satisfied individuals are in terms of basic psychological needs, the more they possess autonomous motivation, which, in turn, increases their willingness to put more effort into their work and thus can be positively related to the actualisation of competencies.

Autonomous (e.g. intrinsic) motivation is the central aspect of the SDT model in predicting workplace outcomes and behaviours. Motivational theorists generally agree that motivation can be divided into four categories (Manganelli et al., 2018):

a) intrinsic motivation – carrying out a task with sheer pleasure and enjoyment;
b) identified motivation – carrying out a task perceived as important (based on one's values);
c) controlled motivation – carrying out a task because of internal pressure that it must be done (to avoid guilt); and
d) extrinsic motivation – carrying out a task because of external rewards.

The more that external factors become internalised into an individual's sense of self, the more autonomous the individual's motivation and regulation become (Manganelli et al., 2018). A vast amount of research has indicated that autonomous motivation leads to higher work satisfaction, performance, well-being, and so on (Manganelli et al., 2018). Similarly, SDT implies that, when individuals can relate to their work's value and importance, they show higher autonomous work motivation and commitment (Deci et al., 2017). For example, a doctor who has high autonomous motivation does his work because he believes that his work is important to society. He needs fewer external or controlled motivational factors to increase his willingness to put effort into everyday work (Manganelli et al., 2018). Thus, it could be argued that autonomous motivation leads to autonomous competence actualisation – for example, individuals are willing to maximise their competencies in everyday work – without the need for external or controlled motivational factors.

6.3 Summary of situational aspects that support competence actualisation

To summarise, to support employees in maximising their potential and actualising their competencies in virtual teams, it is important to make sure that their needs regarding the external work environment, internal values, basic psychological needs, and motivation are met. The aspects related to the external working environment were identified for the virtual teamworking environment and can be found in **Table**

18. The table focuses mainly on identifying aspects in the workplace context, as other factors (individual factors, basic physiological needs, and motivational factors) are generic and do not change based on the context. It is important to add that the factors included in the list of workplace-related aspects are (if taken separately) also applicable in several contexts, so these factors are not unique on their own. However, what is unique is their combination, which considers the nature of the virtual teamworking context and thus covers all aspects and expectations (or at least most of) that employees working in such a context might have.

The theoretical model (**Figure 16**, at the beginning of chapter 6) developed to explain the role of external and situational aspects in the application of competencies can work as an important contribution not only to the competence and virtual team literature but also to OL literature, as it explains the relationship between competence actualisation and the external environment – an area which has not yet been sufficiently explored. In addition to the theoretical implications, the use of the SDT model in virtual team competence development is expected to have important practical utility. The model and discussion explaining which aspects to pay attention to in virtual teams may work as a practical guideline or tool for HR managers who are responsible for developing the competencies (and the application of competencies) of employees in virtual teams.

Table 18. Examples of aspects that influence competence actualisation in virtual teams (developed by the author based on the literature overview).

Main category	Subcategory	Examples of aspects that influence competence actualisation and lead to the fulfilment of basic psychological needs	Basic psychological needs
Workplace context	Workplace	Providing the possibility to work in a quiet area (in the office); compensating workplace-related costs for increasing workplace ergonomics at home (e.g. buying chairs, tables, etc.).	Feeling of being competent, feeling of autonomy and feeling of relatedness
	Tools	Fast internet connection; quality tools (laptops, phones, big screens, headphones) at home and in the office.	
	Applications	Access to licences and different applications.	
	Basic physical needs		
	Job design	Tasks that are not too easy or too complex; meaningful work.	
	Organisational culture	A nonhierarchical, cooperative culture that values open communication, learning, teamwork, and diversity; psychological safety; trust (managers trust employees); common norms and code of conduct (for collaboration).	
	Leadership	Having frequent on-to-one meetings; getting to know the team members; establishing clarity on roles, goals, and objectives (on both individual and team levels); transformational leadership style; shared leadership; providing feedback; effective and clear communication; strong relationships with team members.	
	Team culture	Team cohesion; team feeling; support; mutual understanding; empathy; tolerance; affective trust between team members; relationship building (team-building events, face-to-face meetings); code of conduct (collaboration agreement – for example, always using video, agreeing on response time, etc.); healthy social bonds.	
	Communication	More time for discussions; feedback; attentive and considerate communication style; effective communication forms and tools (which tools to use, double-loop communication style).	
	Working culture	Frequent feedback loops (e.g. applying retrospect).	
	Training	How to deal with diversity and different cultures; how to overcome challenges in virtual teams; how to use communication technologies; how to communicate effectively in the virtual environment; how to establish trust and solve conflicts; the importance of rest time.	
Individual factors		Personal goals and values and their fit with the work.	

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7   Research Design

As a short reminder to the reader, the current research's main aim is to identify competencies and organisational support mechanisms that help individuals better cope with virtual teamwork conditions in firms. From a theoretical point of view, the aim is to transfer, discuss, and integrate competency literature and practices into the field of virtual team competencies to enrich and systematise what is known and applicable in the virtual teamwork context and to evaluate how situational variations might affect the effectiveness of competencies. From a practical point of view, the current research aims to build a holistic virtual teamworking competence framework that can be understood and applied easily in the selection and training processes. The study also aims to provide concrete guidelines for organisations to support the actualisation of individual competencies within virtual teams and enhance the person–organisation fit.

To meet the aim of the research, the researcher posed three separate yet interrelated subquestions based on the main RQ:

Main RQ: *Which individual competencies and other factors enhance individuals' adaptation to a virtual working environment?*

Sub-RQ1: *What are the main constraints on individual effectiveness in virtual teams?*

Sub-RQ2: *Which competencies help individuals overcome key constraints in virtual teamwork?*

Sub-RQ3: *How can organisations support the actualisation of virtual teamwork–related competencies?*

As explained by Eriksson and Kovalainen (2011a, p. 2), *"All research methods are in close connection to research philosophy and to the ways it is possible to bring forward new knowledge through research."*. Similar to many practically oriented business researchers (Eriksson and Kovalainen, 2011a), the author of the current study was not so much concerned about the philosophical viewpoints at the beginning of her study, since philosophical discussions felt unnecessary in solving practical, real-life problems. About halfway through conducting the study, the

researcher realised the need to discover the philosophical issues in more detail, mainly for the following reasons:

- To make the study more holistic – for example, after the selection of the critical realism paradigm, the researcher saw the opportunity to use the P-E fit (Shin, 2004) approach for developing a competence framework. Not only did critical realism work as an inspirational tool, but it also provided guidance on how to conduct such a study and use data for developing connections between the phenomena (competencies) and the external context (e.g. organisational culture, leadership style, etc.).
- To be able to understand and explain the researcher's way of understanding the world around her and her interpretations of the research data.
- To develop research consistency in terms of aligning the ontology, epistemology, and assumptions regarding human nature (Morgan and Smircich, 2008).

Furthermore, choosing the research philosophy means that many of the smaller choices and selections in the research journey are predefined by the philosophical standpoint – and for the current study, this significantly helped in the later stage of selecting methods and explaining the selections made. To put it even more simply, choosing the philosophical underpinnings of the study is like making *one* decision instead of a *hundred*. Last but not least, describing the philosophical underpinnings makes the researcher conscious of their way of interpreting the world – and of the fact that there are several ways of interpreting it. In other words, by becoming aware of one's philosophical underpinnings, the researcher becomes aware of their own biases.

7.1   Critical realism

The underlying philosophical stance of the current study was chosen to be critical realism, under which reality is assumed to "exist but to be only imperfectly apprehendable because of basically flawed human intellectual mechanisms and the fundamentally intractable nature of the phenomena" (Guba and Lincoln, 1994, p 110). Unlike postpositivist and constructivist views, critical realism assumes that reality exists beyond the individual "constructions of the world" (W. Bell, 2009; Welch et al., 2011). Unlike positivist views, critical realism emphasises the subjective aspects of knowledge and the limitations to knowing with certainty (W. Bell, 2009). Outhwaite (1987, as cited in Wynn and Williams, 2012, p. 789) described critical realism as "ontologically bold, but epistemologically cautious".

Critical realism was found to be suitable for the current study, as it allows for developing insights into intangible phenomena, such as competencies, with the help

of logical analyses using the causes-and-effects perspective. As such, critical realism claims that, even though there is a "real and independent" reality outside of the individual consciousness, individuals still experience a portion of it (Wynn and Williams, 2012). In other words, according to critical realism, individual experiences through different activities and actions form only a fraction of "the real" (e.g. reality) (see **Figure 17**). At the same time, by analysing this *fraction*, it is possible to draw conclusions about what structures and mechanisms (e.g. competencies) are behind those events and experiences. Thus, in the current research context, by analysing individuals' experiences during different events and activities, it is possible to draw logical conclusions about which competencies (or the absence of competencies) triggered those events and thus led to these experiences.
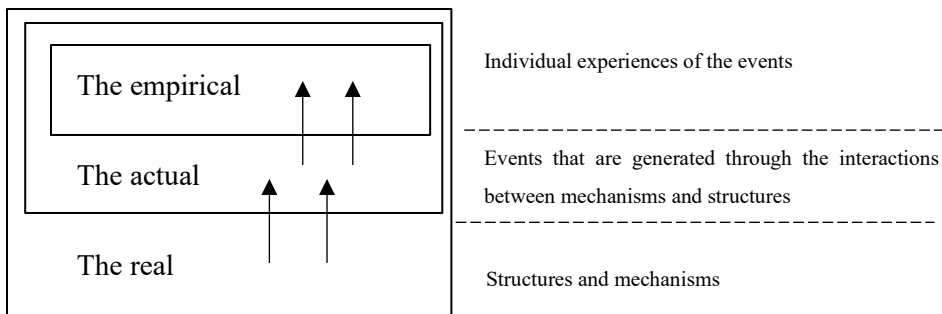
Figure 17. The three domains of reality under critical realism (adopted from Zachariadis et al., 2013, and modified based on Wynn and Williams, 2012).

In addition, critical realism's unique approach to situational and contextual considerations supports current research in developing a more holistic approach to competence framework development. As such, critical realists do not try to neglect the impact that external factors, such as the social context and the mechanisms and actions of other actors, play in determining the trajectory of events and actions leading to individual experiences. Thus, critical realism is in line with the situational approach to understanding individual behaviour (introduced in Chapter 6), as it accepts that, in addition to mechanisms related to individuals (or other aspects under study), there are always other aspects (such as context, mechanisms of other actors, etc.) that essentially determine the behaviour of an individual. **Figure 18** illustrates

the complex relationships between mechanisms and external factors, such as mechanisms or actions by other actors.

Generative mechanisms → Actions → Events   Individual experiences

The context, including one or more mechanisms and actions by other actors
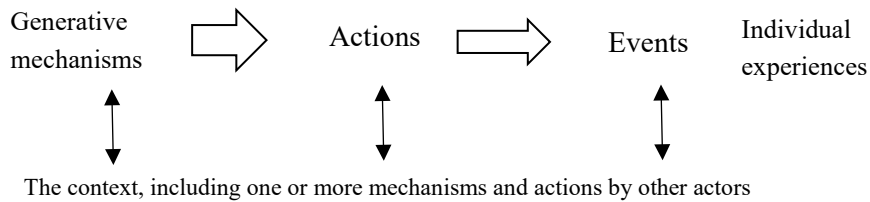
Figure 18. The relationship between generative mechanisms and situational characteristics in critical realism (developed by the author).

Thus, for example, if generative mechanisms are considered the competencies of an individual named Mary that informed her behaviour (actions) leading to certain events, then the external environment (e.g. the competencies and activities of Mary's team members) always has an impact on how Mary's competencies materialise. It is important to note that, when the external environment has an effect on the mechanisms, actions, and events of an actor, the mechanisms, actions, and events of that actor also alter the external environment (Wynn and Williams, 2012). Thus, the more competent the individual virtual team members are, the more effective the whole team is.

When developing causal explanations, critical realism accepts that both the researcher and the researched have unique experiences and interpretations about the "reality under examination", which allow for developing completely neutral and value-free propositions as a positivist would aim to do (Wynn and Williams, 2012). Thus, from the epistemological viewpoint, the critical realist is more a subjectivist than an objectivist, as they accept that the "subjectivity" in research is dependent on the values and interests of both the researcher and the researched (Eriksson and Kovalainen, 2015). At the same time, critical research (contrary to constructivism) allows for generalising and making general propositions based on individual experiences and interpretations when no significant evidence that falsifies the propositions can be found (Wynn and Williams, 2012).

The fact that critical realism accepts a) open (social) structures, b) a combination of various mechanisms at the same time, and c) the opportunity to make propositions based on observable experiences that may differ based on the actor's interpretations makes it possible, or even inevitable, to arrive at multiple explanations about events and their triggering mechanisms. Multiple possible explanations generate a need to compare and evaluate alternative explanations (Wynn and Williams, 2012). Such an

evaluation process in critical realism is called *judgemental rationality* and refers to the process through which several theories or explanations are developed and compared based on their explanatory power (Wynn and Williams, 2012). In practice, a researcher working under the critical realist philosophy develops several propositions for falsification (Bell, 2009). Only propositions that have more supportive evidence (or less evidence or strong arguments that would falsify the proposition) are accepted and considered worthy of belief (Bell, 2009).

In critical realism, this kind of reasoning is called *retroduction*. Retroduction is very similar to *abduction* and is often used interchangeably in critical realist theories (Ritz, 2020). However, according to Ritz (2020), these methods are two distinctive yet complementary ways to make inquiries. Abduction is a mode that lies between induction and deduction and allows for choosing between a number of possible frames, interpretations, or theories when to explain a phenomenon. When using abduction, the researcher uses induction and deduction to generate propositions or hypotheses that could explain a phenomenon. Abduction is similar to retroduction in that it allows justificatory interpretations – for example, reasoning based on justifiable beliefs with the aim of producing the best possible explanations for the problems at hand (Ritz, 2020).

Retroduction, similar to abduction, allows for iterative movement between theories and empirical research (Ritz, 2020). It also allows researchers to create knowledge of the real (the unobservable entities) by observing the empirical phenomena expressed through events (the actual) (Zachariadis et al., 2013). In addition, retroduction seeks to find conditional aspects that make phenomena exist – which is the main aspect that differentiates retroduction from abduction. As Danemark (2002, p 20) explained, research using retroduction usually seeks answers to the following questions:

> *How is any phenomenon, like an action or a social organization, possible? If we call this phenomena X, we may formulate our question thus: What properties must exist for X to exist and to be what X is? Or, to put it more briefly: What makes X possible?*

Thus, in essence, both methods – abduction, and retroduction – are modes of finding the best possible explanations for the problems at hand. However, the main difference between abduction and retroduction is that, while abductive conclusions have a character of suggestions that are not necessarily considered true or false yet, retroductive conclusions are conditional – that is, it looks at what must be true for X to make X possible (although the truth in retroductive reasoning is also considered true until proven otherwise). An analysis of the differences between abduction and retroduction showed that retroduction fits better with the current research aims –

namely, to explain what elements (competencies, situational aspects) must be met so that the individual working in a virtual team can work effectively. The initial analysis of the data and theories found that it is possible to create causal explanations – for example, Y and Z need to be present for X to occur. These causal explanations are not considered suggestions for possible answers (like an abductive researcher would do) but rather causal explanations to be considered true until proven otherwise.

The certainty or confidence involved in the ability to create such causal explanations comes from the fact that competencies themselves are not new phenomena to be studied. Although not studied extensively in the virtual team literature, there is a relatively strong theoretical base that explains how certain competencies or competence attributes are connected to individual behaviour. Moreover, the selected SDT has already been tested in several situations and contexts and found to be a good predictor for explaining what fundamental individual needs must be met for a certain behaviour or state (performance, well-being) to occur. The existing knwoledge was combined with the rich empirical data that the interviewees shared in the current study context. Therefore, it was found that combining the empirical data with theoretical frameworks allows for the development of conditional explanations of individual effectiveness (and the effectiveness of competencies) in virtual teams.

Thus, it can be summarised that, similar to in the ontological assumptions of critical realism, the researcher in the current dissertation:

a) considered both the individual mechanism (competencies) and external factors as causes of individual behaviour;
b) believes that, despite the variety of social structures, it is still possible to make generalisations based on various experiences using the causes-and-effects approach (retroduction); and
c) uses the judgemental rationality approach when developing explanations and identifying mechanisms (competencies) – for example, the explanations are considered true if no arguments that would falsify them are found.

The dilemmas related to critical realism arise mainly from its ontological and epistemological basis. First, critical realism is not suitable for research that looks for regularities for making predictions. This is because the critical realist view of causality is different from the positivist philosophy, in which event A is always followed by event B (Zachariadis et al., 2013). Critical realism looks for contingent causality, meaning that event A may be followed by event B in the case of X. The second dilemma related to critical realism is that it is not suitable for gaining a deeper understanding of the social and cultural meanings of the phenomenon or phenomena. Critical realists accept personal and cultural biases, but the focus is not to study them in depth. Rather, personal experiences and interpretations are accepted and used for

recognising generalities in certain contexts and situations. Thus, for a researcher interested in gaining a deeper understanding of personal, social, and cultural meanings, the constructivist paradigm is better suited. Finally, critical realism is not suited for a researcher who aims to identify social, cultural, or business- and management-related problems. For this purpose, other critical research approaches, such as critical theory and critical management/business studies would be better suited.

7.2   Theorising in the current study

Critical realism provides its own guidelines for theorising; however, before looking into theorising related to critical realism, more general questions (e.g. what is theory, and what is meant by theoretical contribution?) must be answered. Several approaches try to explain what theory is and is not and is presented in the following text. However, before starting to explain what theory is, one must make sure not to confuse *theory* with *theorising*. According to Parson (as cited in Weick, 2014, p. 177), a theory is the "*achievement",* while theorising refers to "*the working itself"*. Lynham (2002) and Whetten (2002) explained how *theorising* is not unique to the academic field but instead arises from a universal human need to order and explain personal experience. Following this line of thought, Torraco (2002) divided theories into *formal* and *informal* and explained how both formal and informal theories come to our assistance on a regular basis. Still, formal theories are expected to have certain qualitative differences which are the focus of the following analysis.

A literature analysis in organisational studies, management, and HRD revealed a general consensus regarding the *role* of theory. The role of theory, according to different authors, is mainly *to explain* the phenomenon or experience (Weick, 1995; Whetten, 2002; Torraco, 2002; Fleetwood and Hesketh, 2006) to help us *understand* events or behaviours (Sutton and Staw, 1995) and *predict* what will happen in a given situation (Weick, 1995; Fleetwood and Hesketh, 2006)*.* A formal theory must answer the questions of *what, how,* and *why* (Whetten, 1989); however, the importance of answering the question *why* has been emphasised by many scholars (Daft, 1985; Sutton and Staw, 1995; Fleetwood and Hesketh, 2006). Whetten (1989) explained that the *what* and *how* questions should be considered part of the explanation – a description of what factors are considered and how they relate to each other. However, only by answering the *why* question is it possible to *explain*.

Two definitions of theory resonate well with the expected role of formal theories. The first definition, by Sutton and Staw (1995, p. 378), highlights the need to describe the relationships and answer the *why* question: *"Theory is about the connections among phenomena, a story about why acts, events, structure, and thoughts occur.*" In contrast, the definition by Sutherland (1975, as cited in Andersen

and Kragh, 2010, p. 50) highlights that the role of formal theories is to be more withstanding than just in one particular case. According to Sutherlands definition (as cited in in Andersen and Kragh, 2010, p. 50): theory can be defined as "*an ordered set of assertions about a generic behaviour or structure assumed to hold throughout a significantly broad range of specific instances.*" Therefore, theories must have some generalisability to be useful. However, even after defining theory and its main roles, it is difficult in real life to decide what a theory *is* and what can be considered a *theoretical contribution* (Shepherd and Suddaby, 2017). Sutton and Staw (1995, p 372) noted this complexity by stating, *"Lack of consensus of what theory may explain the why it is so difficult to build a strong theory."*

Researchers seem to generally agree that good theories are *logically consistent* (Shaw and Costanzo, 1982, as cited in Jacard and Jacoby, 2010, p. 32-33), *novel* (e.g. *advance the current knowledge* about a phenomena or event) (Ibid.), have scientific and practical *utility* (Ibid.), *challenge the current understanding* (Davis, 1971; Mintzberg, 2005), and *direct future research* (Torraco, 2002; Shaw and Costanzo, 1982, as cited in Jacard and Jacoby, 2010, p. 32-33). Still, when it comes to a real-life situation in which a scholar is trying to publish results from their science project, they might run into a clash of different evaluation methods for a theoretical contribution. To sum up the academic debate, there seems to be a divide between the *dichotomous approach* (is-or-is-not theory) and the *continuum approach* (theory as a process) (Shepherd and Suddaby, 2017). In management studies, there also seems to be a clash in choosing between *scientific contribution* and *practical contribution* (Corley and Gioia, 2011). Both clashes deserve a short analysis, starting from the *dichotomous* versus *continuum* approaches.

In their article presenting the *dichotomous approach*, Sutton and Staw (1995) stated that references, data, variables, diagrams, and hypotheses cannot be considered theory. In the same year, Weick (1995) brought forward a more cautious discussion, noting that those lists, diagrams, and hypotheses (even if not considered theory per se) may be a mark of "*interim struggles*" (approximations) regarding a theory. Similarly, Mintzberg (2005, p. 361) approached theories from a continuum perspective, stating that theories are a *"continuum of lists, typologies, relationships, and causation among variables, to full explanatory models"*. Davis (1971) also noted that descriptions, findings, clues, analogies, and models may generate interesting results.

Some authors have argued against the theory, such as Van Maanen (1989, as cited in Sutton and Staw, 1995, p. 378), who stressed the need for descriptive narratives based on ethnographic work, especially when exploring new phenomena. Weick (1989) suggested that authors should be explicit about their current contribution to the process of theorising and explain how exactly the results contribute to the current body of knowledge and thus help the scientific community

more clearly explain the *why*. Thus, it may be summarised that, even when some results (such as lists and models – e.g. competence frameworks) cannot be considered theories on their own, they may still be valuable to understanding phenomena and events and thus can be considered part of a theory as a continuum.

In management studies, *scientific utility* has been considered to improve conceptual rigour and enhance the potential of an idea to be operationalised and tested (Corley and Gioia, 2011). *Practical utility* has been seen as arising when a theory can directly be applied to the problems that practitioners face (Corley and Gioia, 2011). For a long time, practically useful theories have been considered to be not highly relevant in the scientific world and practitioners are looking for theories with higher practical utility – not so much on theories with theoretical utility (Corley and Gioia, 2011). Corley and Gioia (2011) suggested solving this clash of scientific and practical utility by evaluating theories based on their pragmatic contributions. The aim of pragmatist research is to generate theoretical contributions that both are derived from and inform practice (Gorley and Gioia, 2011); at the same time, pragmatist research considers that *"science does not provide a copy of reality but must work with conceptual systems that are chosen for pragmatic reasons with the aim to aid scientific inquiry"* (Lewis, 1929, as cited in Jacard and Jacoby, 2010, p. 10). Thus, the pragmatic approach underlines the need for a theory to inform both science and practice while closely connecting with both fields. And because of that, pragmatic approach was also chosen to govern the theorising process in the current study.

Weick (2014) argued that, in addition to understanding *what theory is*, one has to be aware of the *theorising process*, as only then is it possible to improve the theories themselves. Weick (2014) explained that, by making the theorising process more explicit, it is possible to make it more controllable. Based on Cornelissen and Durand's (2014) analysis of management theories, the theorising process involves both creativity and imagination (cognitive reasoning) and structuring and systematic work (logical reasoning). While logical reasoning processes and tools have gained more focus (e.g. Weick, 2014, 2014; Alvesson and Sandberg, 2011; Shepherd and Suddaby, 2017), less is known about cognitive reasoning processes. Overlooking the creative part of the theorising process and focusing too much on the logical process and strong methods might inhibit the development of interesting theories (Sutton and Staw, 1995; Mintzberg, 2005). Thus, when theorising, one must not only find a balance between the cognitive and logical reasoning processes but also acknowledge that there is a notable tension between those two processes.

A literature analysis on theorising revealed several terms that were used sometimes interchangeably and sometimes without definition: theorising, theory development, theory construction, and theory building. After careful analysis of the literature, it can be proposed that *theorising* is an umbrella term for any kind of

theoretical work (Weick, 2014). At the same time, *theory building* can mean both building a completely new theory (when an existing theoretical framework does not exist, is very thin, or acts as a new radical explanation) (Whetten, 2002) or an ongoing process (where the theories are constantly renewed) (Lynham, 2002). The same applies to *theory development* and *theory construction*, which can similarly refer to developing a completely new theory or developing existing theories by making incremental changes to the existing body of knowledge (Whetten, 2002; Torraco, 2002).

Theorising in critical realism is seen as an iterative process in which *theories are not first and foremost regarded as ordering frameworks but as conceptualisations* (Danemark et al., 2002). According to Danemark and colleagues (2002), concepts provide an abstract language, enabling researchers to speak about the qualitative properties of events, structures, and mechanisms. Theory thus represents the configuration of interrelated concepts (Danemark et al., 2002). The main tool for theorising in critical realism is retroduction, as explained earlier (Danemark et. al., 2002; Wynn and Williams, 2012). Through retroduction, concepts and theories are developed with the aim of revealing generative mechanisms and related contextual conditions (Wynn and Williams, 2012).

To summarise, theorising is used in the current study as a more general term that refers to the work that a researcher does to reach *a theory*. *Theories* are approached in the current study from the continuum approach and consist of "*lists (categories), to typologies (comprehensive lists), to impressions of relationships among factors[...], to causations between and patterns among these relationships, to fully explanatory models [...]."* (Mintzberg, 2005, p. 8). The term *theory building* is used to refer to the aim of the theorising process and is defined as *"the process through which researchers seek to make sense of the observable world by conceptualizing, categorizing and ordering relationships among observed elements"* (Andersen and Kragh, 2010, p 50). The aim of theory building in the current study is to identify generative mechanisms that help individuals be more efficient in virtual teams and to identify contextual factors that can support the actualisation of competencies. Using the pragmatic approach, the researcher of the current study aims to inform both science and practice.

7.3   Qualitative approach

The first reason for choosing the qualitative approach for the current study is related to the existing knowledge base on virtual teamwork–related competencies. Before conducting the current study, the existing literature was examined to identify the existing knowledge base on the chosen topic. The analysis revealed that the theoretical foundation for virtual team–related competencies was rather thin and

largely based on competence frameworks developed more than a decade ago. Since existing works about competencies in a virtual teamworking context (Schulze and Krumm, 2017; Krumm et al., 2016) have approached the topics from a quantitative, deductive approach, applying other research methods was considered worthwhile to allow new insights to emerge.

Second, the rich and deep descriptions of the informants helped not only identify necessary competencies but also develop an understanding of how and which situational variables may affect the application of individual competencies. Thus, the qualitative approach was in line with the chosen philosophical stance. While critical realism offers ontological and epistemological guidelines, it does not provide a specific research methodology (Danemark et al., 2002; Welch et al., 2011; Zachariadis et al., 2013). However, Sayer (1992, as cited in Welch et al., 2011, p. 748) argued that research aiming to reveal causes (as opposed to regularities) requires an *"intensive research strategy"*, which typically takes place as a qualitative, in-depth study of *"individual agents in their causal contexts".*

This leads to the third justification for using the qualitative approach – to allow individuals to express themselves in their own words without imposing preexisting theories on them. The qualitative approach, combined with a comparison of existing knowledge and empirical results, allows for the development of novel insights (Graebner et al., 2012). The interest regarding individuals' experiences was related to the fact that technology and the work environment are constantly changing, and the researcher was interested in the real-life and up-to-date experiences of individuals working in virtual teams. In addition to existing experiences, the researcher asked informants to make future predictions about where the world of teamwork is headed, which allowed for the development of more future-oriented suggestions regarding individual competencies.

7.4   The use of literature in the current study

When conducting research, a qualitative researcher must ask themselves, "When is the right time to look at the literature, and what is the relationship between literature and empirics in my research?" The same happened in the current study, in which the initial idea was to conduct a completely inductive study. However, the reality played out differently – the researcher became aware of different theories along the research process, before and during the empirical study and in analysis of the empirical results. This raised the question of how qualitative the current study really is.

Glaser and Strauss (1967, 1978, as cited in Charmaz, 2006, p. 165), in their *classic grounded theory approach,* strongly advocated for delaying the reading of the literature until after completing the analysis (see also Thornberg and Thornberg, 2012). According to Glaser and Strauss (1967, as cited in Thornberg and Thornberg,

2012, p. 244), delaying the literature review aids the researcher in generating a theory that is "*well-grounded in the empirical world*". Looking at the data through the lens of earlier ideas and theories blinds us from imaginative theorising and revealing new insights (Andersen and Kragh, 2010) and thus may lead to what is known as "received theory" (Charmaz, 2006, p. 165). Furthermore, Glaser (1998, as cited in Thornberg and Thornberg, 2012) argued that the answer regarding which literature is relevant is unknown until the analysis has been nearly finished. Also, it has been argued that delaying the literature review encourages younger scholars to articulate *their own ideas* and more experienced scholars to let go of their favourable (perhaps even their own) ideas (Charmaz, 2006).

At the same time, several authors have highlighted the problematic nature of delaying a reading of the literature until completing the analysis. According to Thornberg and Thornberg (2012), the main reasons are a) it makes it impossible for the researchers to conduct studies in their own field, b) the approach can be easily used as an excuse for lazy ignorance of the existing literature, c) the approach can generate results in which researchers focus on the literature on other fields while overlooking the existing literature in the same field, d) it limits the possibility to make research proposals for funding, e) ignoring existing research findings may imply a loss of knowledge, and f) the *dictum* of delaying the reading of the literature to the very end underestimates the researcher's ability to reflect upon the links between their own knowledge, existing literature, and empirical evidence. Several qualitative researchers have reflected on how the literature has helped draw their focus on certain details that they would have overlooked otherwise (Thornberg and Thornberg, 2012). According to Paavialainen-Mäntymäky (2009), theory can help the researcher develop a focus for the topic and select the more essential parts from the vast amount of data. Andersen and Kragh (2010) also proposed reflecting on preexisting theory as part of the process through which researchers engage in a discourse with the scientific community.

Such a dilemma – deciding when to introduce literature – can be answered with the help of critical realist philosophy. Namely, theorising in critical realism is understood as an iterative process in which the knowledge derived from empirical observations and existing theory leads to the *reconceptualization* of the existing knowledge (Welch et al., 2011; Danemark et al., 2002). According to Roberts (1996, as cited in Welch et al., 2011, p. 749), researchers pursuing critical realist studies make sense of particular events by classifying them into a broader phenomenon while making connections with the existing theories, generalities, and patterns with the aim of connecting the findings and developing explanatory narratives. In other words, in critical realist studies, the researcher goes back and forth between theory and data (Welch et al., 2011).

In critical realism, it is also accepted that researchers have developed a certain understanding of the reality under examination based on their individual experiences, values, and prior readings. Pretending that the researcher is completely neutral and has no prior understanding of the topic fails to recognise the embeddedness of the researcher within a historical, ideological, and sociocultural context (Thornberg and Thornberg, 2012). According to Thornberg and Thornberg (2012), every observation of a phenomenon is inevitably shaped by the researcher's prior understanding of the phenomenon. Therefore, instead of denying social, cultural, and personal biases, critical realism supports the development of contextual knowledge and claims that the aforementioned biases can be overcome by certain research methods, such as making warranted assertions about the nature of reality (W. Bell, 2009). According to critical realist philosophy, *"science is the most reliable path to truth that we know….precisely because it transcends personal beliefs"* (Davies 1993, as cited in Bell, 2009, p. 208).

7.5 Ethics and trustworthiness in the current study

The common criteria for evaluating the trustworthiness of qualitative and quantitative studies do not fit studies using a critical realist approach. The qualitative approach does not fit due to the differences in ontological assumptions – critical realist researchers believe that there is a real "tangible" world out there, while qualitative constructivist researchers believe that the world is a construction of the mind (Kovalainen & Eriksson, 2015). The quality criteria used in positivist studies – internal validity, reliability, construct validity, and external validity – do not fit mainly due to their epistemological approaches (Healy and Perry, 2020). Compared to positivist researchers, critical realists are not concerned with measuring and testing the phenomena in the empirical world, but instead focus more on the underlying mechanisms related to the observed phenomena (Zachariadis et al., 2013).

In response to these concerns, several authors have proposed quality criteria that would fit research carried out under critical realist studies. For example, Healy and Perry (2020) proposed a five-step approach to ensuring trustworthiness in critical realist studies. The first step is related to ontological assumptions – for example, making sure that the research deals with complex social phenomena. The second criterion involves contingent validity – for example, studying generative systems rather than direct causes-and-effects. The third criterion is based on epistemological characteristics – for example, accepting that *"there is a real world to discover even if it is only imperfectly and probabilistically apprehensible"* (Healy and Perry, 2020, p. 123). Fourth, the researcher must ensure that the research can be audited for

methodological trustworthiness. Finally, the research should aim for theory building rather than theory testing.

Another attempt to describe research trustworthiness in critical realist research is called TAPUPAS, which refers to the criteria of "*transparency, accuracy/authenticity, purposivity, utility, propriety*" (Ryan and Rutty, 2019, p. 5). TAPUPAS has been used, for example, in the fields of education, social work, social policy, and medicine/nursing (Ryan and Rutty, 2019) and is based on the following questions that researchers must ask themselves (Porter, 2007, p. 85):

- *Transparency: is the process of knowledge generation open to outside scrutiny?*
- *Accuracy: are the claims made based on relevant and appropriate information?*
- *Purposivity: do the methods used fit the purpose?*
- *Utility: are the knowledge claims appropriate to the needs of the practitioner(s)?*
- *Propriety: has the research been conducted ethically and legally?*
- *Accessibility: is the research presented in a style that is accessible to the practitioner(s)?*

Porter (2007) added to this discussion the idea that, rather than trying to develop common criteria that researchers under critical realism studies should follow, the judgement should be placed in the hands of the readers. This suggestion is in line with the underlying philosophy of critical realism stating that all knowledge is true only until it is falsified – be it by the change of the circumstances, by following studies, or by the readers (Porter 2007; Dweyer, 2017; Ryan and Rutty, 2019). Thus, even if the researcher has followed all of the aforementioned guidelines, the research can be considered trustworthy only after it has passed the evaluation of the readers.

Regarding research ethics, there are general guidelines that every research project must follow – for example, the European Code of Conduct for Research Integrity (ALLEA, 2017), which discusses the general principles and good research practices and provides examples of violations of research integrity. According to the generally accepted guidelines, every research project must meet four principles: a) *quality* in terms of design, methodology, analysis, and use of resources; b) *honesty* in developing, carrying out, and reporting the research; c) *respect* for any stakeholders involved or connected to the research; and d) *accountability*, which refers to the wider impacts of the research.

In addition to the general principles, and principles related to the chosen philosophical stance, it is important to pay attention to ethical considerations related to the selected research methods. Orb et al. (2000) highlighted the following three criteria to follow in qualitative studies:

- Autonomy – making sure that respondents have given informed consent to be interviewed.
- Beneficence – making sure not to harm anyone in the process of doing good.
- Justice – recognising the vulnerability of the participants and listening to the voices of minorities.

To conclude, trustworthiness in critical realist studies lies in the hands of both the researcher and the readers. The researcher's job is, first, to make sure that the selection of the empirical approach, such as ontological, epistemological, and methodological considerations, meets the research questions. Then, it is the researcher's responsibility to develop a concise description of the research, including a description of the philosophical underpinnings, methods, and evidence that support the arguments presented in the study. Third, the researcher must make sure to follow ethical principles in general and those related to the selection of the methods. Finally, the researcher must make sure that the research (including all its parts) is made accessible to practitioners and readers. The role of practitioners and readers is then to evaluate whether the presented research accounts for something that is accurate and worthy of belief (Porter, 2007; Bell, 2009).

7.6   Collective case study

According to Guba and Lincoln (1994), the nature of critical realism requires a dialogue between the investigator and the subject of inquiry. At the same time, this dialogue can take place in various ways, as methodological pluralism is supported in critical realism (Danemark et al., 2002; Zachariadis et al., 2013). While methodological pluralism is accepted, according to Wynn and Williams (2012, p. 795), case-study research has been considered helpful for *"studying the contemporary socio-technical phenomenon to uncover the causal mechanisms and contextual factors that combined generate them"*. Therefore, collective case studies were chosen as a research strategy for the current project and are described in more detail in the current section.

The cases in the current study (i.e. the unit of observation) are the 24 individuals interviewed. The unit of analysis included the interviewees' individual competencies and external factors leading to competence actualisation were derived from the individual experiences shared during the interviews (see **Figure 19**).
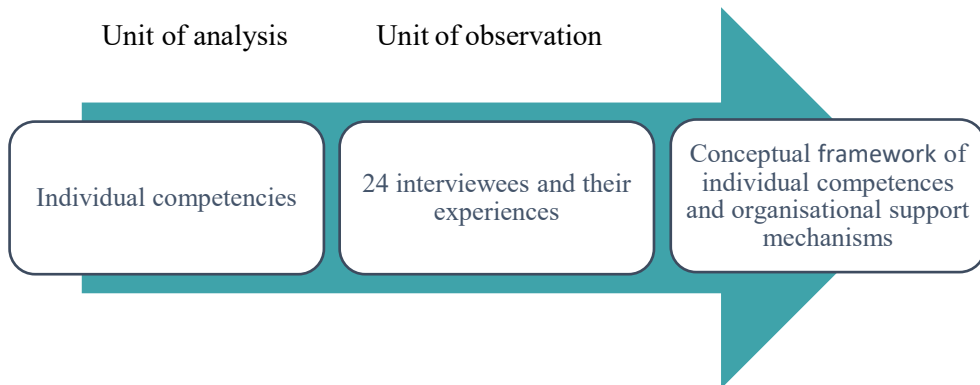
Figure 19. The level of abstraction in the current study.

The current study approaches case studies from collective and instrumental perspectives. According to Torraco (2002), instrumental case studies are used to provide insight into a particular phenomenon or issue, whereas the case itself is of secondary interest. This means that the case(s) are used to facilitate the understanding of a certain phenomenon(a) or event(s). It has also been noted that instrumental case studies are especially suitable for trying to understand the third level of realism – "the real" in critical realism (Healy and Perry, 2000).

At the same time, an instrumental case study still provides an opportunity for generating rich data, as the case is examined in depth and its features are often documented in detail – all with the aim of better understanding the phenomenon under research focus. A collective case study is simply an instrumental case study that is extended to several cases. In collective instrumental case studies, several cases are chosen because the researcher believes that examining more than one case will lead to a better understanding of the selected phenomenon in focus (Torraco, 2002).

The main dilemma of case studies has evolved from their perceived low potential for generalisability. Over time, one of the two main strengths of case studies – that is, being rich in detail and providing rich contextual understanding – has become one of the stumbling blocks for developing theories with a high level of generalisability. According to Welch and colleagues (2011), one of the main aims of case studies – to develop contextualised explanations – has increasingly become less popular, as the context has been considered a hindrance in developing law-like explanations in case studies. At the same time, Welch and colleagues (2011) called for more contextualised case studies based on the critical realism approach. According to their analysis, case studies in which the context is used *analytically*, not *descriptively*, have high potential for developing causal explanations (Welch et al., 2011). In this

type of causal explanation, context is not treated as a hindrance but as part of the explanation.

7.6.1   Case selection

In the current study, when selecting the case, an approach mixing the *typical case* with a *diverse case* was used. (Seawright, 2008). As typical case selection implies, the aim was to find typical cases (or representative cases) to better explore the causal mechanisms (e.g. competencies) that work across cases. At the same time, the aim was also to include as many diverse cases among the typical cases as possible, as this would provide the opportunity to investigate as many characteristics as possible. Thus, the sample consisted of 24 knowledge workers practising virtual teamwork daily. The unifying factor of these cases was that the respondents worked in organisations that have implemented virtual teamwork in everyday practices (or are in the process of doing so more extensively). While the extent of the use of virtual work differed significantly – from occasional home office to being away for a couple of months to completely being global – face-to-face interactions were rarely held between the respondent and the team.

The number of cases was not predetermined. The initial idea was to study 40 cases; however, after conducting interviews with 24 individuals, it was clear that the saturation point had been reached. The author used the known sponsor approach (Patton, 2002) to select the respondents**.** The author had direct access to the known sponsors (e.g. HR managers, project and team leaders) in different organisations, mainly from IT-driven industries, including IT, telecom, and banking. The sponsors recommended participants for the current study based on their experience with virtual teamwork. The selection criteria were based on the boundaries that are typically crossed in virtual teamwork, including geographic dispersion and demographic differences (O'Leary and Cummings, 2007).

The average experience of virtual teamwork among the respondents was five years, ranging from 1–13 years of experience. The sample consisted of nine women and 15 men. Out of these 24 individuals, 17 held managerial/leadership positions, and seven were specialists.

7.6.2   Data collection

Considering the philosophical and epistemological selections, along with the final aim of the current study, *qualitative semi-structured interviews* were determined to be suitable for data gathering. According to Rubin and Rubin (1995, as cited in Dilley, 2004, p. 129), qualitative interviews make it possible to *"understand experiences and reconstruct events in which you did not participate".* Moreover, a

qualitative interviewer is *"not looking for principles that are true all the time and in all conditions, like laws of physics; rather, the goal is understanding of specific circumstances, how and why things actually happen in a complex world."* (Rubin and Rubin, 1995, as cited in Dilley, 2004, p. 129). Thus, the aim of qualitative interviews is similar to that of the critical realist – to reconstruct events based on the personal experiences of interviewees. At the same time, qualitative interviewing, similar to critical realism, accepts that all individual experiences are contextual – in fact, finding out the contextual aspects of specific experiences and events is one of the aims of a qualitative interviewer (Dilley, 2004).

At the same time, there are two main approaches to qualitative interviewing: a) the naturalistic (realist) approach and b) the constructivist approach (Elliott, 2011). According to Elliott (2011), the main difference between these two approaches is that, while naturalists see interviews as a resource and/or access to the body of knowledge, constructivists see the interview as a subject for inquiry. It was decided that the naturalist interviewing approach corresponded with the current study's philosophical underpinnings. Therefore, the interviews in the current study were treated as a resource for collecting detailed information from the respondents while emphasising *content,* for example, *what* has been said rather than *how* it has been said (Elliott, 2011).

The purpose of using the *semi-structured* interviews was twofold: a) to make sure that important topics would be covered during the interviews and that the research aim would be met and b) to allow new insights to emerge. For example, according to Soderquist and colleagues (2010), when the aim is to create a competence framework with future orientation, future-oriented reflections must be added to the interviews to avoid identifying only present or past competencies. Therefore, the interviewer added a part about the discussion of future workplaces and the future of teamwork to the interview protocol. However, the interviewer followed the developed interview protocol flexibly, adapting it to the interviewees' experiences. The variation across interviews was treated as data for analysis rather than errors or technical problems (Mishler, 1999, as cited in Elliott, 2011).

The interview protocol included three blocks. In the first block, the interviewer asked questions about the interviewee's overall experience with virtual teams, their role in the company, and the role of virtual teamwork in their everyday work. These questions helped with understanding the contextual aspects of the data, the way the respondents communicate, and the areas in which the interviewee might have valuable insights to share. In the first block, interviewees were also asked to define teamwork, virtual teamwork, and successful teamwork in their own words. This strategy was believed to help interviewees become engaged with the interview theme. It also allowed the interviewer to understand how the interviewee perceives these things, which helped in making sense of the data later in the data analysis phase.

The second block consisted of questions about the key constraints on virtual teamwork. First, the interviewees were presented with a case of a person called Anu, who suddenly had to start working in virtual teams. The interviewees were asked what the first challenges would be that Anu faces. This exercise was believed to allow respondents to gradually move into sharing their own experiences – without startling them with questions like, *"What challenges did you face?"* Today, after conducting the interviews, it can be said that this kind of strategy worked well, and the interviewees started naturally sharing their own experiences in addition to Anu's case. In this block, the interviewer allowed the interviewees to share as much as they could, and if the interviewees ran out of ideas, the interviewer prompted the interviewees to think about challenges related to technology, diversity, well-being, and so on.

The questions in the third block focused on identifying relevant competencies to overcome the key constraints. The first question in this block was about what the future would bring to teamwork. This question was intended to make the interviewees think about the future relevance of the competencies to be discussed. Then, the interviewer asked the interviewees to fill in two tables. One table initially had three columns: skills, knowledge, and attitudes. A fourth column – values – was added after the initial analysis of the first interviews. The second table also had four columns: technology, teamwork, leadership, and other. When filling in the tables, the interviewees built a great deal on the prior discussion about the key constraints related to virtual teams. For example, when they shared that they had seen that some people face problems when adapting to new ICT tools, they added openness to ICT and the basic knowledge about ICT tools as important elements of the virtual teamwork–related competencies.

The interviews were conducted by the author of this study over a period of five months, from April to September 2018. Most of the interviews were conducted face to face in the interviewee's office at their convenience. Some interviews were conducted using the Skype application due to geographical distance. The average length of one interview was 1.5 hours, ranging from 1 hour to 2 hours. The interviews were recorded with the interviewees' consent and transcribed afterward. The interviews were conducted in two languages: Estonian and English. The author translated the Estonian interviews into English by herself. The translation process allowed the author to start the data analysis during the translation process.

According to Myers and Newman (2007), the creation of mutual trust is vital for a successful interview. Therefore, the interviewer presented herself from a neutral academic perspective, interested in gaining knowledge about the phenomena. The interviewer confirmed to the interviewees that their anonymity and confidentiality would be ensured. Any additional concerns from the informants were addressed before the interview (and/or during the interview, when necessary). The overall aim

was to create a relaxed atmosphere by not intimidating the informants. For example, overdressing, overly formal language, and academic jargon were avoided. In addition, a sense of humour was a prerequisite for creating a friendly and open atmosphere, leading to mutual trust. The underlying assumption when running the interviews was, per Gioia and colleagues (2012, p. 17), that people are *"knowledgeable agents"* who *"know what they are trying to do and can explain their thoughts, intentions, and actions"*.

According to Rubin and Rubin (1995), it is important to encourage people to describe their worlds in their own terms (Dilley, 2004). Therefore, the author adopted the respondents' terminology during the interviews. Before the interviews, when compiling the RQs, the author tried adjusting the terminology as closely as possible to the terminology mostly used in the business environment. Therefore, the author used the term *challenges* instead of *constraints*. It was found that the term challenges is widely used and acknowledged in the business environment to refer to something that can be overcome, thus resonating with the general research aim. The interviewees were asked to describe knowledge, skills, attitudes, and values, with terminology chosen so as not to intimidate respondents with the complicated term *competencies*. During some interviews, the term *capabilities* was used instead of *competencies* if the respondent seemed more comfortable with using the term capabilities. Although, in the Human Resource Management (HRM) literature, capabilities usually refer to the distinctive strengths of an organisation (not an individual), in real life, capabilities, competencies, and skills are often used interchangeably when describing individuals (Soderquist et al., 2010).

After the interview process was over, the interviews were coded and transcribed. During the transcription process, the interviewer gave personal codes to each interviewee and each organisation to provide full anonymity. The author listened to each interview file for transcription purposes and wrote word-by-word transcriptions using the MS Word application. Each coded interview was saved separately and kept in the researcher's personal OneDrive folder. The audio files of the interviews were kept on the author's personal hard drive (for backup purposes) until the data analysis process was completed. After the data analysis process was completed, the audio files were terminated to ensure that there would not be any leakage of sensitive personal and/or organisation-related data.

7.6.3   Dilemmas related to the qualitative semi-structured interviews

One of the main dilemmas regarding any interviewing method is similar to the main concern regarding qualitative methods – the possibilities for generalisability (Agius, 2013). Interviewing (together with transcribing) is a lengthy and time-consuming

process, so there is no opportunity to interview hundreds of people – at least not without losing the quality of the interviews. However, the way the interview sample is created affects its generalisability. According to Agius (2013), qualitative research interviews use purposeful sampling, meaning that the interview sample is deliberately selected to learn about specific phenomena. Individuals are selected for the sample because they are believed to represent a wider population with similar experiences, concerns, and so on (Agius, 2013). Thus, purposeful sampling in qualitative interviewing allows generalisability – but not to all populations, only the part of the population that represents the same characteristics. In addition, since qualitative interviews provide rich data, explanations that could apply to larger populations could be derived from the data (Mintzberg, 2005). According to Mintzberg (2005), studying only one example can be enough to develop generalisable theories.

The second dilemma with qualitative interviewing is that there is a risk that the interviewer will influence the interviewee, which might affect the quality of the study (Alsaawi, 2014). However, as already discussed above, it was not the intention of the current research and researcher to be completely objective. As mentioned above, critical realism allows a degree of epistemological relativism (Zachariadis et al., 2013) by accepting that both the researcher and the researched have unique experiences and interpretations of the reality under examination (Wynn and Williams, 2012). Furthermore, critical realism stresses that explanations are generated through and as a result of the exchange of these experiences (a dialogue) between the researcher and the research object (Guba and Lincoln, 1994).

Finally, the literature has also highlighted the risk that interviewees may say one thing yet behave in a completely different way. The aforementioned risks are connected with the tendency to "*give socially desirable responses on attitude and personality inventories"* (Ajzen et al., 2018, p. 12)*. First, critical realism accepts a certain bias in the recall of memories and in explaining the world to oneself and others (Wynn and Williams, 2012). However, certain techniques can be used to minimise this risk. For example, the interviewer used the technique of coming back to different themes several times during the interview (from different angles) to ensure that responses reflected reality as closely as possible. Additionally, questions about the individual's personal experiences were asked in a combination of questions related to the observed experiences of "colleagues" or even "imaginative others" like Anu. The occasional opportunity to express understandings and experiences without a direct link to the respondents (such as coming back to Anu's case) allowed for sharing different concerns and thoughts more openly.

7.7   Data analysis

In the current study, a combination of categorising and connecting strategies was used to aid in the analysis. Choosing the multimethod approach for data analysis allowed the author to capture the benefits of both analysis techniques. Qualitative content analysis was used for the purpose of categorising, and narrative analysis was used for the purpose of connecting. Categorisation, such as the qualitative content analysis, allowed for identifying similarities and differences in personal experiences across the cases (Maxwell, Joseph and Miller, Barbara, 2008). In contrast, narrative analysis allowed for making connections between the experiences in different cases and the individual experience and the context of those experiences within a particular case. The analysis process can be broken down into five steps, described below (see **Figure 20**).

The *first step* involved reading the interview transcripts, which resulted in tentative ideas about the categories and relationships in the data and selecting what parts to pay attention to in the text. The *second step* involved categorising with the help of qualitative content analysis. The categorisation process was carried out in MS Excel and allowed for identifying, for example, the competencies connected with virtual teamwork and categorising the findings into different clusters. *The third step* included connecting within and across cases and involved narrative analysis. During this process, the author read all the transcripts and crafted narratives based on the contiguity found in the text (Maxwell et al., 2008). In this process, the author read the interview transcripts and identified themes (across cases) corresponding to the research questions. The themes were then organised into a storyline to capture the most important events and the structure/context within which those events occurred.
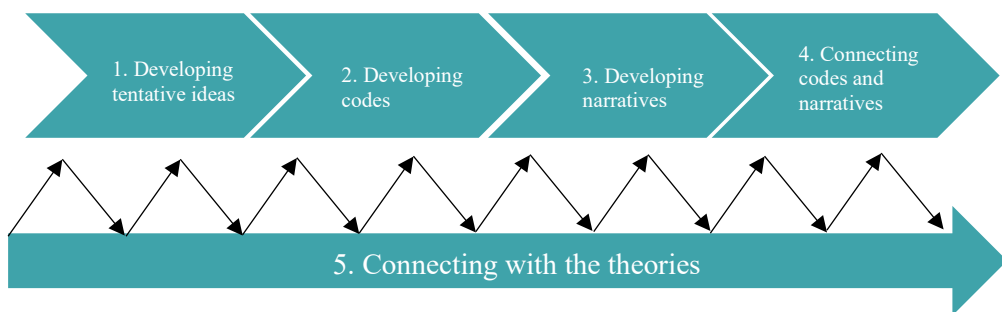
Figure 20. Illustration of the data analysis process using content and narrative analysis (developed by the author).

The fourth step involved connecting the categories and narratives and was aimed at creating connections based on the relational logic and causal explanations that

emerged from the categories (codes) and the context in which the events took place. This step allowed, for example, the development of the descriptions of competencies (e.g. how a person with certain competencies would behave). *The fifth* step was a continuous process taking place in an iteration between the empirical data and the existing theoretical base throughout the entire doctoral research process. The author was reading and increasing her theoretical knowledge base throughout the whole doctoral project, and the continuous iterative process of reading and connecting took place even when the author was not directly working on the doctoral project.

7.7.1.1   Qualitative content analysis

Qualitative content analysis is defined in the current study as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh and Shannon, 2005, p. 1278). The goal of content analysis, like any other analysis is "to provide knowledge and understanding of the phenomenon under study" (Hsieh and Shannon, 2005). Qualitative content analysis can be carried out using three approaches: conventional content analysis, directed content analysis, and summative content analysis (Hsieh and Shannon, 2005). According to Hsieh and Shannon (2005), the three approaches to content analysis can be described as follows:

- *Conventional content analysis* is inductive in nature and used when the existing theoretical base and research literature is limited.
- The *directed content analysis* approach can be described as an iterative/abductive approach in which the existing literature and theoretical base are used to direct both the data-gathering and analysis processes.
- The *summative content analysis* approach is used to quantify the qualitative data.

Qualitative content analysis was applied as the first analysis method to make sense of the data. In some cases, content analysis was found sufficient to answer the research questions – particularly sub-question one which aimed to developing an understanding of the key constraints in virtual teams (see **Table 20** at the end of sub-chapter 8.6). However, in some cases, the author saw the possibility of further extending the findings from the theory with the additional use of narrative analysis or by completely replacing content analysis with narrative analysis. The reasons for and ways of applying narrative analysis are explained in the next section.

To explain the process of content analysis in the current study, it cannot be said that the analysis was purely inductive, as the researcher generated some preliminary understanding of the issues from the theory – or did so in parallel with analysing the data. The most explicit example of preexisting theoretical knowledge about the

issues studied in this project is the authors MBA thesis (Link, Sulakatko, Meriloo, 2016), in which the researcher, together with her colleagues, provided a theory-based overview of the key constraints in virtual teams. Therefore, a theory about the key constraints in virtual teamworking not only influenced the data analysis regarding sub-RQ1 but also impacted the data gathering. Examples of this kind of impact are the prompts (e.g. technology, diversity, etc.) that the researcher used to guide the interviewees when interviewees ran out of ideas. Regarding the second and third sub-RQs, the theoretical understandings were built in parallel with the empirical data analysis. Therefore, it can be summarised that the analysis process (and in sub-RQ1, the data-gathering process) was, to some extent, directed by the theory. As such, the content analysis method can be called a directed method to acknowledge that this does not mean that it was purely deductive but rather an iterative process.
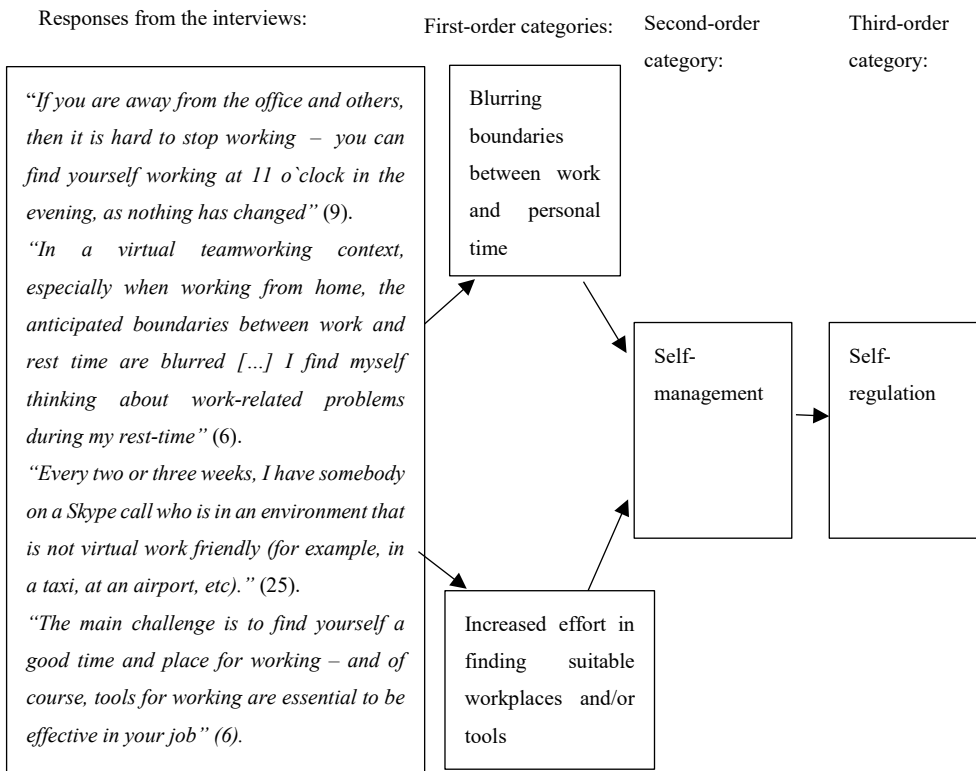
Figure 21. Example of the process of developing categories by using qualitative content analysis and the categorisation method from grounded theory.

The analysis process itself looked much like the process used in grounded theory (see **Figure 21**) (originally Glaser and Strauss, 1967, as cited in Corley, 2015), except that it cannot be called grounded theory, as it was not conducted in a purely

inductive manner. Grounded theory is rooted in the constructivist paradigm, and its original aim was to build theory from data. However, the method of developing first-order categories, second-order categories, and third-order categories has been found helpful to researchers with other paradigmatic underpinnings as well (Gehman et al., 2018). The same happened in the current research – although the data analyses were not grounded in only the empirical data – the developing of first-order and second-order categories helped make sense of the data.

7.7.1.2   Narrative analysis

The main aim of the narrative analysis in the current research was to create an opportunity for new insights to emerge, namely, the context and generative mechanisms of the causal relationships and the descriptive results developed by the content analysis. It must be underlined that the current research's strategy was an instrumental collective case study, and the source of the data was semi-structured interviews (not narrative interviews); therefore, the aim of the narrative analysis was not to *analyse narrative(s)* but to *create narratives* based on the empirical data obtained across cases. Thus, as Eriksson and Kovalainen (2011b, p. 10) stated, "*the focus is on narrative as a mode of analysis*". According to Eriksson and Kovalainen (2011b, p. 10), in narrative analysis, in which narratives are used as modes for analysis, "*the researcher organizes and interprets empirical data that describes some more or less consistent events, happenings, and actions in a way that they construct one or more narratives that will be interpreted and discussed.*".

According to Reid and Miller (2013), the role of a narrator is to create plots (stories) from disordered experiences, giving reality a unity that neither nature nor the past possesses so clearly. This approach to narrative analysis, in which the central consideration is the content, is called a thematic approach to narrative analysis (Riessman, 2005). To develop the narratives, a problem–solution approach for narrative writing was used, as introduced by Ollerenshaw and Creswell (2002). This approach aims to organise raw data to form a story while providing an opportunity to explain experiences and why attempts occurred as they did (Ollerenshaw and Creswell, 2002). The problem–solution approach to narrative analysis involves five steps: 1) transcribing the interviews, 2) reading through the raw data, 3) colour coding the transcripts for the elements of the plot structure (characters, setting, problem, actions, and resolution), 4) organising the colour-coded transcripts into events or attempts (e.g. the setting, problem, physical actions, reactions, thinking, intentions, goals, and resolution), and 5) sequencing the events until the narrative makes sense (Ollerenshaw and Creswell, 2002).

In the current research, narrative analysis was used a) to extend the insight from sub-RQ1 (explained in more detail shortly), b) to create more insight into sub-RQ2,

and c) to analyse the practical implications of the situational aspects regarding the application of competencies in virtual teams. Since narrative analysis is less known than content analysis, the author decided to provide examples of how narrative analysis was utilised in each RQ to eliminate any black boxes regarding data analysis.

For sub-**RQ1**, after the researcher finished the categorising process for the RQ, she realised that additional insights came from the data that could not be captured and presented by using content analysis solely. These insights included the phases that individuals go through when starting to work in virtual teams. Here, narrative analysis became useful, as it allowed the development of a storyline (presented in **Table 21** in subchapter 8.7), which described the processes and example questions that individuals have while working in virtual teams based on their experience in virtual teamwork. Narrative analysis was used here as a method to connect the findings with the contextual information (respondents' experience in virtual teamwork) and as a tool for presenting the research data (developing example questions that a person might ask in each stage). The example questions did not directly come from one respondent – they were formed when looking across cases and seeing similar patterns unfolding.

For sub-**RQ2**, the process of answering the RQ was much more complex than for RQ1, as the process included considering findings from sub-RQ1 (theory and data), and theory and data regarding sub-RQ2. Therefore, it was difficult to draw out a sequential pattern that would easily illustrate how this process took place. It can best be captured with the iterative process going between different pieces of information (see **Figure 22**).
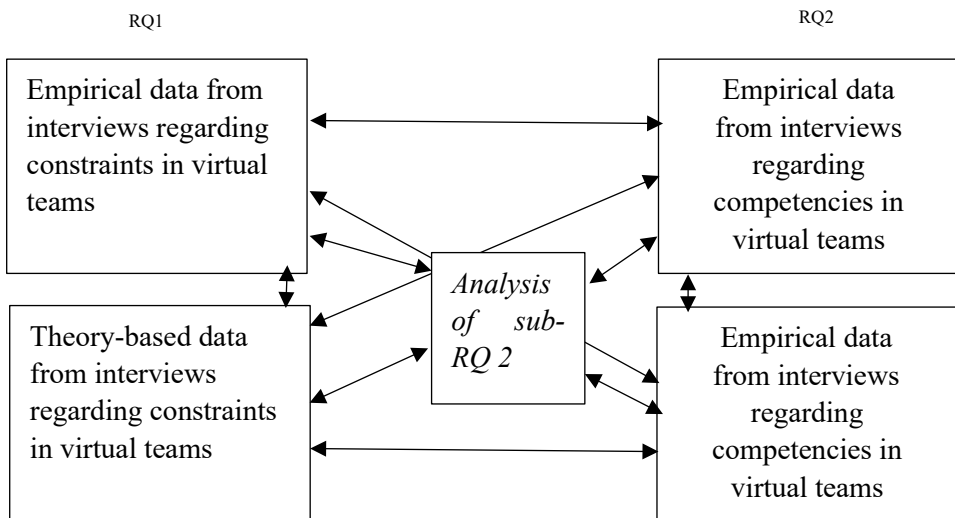
Figure 22. The process of moving iteratively between theory and data when developing the competence model under RQ2 (developed by the author).

It is important to note that, after applying content analysis to the empirical data for sub-RQ2 (e.g. developing first-order categories) and comparing it with the preliminary competence framework developed in the theory section, it became apparent that content analyses would not bring additional insights in terms of competencies – although that was the initial expectation. Then, it was found that applying narrative analysis had the potential to extend the theory, as it helped synthesise and systematise the findings from the literature and the provided narratives (of competent individuals), providing additional practical utility to the competence framework developed. Narratives were developed by combining the findings across different interviews (see an example of such a process in **Table 19**).

It is important to note regarding sub-RQ2 that critical realism – especially acknowledging the situational characteristics of where the events happen – also helped significantly advance the knowledge about competencies in virtual teams. Without using the critical realism approach, the narratives would have been developed by probably just looking at the individual, their problems, and connecting those problems with competencies. For example, if person Y has problems engaging colleagues during virtual meetings, then this person must acquire competencies for engaging people during virtual meetings (such as storytelling skills, how to use polls, etc.).

Table 19. An example of the process of developing narrative descriptions.

Quotes from the informants	Narrative description
"It is the role of the manager to agree on the rules of the game. For example, when some people are used to working in the office, and others are away, then these people who work in the office might forget to share information with those who are away. We had that issue in the beginning – where even I was forgotten. Then, we made some agreements – to make memos, to share information in chat (even jokes) and today, I can say that we do not have that problem anymore" (1). *"The lack of physical proximity made me rethink what I know about the rhythm of engagement – how to make the right balance between leveraging between virtual meetings and physical meetings. With the team, we created an agreement about what the minimum of physical meetings would be. The other thing is to be even more conscious of how to leverage the potential of technology in the distributed team to make sure that there is effective communication. […] And we now have a concrete rhythm for communication (week 1, week 2, week 3). We agreed precisely when, to whom and in which format we share information. It sounds very basic but helps a lot to communicate in this very well thought-through and clear way"* (23).	A leader who can develop effective communication and information exchange within their team first agrees with their team on how they are going to exchange information (what tools will be used, etc.). The leader supports that process by ensuring that there is a logical process of information exchange agreed upon and that the chosen tools fit the task. Then, they ensure that there is a proper infrastructure supporting information exchange, as agreed upon within the team.

However, not being able to engage people during virtual meetings is also strongly related to colleagues' readiness and willingness to be engaged. Thus, virtual team members must also be aware of the challenges that virtual communication brings to anticipate and mitigate their colleagues' struggles. Therefore, instead of developing just a one-sided lens to the issue of competencies – for example, problem X leading to individual having competence W – critical realism allowed for looking at the situational characteristics and extending the knowledge about virtual team–related competencies – for example, problem X leading to individual competence W, and other team members competencies X, Y, and Z.

Sub-**RQ3** was the most difficult to answer out of the three RQs based on the empirical data. One reason is that RQ3 was added to the RQs after the interviews were conducted. Another reason is that, even if there are possibilities to observe or experience the results (the empirical) regarding constraints or competencies, it is much harder to do so regarding the mechanisms that trigger or support competence actualisation. Competence actualisation is such a complex phenomenon that, even if there had been interview questions regarding this RQ, it is doubtful whether the respondents could have answered them. Thus, the need to go beyond events and experiences to explain the relationships between competencies and external mechanisms that can support their actualisation arose. Here, the fallibility approach from critical realism was used when analysing and reporting the data regarding sub-RQ3. The researcher developed possible explanations for the support mechanisms regarding competence actualisation using a mix of content analysis and narrative analysis approaches. The explanations were considered true if no relevant counterarguments were found. Again, the knowledge gained from the previous two RQs (theory and empirical data) supported the data analysis.

7.7.1.3   Dilemmas related to the analysis methods

The main dilemma with the chosen analysis method was that the mix of categorising and connecting methods has not been well described. While both analysis methods have received much attention and it is possible to find guidelines on how to use them separately, it is not possible to find many guidelines explaining how to mix the two methods. Therefore, the author took the risk of developing her own guidelines based on the examples that Maxwell and colleagues (2008) developed in their book.

The main dilemma with qualitative content analysis was that, first, it is a method that allows mainly categorising, and thus using this method carries the risk of losing the context that the case-study method provides. Another dilemma was that, since the method is qualitative, it is highly interpretive – the results are developed based on the author's understandings. However, as mentioned earlier, critical realism as a philosophical underpinning of the current study accepts that the researcher has

unique experiences and interpretations about the reality under examination (Wynn and Williams, 2012).

The main dilemma of narrative analysis, especially in an analysis in which the researcher takes stories shared by people and places them into a larger narrative, is that the researcher is in this process, imposing meaning on the participants' experiences. Although it is the responsibility of the researcher to show the ongoing narrative constructions, the participants can never be completely free of the researcher's interpretation of their lives (Bell, 2002). Another problem associated with narrative analysis is that the researcher chooses only certain parts of the data to develop the narratives, meaning that the results do not reflect the whole dataset. Therefore, it can be said that narrative analysis is highly interpretative and requires that readers trust the researcher's selection and interpretations.

The next block of the monograph reports the results and key findings of the empirical study. The results and discussion are presented so that the results regarding each sub-RQ are immediately followed by a discussion of the key insights. Since there were three sub-RQs, which are connected but also form separate topics by themselves, it was decided that it was best to have the discussion immediately and not after the results of all three sub-RQs were presented, as then the reader might have already forgotten what the results for each sub-RQ were. A short reminder to the reader that the main RQ and subquestions in the current study were as follows:

Main RQ: *Which individual competencies and other factors enhance individuals' adaptation to a virtual working environment?*

Sub-RQ1: *What are the main constraints on individual effectiveness in virtual teams?*

Sub-RQ2: *Which competencies help individuals overcome key constraints in virtual teamwork?*

Sub-RQ3: *How can organisations support the actualisation of virtual teamwork–related competencies?*

8 The Key Constraints on Individual Effectiveness in Virtual Teams and Insights Regarding the Phases of Experiencing the Key Constraints

The current chapter focuses on exploring the results and insights emerging from the empirical data for sub-RQ1: *What are the main constraints on individual effectiveness in virtual teams?* This question and the findings related to it were the starting point for developing insights into the necessary competencies and support mechanisms. For example, as the idea was to understand the problem in its all nuances before starting to offer solution(s) to virtual teamwork–related constraints, the focus was turned not only to the boundaries (technology, distance, etc.) but also to the *experiences* that individuals with various backgrounds and familiarity with virtual teamwork had with the well-known boundaries. That is, how did the boundaries impact individual coping with virtual teamwork?

The content analysis of the raw data resulted in an initial 53 groups representing the circumstances and events that, according to the respondents, inhibited them from being as effective as they would wish in a virtual teamworking context. The 53 groups were merged into larger categories, subclusters, and main clusters during four rounds until one main cluster (the root cause) – physical distance – was reached. In this process, the preexisting categories were used as guidelines, not directives. Some preexisting codes were used as the main clusters, whereas others were moved to subclusters. **Table 20** (at the end of the chapter) represents the summary of the categories/subclusters/main clusters developed by the author using first-order categorisation, second-order categorisation, and so on.

In addition to documenting key constraints on individual efficiency discussed by the informants, the author, through a mix of content analysis and narrative analysis, was able to detect insights regarding the processes, phases, similarities, and differences for those barriers. These insights can be found in sub-chapter 8.7. Insights regarding the processes of certain constraints in virtual teamwork have important implications for both theory and practice, which is discussed in more detail in the "Findings and Discussion" section (8.8) after the results are presented.

8.1 Communication and information exchange

Communication and information exchange are more difficult in virtual teamworking than in physically co-located teamwork. Physical distance creates a situation in which the awareness of each other's whereabouts is affected, and this, in turn, creates delays in everyday communication and information flow. The possibility of reading body language is also inhibited due to the members not being in the same room, which increases the risk of misunderstandings. Moreover, socialising, such as prompt discussions at the coffee machine, is limited due to the physical dispersion. While the virtual teamwork context requires more virtual meetings, the difficulties related to participating in virtual meetings emerged strongly in the data. In general, difficulties related to communication and information exchange were divided into three larger sub\clusters and corresponding subcategories:

- Task-related information exchange and management
  - Misunderstandings
  - Response time
  - Distribution of information
- Social interactions
  - Getting to know each other
  - Emotional support
  - Isolation
- Virtual meetings
  - Communication quality
  - Engagement and focus

Regarding task-related information exchange and management, virtual communication was seen as less favourable than physical communication because of the risk of miscommunication via virtual means (Respondents 12, 14, 15, and 17; henceforth, only numbers are used). Sometimes, virtual communication tools do not support explaining complicated things (9, 12), as face-to-face meetings provide opportunities to use visualisation (e.g. quick drawings on paper) to explain their thoughts (9, 19). In addition, respondents mentioned a lack of physical cues (e.g. body language) and lack of contextual cues (15) as reasons behind miscommunication via virtual communication tools (6, 9, 11, 17, 20). Because of the lack of nonverbal cues, the virtual communication tool was seen as inappropriate for discussions in which it is necessary to understand the emotional state of the other person (11, 12, 20). Text-based communication tools were similarly reported to cause misunderstandings (14, 15, 19). One of the respondents reflected: *"Sometimes you write a completely clear e-mail (based on your own understanding), and the other person responds something completely different"* (14). Communication-

related constraints can seriously affect individual productivity and, in the worst cases, can lead to conflicts.

One of the mentioned discontinuities related to task-related communication and information sharing was the lack of spontaneous opportunities for asking questions (1): *"Information sharing in a face-to-face environment happens naturally. People shout to each other across the room, share insights next to the coffee machine, etc." (25)*. The benefits to communication of being in the same physical location include the opportunity to discuss things with a colleague while in the elevator or the ability to go to someone's desk for a quick discussion. These prompt opportunities for (informal) information exchange were seen as enhancing the chances of making (informal) agreements (15) and thus increasing the speed of decision-making (11, 14, 15) in face-to-face settings. In addition, getting a quick response from colleagues was said to increase individual productivity while managing individual tasks (6, 11).

In contrast, asking even a simple question in a virtual teamwork context can take much more time and effort than working in the same physical location, mainly because finding mutually acceptable times for information exchange is challenging in virtual teamwork contexts (12, 15, 19). When people do not work physically together, their personal working times gradually shift away from each other (1). The following shows Respondent 15's reflections on this:

> *You have to start looking from the calendar who is free and when. Then you start preparing your message…*

> *Sometimes you need a quick answer, but the other person does not respond to the e-mail…*

> *Even if you pick up the phone for a quick question, you do not know if the other person is ready to respond.*

Some questions might eventually not be asked because, according to respondents, they feel hesitant to ask them via virtual tools: *"For some questions, it feels weird to use e-mail or Skype. I would like to ask them in a face-to-face situation"* (14). Respondents mentioned that this resulted in a loss of *"momentum"* (14) and *"spontaneity"* (15, 16) and a *"lack of speed"* in communication (6, 12, 13, 14, 15, 17), which can lead to an increase in decision-making time, a decrease in productivity, and a loss of motivation.

Uneven or limited opportunities for face-to-face discussions lead to additional complications related to the distribution of information. Sometimes, people who are in the same physical location discuss something and forget to inform the person who

works in a different physical location (15). The worst cases are those when people who are in the same physical location come to an informal agreement before the formal meeting, which involves everyone (17). Respondent 15 reflected: *"Sometimes, people who are in the same physical location came to an informal agreement before the meeting. And then, it is very difficult to convince them to decide differently during the virtual meeting."*

Another reason for the uneven distribution of information is that *"sometimes team members just forget about your existence, especially if they haven't seen you for a while"* (16). In addition, text-based communication can make members cautious, as they might not feel so open to sharing everything since there will always remain a digital sign about it:

> *When you are communicating via text messages, you have to be extra cautious of what you are saying. People might understand it in the wrong way or turn against you at some point. Also, you must be more precise, cannot say that, you know, "I heard something from someone…"* (14)

Respondent 1 explained that, in virtual teams, even jokes need to be moved to chat; otherwise, people might feel left out. Uneven distribution of information may lead to a situation in which certain tasks are poorly managed, there is a need to do double work (13), or people just feel left out (1).

Virtual teamwork often increases the number of projects and teams in which team members are involved (1, 4, 9, 11, 13, 18, 20, 21, 22, 23, 25). This involvement in many project teams requires alternating between different collaborative tools. Respondent 21 explained:

> *Now, you work on several projects, and you contribute to a small part that you are an expert on. So, the number of projects that people are involved in is increasing all the time. And thus, we cannot keep on e-mailing all the time, because it is not an efficient way of doing what we must do.*

Even if the number of projects remains the same, virtual collaboration still increases the amount of written information coming in, which, in turn, may lead to information overload, or information cannot be found where it should be because someone has saved it in the wrong place (18, 19). This type of obstacle can decrease productivity and increase overall frustration regarding work.

The second type of discontinuity – social interaction – was connected to decreased opportunities for face-to-face connections (especially at the beginning of the collaboration), making it difficult to get to know the other team members (16). Respondent 10 explained: *"People have different 'handwriting' and backgrounds."*

It was found to be more difficult to find time and place for sharing personal thoughts and motivations in the virtual context (15). Virtual communication was found to be more task focused. Respondent 20 described an example of this type of experience: *"I remember when I was on a call with my manager, and I had just come back from holiday. He asked, 'How was your holiday?' I said it was great. And he said, 'Great! Let's start with our topic then.'"* With regard to daily communication, respondents reflected that, *"if you do not know the other person, you don't know, for example, if your jokes are landing well"* (20) or what expectations your team members have of you on a personal level (15, 20). Again, not knowing your team members well may increase misunderstanding, decrease individual efficiency, decrease communication efficiency, and negatively impact teamwork in general (e.g. building trust, 19).

According to the respondents, in a virtual context, it is more difficult to anticipate that someone has problems related to their personal life or is in need of emotional support in general (8). For example:

> *In the real world, it is easier to be supportive, to have a coffee together, to give your team members some comfort and celebrate together. Virtually, you must be very explicit about these things. And if you must be explicit about this, then it does not feel natural anymore. It is very difficult to set up a virtual meeting with the topic to celebrate somebody getting married or give condolence to someone's losses. It does not feel natural anymore. It feels weird and artificial.* (25)

Eventually, individuals may become more independent and less related to each other, decreasing their personal motivation to work towards the team's goals.

Although isolation and feelings of loneliness are closely connected with the discussions in the above paragraphs, they are worth noting separately, as they may lead to separate competencies. Thus, respondents mentioned that, although they spend the whole day on calls with colleagues, they still feel it is not enough and end up feeling lonely and *"antisocial"* (20). Some respondents mentioned that it is possible to avoid loneliness by having occasional virtual coffee calls with colleagues, while others stated that nothing replaces physical meetings, and thus, they occasionally go to the office to have that *"real"* connection with colleagues (20). Feelings of isolation may lead to the same negative effects as described above, namely, decreased motivation, decreased efficiency in communication, decreased trust, misunderstanding, and a general loss of motivation.

Constraints related to virtual meetings came so strongly out in the data – that it was decided to treat them separately by placing them into third category of communication related constraints. Respondents reported that communication during virtual meetings is challenging, especially in the beginning, when they had less experience with virtual

meetings (8,20,21). One respondent shared how she was nervous during the first calls, as she was not sure whether she could find the right words at the right time: *"The fact that you cannot see other people's body language makes communication in virtual meetings more challenging"* (20). Communication during virtual meetings was also found to be more unnatural (5). People tend to talk longer, and it is harder to interrupt them to get in a word (21). At the same time, the data also showed that most problems with virtual meetings were experienced by people whose meetings were mainly held without using the video feature. These respondents reported that they missed using video and that it might help improve the experience. The challenges in virtual meetings may lead to, for example, information loss, extended meeting times, deceased individual efficiency, and an increase in individual stress factors.

Virtual team meetings were also reported to be more exhausting because they made it harder to stay focused. One respondent explained:

> *There is a certain energy drain in virtual teamwork. If I am on calls the whole day, I am most probably more tired than being at meetings in the office all day. [...] This is because you need to focus more. And you are the only one who can help you focus. So, you are responsible for your concentration. If you want to be actively present, it is your task.* (25)

Similarly, Respondent 4 said: *"At virtual meetings, I try to do everything to stay focused (use headphones, etc.) and still I find it hard to stay focused and engaged compared to physical meetings."* Respondents also shared that it is hard to grasp whether colleagues are engaged in the meeting or not (5), and the loss of focus may require explaining or asking the same things twice – which results in extended meeting times or some other topics getting less attention than needed.

8.2   Teamwork

The second subcluster emerging from the data was related to teamwork and relationship building. Being physically in different locations was reported to decrease the overview of work-related progress, thus inhibiting personal and team efficiency. In addition, developing relationships and building trust and team feeling were reported to be more difficult in the virtual context. This cluster of teamwork was divided into two subclusters:

- Coordination and synchronisation
- Relationships and trust
    - Interpersonal relationships
    - Task-based trust

One of the difficulties in the virtual teamwork context was having no overview of what your colleagues are currently working on and when they will be completing an agreed-upon task (15). The decreased overview of each other's progress was said to impact overall productivity and efficiency among the individuals in the virtual team. Moreover, without understanding each other's workload, tasks might be distributed unevenly – some people might be overloaded, while others do not have anything to do (7, 22). Someone finishing their task at the *"last minute"* might mean that the other person has to work late hours (7). Not being able to see how much time team members spend on certain tasks may eventually influence good judgement within the team while planning time for your work (7). Respondents also stated that, since others do not see or anticipate how much work everybody is doing, they are less likely to help carry each other's workload. Respondent 18 reflected: *"You are alone with your tasks and responsibilities, and it is hard for someone else to support you in your work when they do not know what you are doing."*

Regarding interpersonal trust, the data indicated constraints regarding two separate categories: a) interpersonal relationships and b) task-based trust. According to the respondents, it is harder to build interpersonal relationships in virtual teamwork settings (16, 19, 4). When relational ties are weaker, it is harder to anticipate how the other person will behave, which ultimately affects interpersonal trust (10). Respondent 16 reflected: *"It is important to understand the other person, to have this 'click' for building trust [...] You need to meet the other person (even if it is just through Skype) to understand what type of person you are dealing with and for trust to emerge."* In addition, people find it harder to trust others if they do not see their work effort (1, 2, 3, 4, 15, 17), which refers to task-based trust. Respondent 1 explained: *"When people do not see each other, they might have this feeling, that they are the only ones working, and others are just having fun."*

From the individual perspective, the virtual context (e.g. physical distance) makes it difficult to prove how much time people spend working (10), which might create feelings of anxiety, where individuals start creating unnecessary working routines to prove that they are working. One respondent reflected:

> *In the beginning, when I started working from my home, I found myself touching the mouse from time to time, to show that I was active. But it does not make sense, because no one looks at whether you are online or not. They just expect you to get your things done.* (20)

This behaviour might also be related to prejudices against virtual teamwork. Respondent 1 explained: *"The image of remote/virtual work is often as if the people were at the beach instead of working."*

8.3   Self-regulation

The third subcluster emerging from the data was self-regulation. It must be said that most interviewees used the term *self-management*. However, when the later analysis of the data revealed additional topics related to self-management, such as independent decision-making and the need for continuous self-improvement, it was decided to call this subcluster *self-regulation*, as it is a broader term and allows additional aspects to be included in self-management. Based on the data, it can be concluded that the responsibility for one's own physical and mental health, workplace, work, and rest time increases significantly in virtual teamwork. Virtual teamwork blurs the boundaries between work and rest time, which can lead to overworking and burnout (2, 4, 5, 6, 8, 9, 11, 20). All respondents stated that individuals must be much more self-disciplined to manage work tasks on time. Therefore, virtual teamwork was reported not to be suitable for everybody – or at least would require more time to learn how to manage on one's own. Thus, virtual teamwork also requires members to learn and improve themselves to better meet the requirements of this work style (1,9, 11, 12,15,20). The clusters that emerged from the data were as follows:

- Self-management
  - Time management
  - Workplaces and/or tools
  - Focus
- Independent decision-making and problem-solving
- Self-improvement

Flexible working arrangements were reported to create difficulties in finding a balance between work and personal life. One of the problems encountered was the discontinuity in boundaries related to work time, which often results in working more hours a day and later in the day, ultimately resulting in decreased time for resting/spending with family and friends (2, 4, 5, 6, 8, 9, 11, 20). One of the respondents explained: *"If you have your responsibilities, and your work is not fixed by time, then it is easy to spend more time working. Remote workers are often accused of working less than in the office; my personal experience says that they tend to work even more"* (20). Some respondents reported having difficulties switching off work-related thoughts when they read e-mails (on the phone) sent by other team members working during evenings or weekends (8). Respondents expressed feelings of guilt when they see other team members working on weekends while they rest. One of the respondents reflected: *"And then you see a discussion starting in the e-mail by your team members during the weekend. And you feel that you are the only one who's lazy and not working"* (13).

Contrary to the previous section, some respondents reflected that being physically away from others made it too difficult to start the workday (1, 2, 8, 9, 10, 17, 19). Having a physical workplace and colleagues around was perceived as one of those external motivational factors that helps one be more disciplined (1, 8, 9, 10, 17, 19, 25). One respondent reflected:

There is a risk of becoming too flexible with your work time, which can lead to things piling up [...] When I work from a distance, then it is harder to open my laptop at 9 a.m. [....] Also, it is easier to have longer lunches, finish your workday earlier, etc. (2)

Another respondent reported: *"The lack of commitment is always a little bit present in virtual teams. There is no one in your face to make you accountable"* (25).

According to the respondents, self-discipline is not the only thing that helps one stay focused and finish work tasks. They also reported that individuals working in virtual teams need to find their own "rhythm" of working. People with a good rhythm know when they are most productive and can leverage that; they also know how to manage work time effectively and prioritise work tasks. Virtual teamwork requires individuals to *"make conscious choices of your time, and conscious choices of which meetings to attend"(21).* Thus, it can be concluded that virtual teamworking would be harder (at least in the beginning) for those individuals who rely more on external factors to motivate them to start working and those who have lower self-consciousness and poorer time management and prioritisation skills. Not being able to manage work tasks and time well can lead to not being as effective as planned, being late with tasks, or delaying tasks, which leads to working evenings and weekends, eventually leading to stress and burnout.

Regarding the workplace and tools, matching suitable workplaces with work tasks was reported to be a challenge at first: *"My brain works differently at different locations. So, in the beginning, it was a challenge to find the right location for certain tasks"* (6). Moreover, not all locations are virtual teamwork friendly. One of the respondents explained: *"Every two or three weeks, I have somebody on a Skype call who is in an environment that is not virtual work friendly (for example, in a taxi, at an airport, etc.)"* (25). Distractions related to the home and office were also mentioned. For example, requests for attention by family members were reported to make it difficult to focus on work-related responsibilities at home (3, 4). However, the office was not always considered the best place for concentration either; noise or colleagues popping in to ask something were the reasons that several respondents chose to work from their home office for tasks that needed concentration (1, 8).

Many of the respondents reported that choosing a place for work is challenging because of the availability of different tools at different locations (3, 4, 5, 6, 9, 10,

11, 14, 19). Fast internet connection was mentioned to be inconsistent in different locations (11). Additional screens (preferably big) were mentioned as important for efficient working; however, they were not available at all locations (3, 4, 5, 10). Workplace ergonomics were also mentioned as inconsistent when working from different locations (19). Printers and scanners were also mentioned (3) to be important for completing certain tasks but not always available everywhere.

The psychological aspects related to different workplaces were discussed. The physical location was reported to be the first lighthouse for new employees (1). Therefore, virtual teamwork was reported to be a challenge for newcomers (1). The psychical location was also reported to influence performance on an unconscious level. Respondent 10 explained: *"It is difficult to work from home, because at home I have so many different roles besides my work role. And I found it difficult to tune myself into being a 'somebody to be taken seriously at work' when I was working from home."* In addition, switching roles was reported to be an issue while working somewhere other than the office (especially from home) (10). One of the respondents reported interference with their personal life after using the home office more often as a place for working:

> *I found myself working from home for at least a couple of days per week. And then, I noticed that I did not actually want to eat at my dining table in the evening [...] because, to me, the dining table was connected with work. So, I felt in the beginning that virtual work interfered with my personal life.* (20)

Last, but not least, is the increased effort needed to *focus* in a virtual teamwork setting. Although briefly discussed in the communication cluster, it is worth discussing here as well, as it might lead certain competencies to be added to the final framework from the self-management perspective. Respondents stated that, in virtual teamwork, the biggest distraction is in front of the team members – the computer (25). Respondent 23 explained:

> *Sometimes, when I have three calls in a row, and it takes three hours, then when things are a little bit off topic (for me), I lose focus. I start looking at my e-mail, etc. So, I must pay attention – sit there with all the windows closed and a pen and a paper in my hand – to not lose focus.*

Additionally, e-mails or messages popping up can distract the mind from being focused (17). One respondent added that, while it is possible to ignore a phone call when you are busy with something that needs focus, it is much more difficult to ignore a Skype call when you are marked as being *"online*" (17). To avoid unscheduled Skype calls, *"Some people mark themselves 'offline' or 'away' all the time*" (17), which "*does not support healthy teamwork"* (17).

One respondent highlighted that there are often fewer opportunities in virtual teams to ask for help from colleagues or the boss: *"You may not always have somebody to turn to with your questions. If you are used to that, then now it is not so"* (18). The respondent also stressed that virtual teamwork requires much more independent thinking: *"You have to be much more independent – think independently"* (18). Similarly, Respondent 14 explained: *"An individual must have common sense and analytical thinking. [...] Team members must have the ability to think independently and make logical conclusions, instead of running to me with every question."* Thus, it can be concluded that virtual teamwork settings, where there are fewer opportunities to ask for help, require members to have much more independent thinking skills.

Regarding self-improvement, respondents stressed the need to be *"a fast learner"* (12, 9), the need to be ready to *"learn throughout life"* (11, 12, 19), and the need to *"learn independently"* (15, 20). Respondent 20 stated: *"Because everything is changing so fast, we must become good learners instead of knowing everything."* Without the necessary skills for independent learning, individuals may not be able to cope with technological tools and technological innovation and may not grasp the benefits of technology and new ways of working that might otherwise help them improve their work performance and satisfaction (23).

8.4   ICT and technology

Being apart from each other creates a need to use new tools, for example, those *"that are shared"* (20). Most of the respondents did not report personally having difficulties adapting to new technologies. However, respondents agreed that some people find it difficult to choose the right technologies for the tasks (especially at the beginning of their virtual teamwork experience) and adopt new technological tools (1, 21). Using new technologies can be initially intimidating, and without proper "digital hygiene", the tools may hinder personal productivity and efficiency through increased distractions (1). Additionally, when working from public places, employees might not have access to or the ability to share certain data for security reasons. It must be acknowledged that many constraints related to technology could also belong to other categories, such as communication or collaboration. However, since these topics were mostly brought up after probing technology questions, it felt appropriate to keep them in the current cluster. After careful analysis of the data, the following subclusters and subcategories were created:

- Adoption of new technologies
  - Leveraging the technologies
  - Adjusting to new technologies
- Security and data protection

- Technical problems

The first step in virtual teamwork is finding the right tools for the task, both for the individual personally and for the team (15, 19). The selection of tools in virtual teamwork is not a one-time thing. For example, in virtual teamwork, individuals must decide on several occasions every day which communication tool to use to deliver a certain message. Respondent 25 explained:

So, you must identify what technologies to use [for information sharing] and which information must be shared –- because it is so important that you expect them to act upon it. One option is e-mail. It is a great thing that it pops up and requires your attention. At the same time, too many e-mails mean that information will get lost. You become overwhelmed, and you do not know how to prioritise. So, things like MS teams and Yammer are ultimately sharing environments without that alert system. So, you must go in as a team member to get that information. And it is a constant thing to find the balance between sharing information with the alert system (you need to be in front of people's face) and sharing them in the collaborative platforms (where people must come and get the information).

Not knowing how to choose the right technologies or not choosing the right ones and therefore not getting the needed response may decrease team members' productivity and efficiency.

According to the respondents, one reason for poor adaption to technologies within virtual teams is insufficient skills for using the new technologies (1, 4, 9, 13, 15, 19). There are also problems with the awareness of individual skills related to technology, which are then turned against technology (9). One of the team managers explained: *"For example, when somebody does not know how to share a screen on Skype, they state that Skype is not a comfortable tool for collaboration"* (9). Moreover, when (new) technology fails, people *"burn their fingers"* and do not want to try new technology again (20). Being afraid of technology failing (e.g. bad audio quality during a Skype call) may hinder people's readiness to try new technologies for collaboration (17). The respondents added that changing behaviours regarding the adoption of new technologies (e.g. moving from old to new ones) is often hard (9, 14, 21): *"For example, they continue sending e-mail attachments instead of sending a link to a file [to work on it simultaneously]."* (21).

According to the respondents, using video during calls can be intimidating, especially in the beginning:

Using a video can feel a bit awkward at first. You are thinking a bit more about how you speak and how you look when you speak. [...] When I am on Skype, I feel I am more aware of my facial expressions [...] So, I find myself thinking that I should not look at the ceiling (as if I am just wondering or daydreaming)...because it might be perceived in a wrong way (as if I am not interested). This is something I do not feel in a regular office. (20)

Respondents also mentioned that using video features is inconvenient to some people, since they do not want to share the environment they are working in (20). Moreover, some people fear being caught doing something else during a video call (20). Eventually, when people do not feel accustomed to video, they might start inventing excuses *"by saying that the camera is not working, for example"* (25), which may decrease trust in the team.

Changing locations and working via online tools creates a risk for information security (1,16,17). When people work in different locations (e.g. on airplanes), it is difficult to guarantee information security because, for example, somebody may be looking over their shoulder (17). Somebody may also overhear the discussion during a Skype meeting in a public location (19). Finally, using open-access Wi-Fi may cause information leaks (16). Sometimes, there are limits to accessing certain programs when a person works outside the regular office. Limited access to information through certain programs or simply being out of the office and having to consider the risk of information leakages may decrease productivity (6).

Finally, respondents generally agreed that, even after making all preparations and conducting tests, technology fails from time to time: *"With technology, your hands will always be short. You may order for yourself the fastest internet connection, and it still fails you when the meeting is starting"* (19). Respondent 1 stated: *"You just have to accept that technology works 80% of the time, and other times, it fails to work."* According to respondents, technological hiccups mostly affect those who are not accustomed to using new technologies, and when they burn their fingers, they may start to blame the technology and refuse to give it another try (20). For example, when it takes 10 minutes to set up an important call, people might find it frustrating and not want to participate in virtual calls again (10). Technical problems may lead to decreased productivity and efficiency in virtual teamwork.

8.5   Leadership

Respondents also reported many issues related to leadership in the virtual context. One reason is that many of the respondents were team leaders. Another reason is that virtual teamwork allows companies to use more and more matrix- and project-based teams, which results in individuals shifting roles, for example, from being a leader

in one team to being a member of another team. From a leadership perspective, respondents reported difficulties related to company culture, goal alignment, overview and coordination, team building, fostering innovation, and knowledge transfer. The clusters that emerged were as follows:

- Company culture
    - Role, goal, and task alignment
    - Coordination of tasks and resources
- Communication and information exchange
    - Virtual team meetings
    - Virtual brainstorming
    - Effective communication and information exchange
    - Employee–leader relationships
- Relationship and trust
    - Team building
    - Celebrations and acknowledgements
- Fostering learning

In general, all respondents who were leading other people mentioned the importance of company culture in one way or another. Respondent 1 explained: *"I realised that remote work is all about the company and leadership culture […] You as a leader must organise things so that it does not matter where your employees are located."* Developing a company culture that supports remote work means that there are agreements on how to communicate with each other, there is trust that people work even if they are not at the office, and those who are in the office accept that their colleagues wish to be somewhere else (1). Respondent 1 added that some people might feel frustrated when others decide to work from home, and it is the role of leaders to explain that this is okay and accepted. Without creating the right culture, leaders can tell people to stay at home some days a week, but it will not work out (2). Respondent 21 explained that, without the right company culture, there is no point in investing in new tools, as it can create even more mess instead of *"creating structure within the mess"*. Without the right company culture, people might start to lose trust in each other. There is a higher risk of information blockage and uneven distribution of information.

In addition to company culture, all people involved in leading others on a daily basis stressed the importance of creating clarity and transparency in roles, goals, and key-performance indicators (KPIs). According to the respondents, the most challenging thing for leaders who are not used to leading virtual teams is changing their mentality – *"getting the work done is more important than going to work"* (2). According to the respondents, it is the leader's job to first understand the value of

each role and person in the team and then discuss these with the employee, together agreeing on KPIs and goals. Still, some people may end up doing something other than what was agreed upon (1). The risk in virtual teams is that it takes longer for the leader to notice that people are doing something other than the agreed-upon tasks (1). Accordingly, Respondent 7 said that *"understanding whether your employees are in the same boat with you"* is one of the biggest challenges. Without clarity in roles, goals, and KPIs, the whole team's productivity may decline.

Respondents stated that it is a real challenge in virtual teams to understand how employees are doing (2, 7). The same applies to team members – it is difficult to know how the other team members are doing (7). Although there are best practices for generating overviews (digital tools, regular team meetings, and regular one-to-one meetings), respondents still agreed that developing an overview and good flow of work processes within virtual teams takes extra effort. Without a good overview, it is hard to understand what the capabilities and resources of the different team members are; thus, in the end, some people may be overloaded, while others are working with half capacity (7). Additionally, without a good overview, trust may start degrading within the team. Overall, it can be stated that developing an overview takes extra effort from team leaders and members, and without it, there is a risk of decreased productivity and trust.

For some virtual team leaders, it was challenging to develop a sense of presence: *"I was struggling quite a lot with that in the beginning, that my employees felt that when I was out of sight, I was out of reach"* (1). Other leaders stated that, for them, it is difficult to spot how their team members are doing: *"It is much harder to read people's feelings, emotions, etc., without face-to-face contact […] It is also harder to understand when the team has inner conflicts or tensions when people are not in the same room with the leader"* (6). Thus, there is a risk that leaders will not notice when their team members are not happy with their work and may resign from work before the leader can do anything about it (8). Moreover, it was found that noticing conflicts and tensions emerging in the team is harder if team members are not in the office (6). The importance of physical presence was also highlighted. Respondent 1 shared that it is the role of the team leader to find a good balance between virtual and physical meetings.

Connected to the earlier sections, respondents found that, in virtual leadership, it is challenging to create team feeling (8, 11, 12, 16, 20). Respondent 8 shared: "*For building the team feeling people need to spend time together in the same physical location*". Respondent 12 added:

> *If people do not meet in person, the sense of a team decreases. People start behaving like guests – as just people who are forced to do something together*

*[…] People do not have the "connection" with each other, and they will not
function any more like a team.*

Team feeling was seen as the biggest driver behind team members agreeing to put in
a little bit of extra effort and helping each other during tough times (12). Again, the
opportunity to get the team to the same physical location from time to time was
reported to be good (1, 12). In some cases, when employees work globally, these
opportunities are rare – once or twice a year. However, the opportunity to have
physical meetings once or twice a year was reported to be better than nothing
(12, 22).

While closely connected with the difficulties related to personal conflict and
team feeling, the topic of employee acknowledgment is still worth discussing, as it
adds a new angle. Namely, the data revealed that leaders found it harder to
acknowledge employees in the virtual setting, especially regarding the celebration
of personal news, such as birthdays or marriage: *"In the real world, it is easier to be
supportive, to have a coffee together, to give them some comfort and celebrate.
Virtually, you must be very explicit about these things. And if you must be explicit
about this, then it does not feel natural anymore"* (21). Without the opportunity to
celebrate together, team feeling and employee motivation might gradually start
fading.

Respondents mentioned that it is more difficult in virtual teams to ensure smooth
communication between team members (1, 7, 12, 24). Respondents said that it is the
leader's job to make sure that no one will be left out of the communication (both
task-based and social communication). It is best if leaders and the team agree on
communication guidelines (where, when, and how the information will be
exchanged) (12). A leader must also provide the proper infrastructure for
communication and information exchange (24), while, as discussed earlier, the
company culture in general must support virtual teamwork. There must be good
overarching communication practices in place in the organisation and in top-
management support (21). Respondents agreed that developing a good information
process is challenging when the leader is used to walking up to their employees to
ask something. It takes extra effort to change leaders' habits and find the right
leadership activities to meet the virtual teamwork context (1).

Connected to the communication topic, respondents stated that leading and
facilitating virtual meetings was challenging. For example, they said it was harder to
make sure that everyone could say a word and that people do not start to speak over
each other (15). Sometimes, especially during hybrid meetings, those people in the
same room may start talking to each other and forget about the people who are online
(15). Respondents also shared that sometimes it is hard to make people speak up:

Because sometimes some of the people were a bit …not scared but… Well, they are all on 'mute', and they listen. Sometimes, that was a bit awkward. You really need to …well, it is a bit harder to make sure that the community talks and has a conversation. (20)

One respondent reflected that personal communication styles are amplified in virtual settings: *"The person who talks a lot will talk even more. And the person who does not talk a lot will be even quieter"* (25). Keeping everyone engaged and focused during the meetings was also said to be harder (20), and fostering discussion was found to be difficult (15). All of these challenges may lead to virtual meetings not being as effective as expected, thus resulting in a decrease in information exchange, for example.

Although perhaps not so strongly stressed, some respondents mentioned that they have experienced that it is more challenging to brainstorm virtually. While some were talking about explicit brainstorming events (9), others found that, even during regular meetings, they sometimes miss the tools and gadgets that would help them convey the message better (12). Limited brainstorming opportunities may lead to less innovative solutions, resulting in lower quality performance of team members.

Virtual team leaders also stressed the importance of escalating the speed of learning. Respondents explained that real learning happens through discussion, and in virtual teams, the main threat is that there is less time for discussion (20, 23). Thus, it takes more effort from the leader to foster real discussion. One way of doing this is to reduce the time taken to inform and increase the time for discussions during virtual meetings, as informing can be done via asynchronous tools (23). An additional way to support knowledge transfer is to invite people to share their ideas and discuss them during virtual meetings (20). Collaborative tools (e.g. Teams and Jira) were found to be useful, as they help create a collective brain. However, even though there are practices that can be implemented, it still emerged how supporting learning and knowledge exchange is harder in virtual teams compared to traditional teams.

8.6   Diversity

In general, the diversities that were brought up during the discussions were related to national cultures, company cultures, working styles, and different roles (IT people vs businesspeople). With different nations, for example, it was found that they use different body language signs, have different holidays, and value different things (15). Regarding working culture, respondents mentioned that some people like to work late hours, whereas it may create a feeling in others that they are somehow less valuable when they do not work late nights or over the weekends (1). It was also

found that sometimes different roles do not understand each other (e.g. IT people and businesspeople). Finally, respondents mentioned that, when people from smaller companies work with bigger corporations, it might be challenging for them to understand that making decisions takes time (17). Interestingly, diversity itself was not found to be so problematic as the fact that, in virtual settings, it is harder to mitigate diversity-related issues, such as getting to know other people. All of these challenges can lead to misunderstandings, productivity loss, and, in the worst cases, conflicts.

Table 20 summarises the findings regarding virtual teamwork–related constraints. It highlights the root cause (physical dispersion) and distributes virtual teamwork–related constraints into main clusters, subclusters, and subcategories of subclusters. The final column describes the potential effects of the key constraints on individual and team effectiveness. The text in blue was added after comparing the interview findings with the findings from the theory. Although not mentioned in the interviews, it was decided that the additional findings from theory should be added to the table to make the table more holistic.

Table 20. The overarching table of virtual teamwork–related constraints (developed by the author)

Main clusters of constraints	Subclusters of constraints in VT	Subcategories of subclusters	Effect of constraints on individual and team efficiency
(1) Communication and information exchange	Task-related information exchange and management	Misunderstandings due to not seeing the body language of other people, due to misinterpreting the written text, etc.	Risk of conflicts, decreased productivity, need to complete the same tasks twice, increased decision-making time, decreased productivity, poorly managed tasks, delays and loss in work quality, and negative effects on trust.
		Increased response time.	
		Uneven distribution of information.	
		Information overload, and scattered information.	
	Social interactions	Difficulties getting to know each other, and more task-focused communication.	Decrease in motivation, decreased efficiency, less engagement with team members, and decreased commitment to team goals.
		Decreased emotional support, and **increased aggressive and disrespectful communication behaviour.**	
		Isolation, and feelings of loneliness.	
	Virtual meetings	Difficulties adjusting to virtual meetings (speaking up, getting the message delivered, etc.).	Decrease in motivation, not harnessing the benefits of remote meetings, and less effective meetings.
		Decreased engagement and focus.	
(2) Teamwork	Task-related coordination and synchronisation	Decreased overview of work processes.	Decreased task-related support from colleagues, uneven workload, increased time to complete the tasks, and poor management of tasks within the team.
	Relationships and trust	Difficulties building trust and relationships.	Decreased team feeling -> decreased motivation and commitment to team goals.
(3) Self-regulation	Self-management	Blurring boundaries between work and personal time.	Risk of overworking and burnout, not being as productive as planned, being late with tasks, or delaying tasks, which leads to working evenings and weekends and physical and mental health-related risks.
		Increased effort in finding suitable workplaces and/or tools.	
		Increased need to manage one's own work time and tasks.	
		Increased effort to stay focused.	

Physical dispersion

Main clusters of constraints	Subclusters of constraints in VT	Subcategories of subclusters	Effect of constraints on individual and team efficiency
	Independent decision-making and problem-solving	Increased need to solve problems and make decisions independently.	Misunderstandings, delays in decision-making, and poor quality of work.
	Self-improvement	Increased need for continuous (independent) learning.	Not being capable of doing one's work and reaching expected results.
(4) ICT/technology	Adoption of new technologies	Difficulties in leveraging the technologies, and poor task–technology fit.	Decreased efficiency, trust, communication, and collaboration.
		Difficulties learning and adjusting to new technologies.	
	Security and data protection	Risk on information security while working in public places, etc.	Risk of data leakages or inability to participate in meetings/decision-making when in public places.
	Technical problems	Internet connection or other technical tools/features failing.	Decreased productivity, and negative effects on work tasks and reputation (clients or colleagues not being happy, etc.).
		Increased effort in managing workplaces and tools.	Risk of not being as productive as planned, and risk of not harnessing the potential of remote work due to a lack of tools or knowledge of how to use the tools.
(5) Leadership	Company culture	Extra effort is needed to create a company culture that supports remote work.	Colleagues not trusting each other, those who are in the office not considering those who are not, information blockages, etc.
	Goals and work processes	Extra effort must be made to ensure there is alignment in roles, goals, and KPIs.	Individuals doing other things than what is expected from them – thus, managers and colleagues are not pleased, and productivity decreases.
		More effort is needed to develop an overview and coordination of tasks and resources.	
	Communication and information exchange	More difficult running team meetings.	Team members are not engaged, resulting in missing information and fewer quality decisions made.
		Challenging to brainstorm virtually.	Feelings of frustration, misunderstandings, and loss of productivity and innovation.

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Main clusters of constraints	Subclusters of constraints in VT	Subcategories of subclusters	Effect of constraints on individual and team efficiency
		Communication and information exchange is more challenging.	Information blockages, people feeling that they are left out, decrease in productivity.
		Difficulties creating personal contact and feeling of availability.	Leader is not aware of the problems that employees are facing, employees burning out, quitting, etc., leader not supporting enough team members, and decline in team members' motivation.
	Relationships and team feeling	Takes more effort to build team feeling (building trust and rapport among team members).	Less helping behaviour towards colleagues and from colleagues, decrease in motivation, and less knowledge exchange.
		Difficulties acknowledging employees (birthdays, *problems*, small wins at work, etc.).	Loss of motivation.
	Learning	Difficulties fostering innovation and knowledge transfer.	Loss in productivity, and less innovative and quality work results.
Diversity	Harder to mitigate diversity-related issues	Harder to spot and respond to national, role-based, organisational, and work culture–related differences.	Misunderstandings and mistrust.

The next section reveals additional findings emerging from the empirical data that can be useful from the theoretical and practical viewpoints when trying to understand and support individuals in the process of adapting to virtual teamwork.

8.7 Phases of settling into virtual teamwork

While respondents mentioned challenges that all members in virtual teamwork experience from time to time, such as *"what to do when technology fails"* and *"how to find a balance between work time and rest time"*, it soon became apparent that there are certain difficulties that people experience differently depending on either their role in the virtual team (team leader, team members), the nature of the virtual teamwork, or their overall experience in the virtual teamworking context. Regarding team members' roles (members vs leader), the content analysis already revealed aspects that differentiate leaders from members. Regarding the virtual team characteristics, it was evident from the narrative analysis that the higher the level of virtuality (members staying apart from each other more often), the stronger the negative impacts associated with the same aspects found in the content analysis. For example, highly diverse teams more strongly felt the constraints regarding getting to know each other, and in short-term project-based teams, the team leaders felt more challenged about tasks such as "*motivating people to do their jobs*" than in long-term teams.

What was found to be new or different from the results of the content analysis compared to the narrative analysis were the similarities and differences of the experienced constraints based on the team members' experiences in virtual teamwork. First, the narrative analysis revealed unique paths in the transitioning process. For some respondents, the transition from traditional teamwork to virtual teamwork came with big "changes", while for some, it was a more gradual process. However, after zooming out from individual stories to a more aggregated level, some generalisations can be made about the process of transitioning from regular teamwork to virtual teamwork and related difficulties based on the member's level of experience. **Table 21** (at the end of the section) illustrates the typical concerns of virtual team members based on their level of virtual teamwork experience. The timeline (e.g. dedicated months for each phase) was created based on the respondents' statements or their personal experience in virtual teamwork. However, the developed timeline should be viewed in light of the fact that adjusting to a virtual teamworking context is a highly individual process that depends on both internal and external factors (e.g. personal readiness for change or team members' support and overall company culture) and on the intensity of virtual teamwork.

The narrative analysis revealed that the first phase – "adjusting" – involves a great amount of unlearning from novice virtual team members. In this phase, those

who come from more traditional organisations (where work time was controlled) find it hard to adjust to the flexibility offered and used by their colleagues. In this phase, they might do some *"silly"* things, such as touching their mouse from time to time to let others know that they are active (20), although, after a while, they do understand that nobody is watching them. A story by one of the respondents illustrates well the challenges of coping with a flexible working culture:

> *I remember when I started working here (it was my internship), I remember calling my manager [to say] that I would be late for work because I fell off my bike. So, my bike was broken, my knee was bleeding, etc. And he was like, "Why are you calling me? Is there a meeting I must cover, or…?" I said, "No, I am calling because I'm not going to be in the office before 9." And he was like, "Okay, I'm going to hang up on you now."*

Those who come from more traditional organisations might also find it hard to accept that their colleagues prefer to be somewhere other than the office. They might feel that they are the only ones working and that others have time off (2). However, after a while, they realise that the work is measured based on outputs and that the work time and location are not important measurements of work effort.

In the adjusting phase, individuals need mostly mental support from their leader and colleagues. From time to time, it is good when somebody reassures them that everything is fine and explains (perhaps several times) the company culture and its working style. When individuals have basic IT skills, they usually do not need any training; it is enough for someone to show them how to use everyday communication tools, how to book (virtual) meeting rooms, and so on. Supportive leaders and helpful colleagues are the most critical success factors in this phase, and they help reduce many stress factors of the less experienced virtual team members.

The second phase – developing – involves learning new *"tricks"* and *"hacks"* for being more productive. In this phase, individuals learn much about themselves (their working and communication styles and habits). Most of the emphasis in this phase is on self-improvement – for example, one's own communication skills, technological skills, and time management skills. Thus, external training helps accelerate learning. It is also important that individuals are encouraged to try out new ways of doing things; thus, colleague and managerial support is still very important. A company culture that supports learning is one of the key aspects of the developing phase. Without this type of culture, there is a risk that the training – no matter how good it is – will not materialise into actions.

The final phase – maturing – involves a great deal of refining and defining what the individual has learned. In this phase, individuals make selections between what they have learned so far. Individuals use the unlearning function to eliminate some

behaviours and patterns that are not beneficial or have not produced the expected results. Self-reflection reveals knowledge gaps that still need improvement – usually related to deeper questions, such as how one can bring more value to their work or make more conscious choices regarding time. Regarding technology, individuals learn more advanced options for leveraging the technology even better to their and their team's advantage. In the maturing phase, the focus shifts more from *self* to *others*. Here, individuals might find themselves thinking about how to support their colleagues better. In this phase, certain training, with the opportunity to discuss it with other more mature colleagues (or mentors/coaches), will help accelerate learning.

The data also revealed that some questions are overarching and span all phases almost unchanged. These questions are related to, for example, finding a healthy balance between work and personal life, dealing with diversity, and what to do when technology fails. These questions can be assumed to be so greatly impacted by external factors and less under personal control that there is a continuous search for balance to cope with these aspects. The data also referred to the continuity of learning, and it can be assumed that the learning cycle will never end due to the fast changes in technologies. Thus, if an individual in the mature phase is confronted with some new technology, the learning cycle will start again, from adjusting to developing to *maturing*, with new questions to answer.

Table 21. Phases of key constraints according to the employee virtual teamwork experience (developed by the author).

	Novice virtual team member (approx. the first six months) "adjusting"	More experienced virtual team member (approx. six months and further) "developing"	Experienced virtual team member (approx. two years and further) "maturing"
Me and my work: *Example questions and concerns.*			
Flexibility/mobility	Is it okay to work outside the regular office time and from other locations? How can I make sure my team members do not forget me? Feeling bad about not working overnight or on weekends when others do. How can I cope with prejudice and opposition from colleagues?	How can I increase efficiency, e.g. how can I manage my time better? How can I sync my working cycles with the rest of the team?	When am I most productive? How can I make the most out of my time – e.g. *"have more life in a day"*?
Location and tools	Do I have access to the necessary environment and work tools from other places besides the office?	How do I ensure better task–technology fit?	How is the environment affecting my work, mental health, etc.*?*
Discipline/productivity	How can I make sure that I really start working when I am not in the office?	How can I stay motivated about my work while working alone?	How can I make smart decisions between different options (meetings, tasks, training opportunities)?
Health and well-being	How can I ensure a healthy balance between work time and rest time outside?		
Me and my colleagues: *Example questions and concerns.*			
Trust	How can I trust my colleagues' work when I do not see them? How can I make sure my team leader knows I am working hard?	How can I better get to know my team members and how they are doing?	How can I contribute to the process of increasing trust within the team?
Relationships and social ties	How do I maintain a healthy balance between working in isolation and with others?	How can I build relationships with colleagues in the virtual environment? For example, how can I be more connected?	How can I manage my connections and connecting time in a smart way?

	Novice virtual team member (approx. the first six months)	More experienced virtual team member (approx. six months and further)	Experienced virtual team member (approx. two years and further)
Virtual meetings	How do I overcome the *"awkward"* feeling while communicating via virtual communication tools (e.g. when using the video feature in Skype)?	How do I make sure I engage my team members in what I have to say and deliver the most important message to them?	How can I support others in feeling better in communicating in the virtual environment?
Written communication via ICT	Do I understand the messages in the intended way?	How do I ensure that my team members receive my messages in the intended way?	How can I be even more precise and concise in my communication?
Information management	How can I make sure that I find all the necessary information?	How can I make sure that my colleagues receive and orient all the information I am sending out?	Are there any better ways of sharing or managing information?
Choosing communication channels	Which channels do I prefer for contacting others?	Which channels do my colleagues prefer for contacting?	Are there any new channels that could improve the communication in our team?
Diversity	How can I deal with diversity (different work styles, backgrounds, cultures, etc.)?		
Me and technology: *Example questions and concerns.*			
Software and Applications	How do I use the technological advances that I'm supposed to use in my team?	How can I make technological advances work for my team and me?	How can I support others in using the technologies in our team?
Technical tools	What do I do if technology fails?		

8.8 Findings and discussion about the key constraints related to virtual teamwork

A comparison between the theory-based description and the data-based description of the main constraints in virtual teams revealed that the data confirm the theory in most subjects and vice versa (see **Table 20**). What the data add to the theory is the realisation that work-at-home offices might start interfering with individuals' personal space. This was illustrated by Respondent 20, who explained that, after working from home and using her dining table as an office table, she did not want to eat at her dining table anymore. The respondents shared how the dining table started reminding them too much of work. This finding can be elaborated on to show that people with smaller homes have much more difficulty coping with virtual work. Their furniture might not support working from home, and adding some office furniture to the small rooms might be impossible. From a competence perspective, this means that individuals must become more aware of how the physical space in which they work affects their behaviour, feelings, and productivity, among other things. However, the aforementioned highlights that organisations must support their employees while they work in home offices (with tools, furniture, etc.) and that the opportunity to use the office also needs to remain for those whose homes are too small or not remote-work friendly.

Another interesting finding from the comparison of data and theory is the difference in the relationship between the boundaries in the data and those in the theory. The theory often equally treats boundaries that create inconsistencies in virtual teamwork (Schulze and Krumm, 2017; O'Leary and Cumming, 2007). However, according to the interview data, physical distance was found to be the main boundary, which creates other boundaries and, thus, inconsistencies at virtual work. This is an important finding because it helps highlight the root cause of most of the problems in virtual work. As a practical implication, it stresses the need to get together in a physical setting from time to time, thus mitigating many of the problems that might develop otherwise.

The analysis of the data also revealed that virtual teamwork significantly increases the need for team members to perform managerial activities. Virtual team members must spend much more effort and time managing their health and well-being, work time, workplaces and tools, work activities, decision-making processes, and so on. This type of work might fit well with those who value self-direction and autonomy (Schwartz, 2006, 2012; Albrecht et al., 2020). However, people who do not value independence might feel highly frustrated in virtual teams, especially in virtual teams that exercise high virtuality. These findings resonate with Shin's (2004) proposal that individual values are important determinants of P-E fit. However, neither Shin (2004) nor the later virtual teams literature highlight that developing certain competencies might also help change personal values (Rohan, 2000). For

example, developing individual abilities to plan, prioritise, and solve problems creatively may help increase an individual's values regarding independence and autonomy. This is an important finding in light of virtual teamwork, as it might help prioritise the order of certain training and other managerial interventions based on a person's unique characteristics (such as values and skills) and the nature of the work (high virtuality vs low virtuality).

Another interesting finding from the data came through the narrative analysis, which revealed that there are certain phases of adjusting to virtual teamwork. This finding aligns with the discontinuity approach (Chudoba et al., 2005), which highlights that people experience discontinuities differently based on their prior experiences, competencies, and other factors. At the same time, the existing examples of the differences in experiences in virtual teams are rather fragmented. Some examples from the literature could be found on how certain discontinuities could be perceived differently. However, currently, no structured approaches have been found that would provide a better overview and understanding. It could be argued that individual experiences are very different, and thus, it is almost impossible to come up with a more structured and generic approach. However, with the help of critical realism and a collective case–study approach, it was possible to develop certain generalisations from the empirical data. These findings suggest that there are certain stages (in the current study, called adjusting, developing, and maturing) that all virtual team members experience more or less similarly.

The aforementioned finding could be materialised in managerial know-how on how to better support virtual team members, depending on their experience in virtual teamwork. For example, when people start working virtually, instead of providing a list of training to the employees, it is sufficient to support the individual by reassuring them that everything is going fine and that they are going in the right direction. However, after a certain amount of time has passed (depending on the intensity of virtual teamwork), employees should be introduced to certain training – for example, which tools work better for certain tasks. When virtual team members have matured, the need for training changes regarding topics – for example, now, the training could be about how to make more conscious choices between different tasks and meetings, how to bring more value to the team, or how to support their fellow colleagues.

From the theoretical perspective, the findings regarding the phases of experiencing virtual team–related constraints help advance the theoretical understanding of how virtual teamwork–related constraints evolve and manifest over time. Currently, virtual teamwork–related literature treats virtual team–related constraints as if they are static. The discontinuities approach by Chudoba and colleagues (2005) highlights that individuals may perceive virtual team–related constraints differently. However, neither Chudoba et al. nor later virtual team literature provides insights into the dynamic nature of virtual team–related

constraints and how these dynamics are related to virtual team members' experiences. Thus, the current research provides a starting point for discussing the procedural nature of virtual team–related constraints.

To summarise, answering sub-RQ1 helped advance the theoretical and practical knowledge about virtual team–related key constraints, the processes of these constraints unfolding over time and based on virtual team members' familiarity with virtual teamwork, and the root cause of the key constraints experienced by virtual team members. This understanding was used to develop the virtual teamwork competence framework (sub-RQ2). The empirical findings regarding sub-RQ2 are presented in the next section.

9   Competencies to Overcome Key Constraints in Virtual Teamwork

The current chapter describes the results and insights developed based on the empirical data to answer sub-RQ2: *Which competencies help individuals overcome key constraints in virtual teamwork?* Answering this question was the second step in the whole research process in the quest to understand how individuals (and thus teams) can better adapt to virtual teamworking. Based on existing theories, it was possible to conclude that people with certain individual characteristics (referred to as competencies in the current study) are better prepared for the challenges emerging in virtual teams. The proposition in the current study is that a team's ability to adapt to virtual teamworking–related constraints is based on virtual team members' abilities to adapt to the constraints emerging from this type of working environment.

Since the theory already allowed for the development of a comprehensive overview of the competencies related to virtual teamwork and the qualitative content analysis of the theory supported the theory-based findings, the focus of the analysis was to improve the theory-based competence framework. Narrative analysis was used to enhance the theory-based competence framework. The narrative analysis of the data enabled the development of descriptions of behaviours of individuals who are competent in certain areas (e.g. virtual communication) and also provided an opportunity to fill the gaps and add knowledge, skills, attitudes, or values that the theory did not highlight. In the analysis process, the theory-based competency framework was compared with the results from sub-RQ1, and some of the categories in the theory-based framework were rearranged according to the results from answering sub-RQ1. The results from the data analysis were added directly to the theory-based framework (Tables 22-26, in subchapters 9.1-9.5) and coloured light blue to allow readers to detect the parts coming from theory and parts coming from the data. The revision of topics by analysing and combining the theory and data-based interview insights resulted in five competence areas:

- Virtual communication (presented in sub-chapter 9.1)
- Virtual collaboration (presented in sub-chapter 9.2)
- Self-regulation (presented in sub-chapter 9.3)

- Digital competencies (presented in sub-chapter 9.4)
- Virtual leadership (presented in sub-chapter 9.5)

The interview data were rich and provided an opportunity to present narratives about each aspect of knowledge, skills, attitudes, and values highlighted in the theory-based framework. However, this approach would have made the narratives very long. Therefore, the narratives were developed so that the author could highlight the abilities that were either more implicit – for example, those that did not emerge so strongly from the theory-based framework – or should be highlighted more based on the emphasis that interviewees put on those qualities. It should be mentioned that this kind of analysis and reporting is, of course, highly interpretative, as it is based on the author's understanding of the phenomena. However, the aim of selecting such an approach was to make sure that the narratives would complement the theory-based framework and not repeat what was already there. The chapter ends with a discussion about the most interesting findings (sub-chapter 9.6).

9.1   Virtual communication

In the theory-based framework, virtual social competencies consisted of *communication* and *collaboration*. For better alignment with the results from sub-RQ1, virtual social competencies were named virtual *communication* competencies and treated separately from collaboration (see **Table 22** at the end of the section). In the theory-based framework, virtual communication competencies included the ability to choose the right tools for communication. In the analysis process, it was decided that this part would be merged with digital competencies. In contrast, knowledge and skills regarding socialising virtually were kept in the communication part; thus, the third caption in the framework was renamed *"socialising".* The theory-based framework had one gap: values regarding virtual communication. After careful analysis of the data, it was decided that the most important value to add here was *valuing other people*. General respect and value towards other people eliminate the risks of imposing aggressive or disrespectful behaviour in virtual communication. The analysis of the data also revealed that a successful virtual team member should have basic knowledge about the risks related to virtual collaboration – thus, it was added to the framework. The data also revealed that those with good virtual communication skills are not afraid to share their failures and challenges with others – to allow others to learn from them.

The analysis of the data revealed that the ability to select and join online communities is becoming more relevant as remote working increases. One respondent explained: *"We as humans are looking for groups where we belong. And so, the fact that we are looking for groups by using electronic tools is good (it is only*

natural that we do that). Because as groups, we are stronger than individuals" (21). Therefore, joining online communities can be considered a vital ability to overcome the risks of isolation, feeling left out, and so on. Thus, the knowledge and skills for joining online communities were relocated from *digital problem-solving* (under *digital competencies* in the theory-based framework) to here, under the *socialising* caption.

Another thing that emerged from the interview data was the need for open communication, in which leaders and members are not afraid to share their failures with others. This kind of *"relaxed communication without barriers"* is expected to create an *"emotionally safe environment for communication"* (19). In addition to creating a psychologically safe environment, according to Respondent 23, sharing failures and challenges helps boost team learning. Therefore, it was decided to highlight this as an attitude: *"to be open to sharing failures and challenges with others"*.

Narrative descriptions of a person with virtual communication competencies

Many respondents stressed that they faced difficulties getting people engaged during virtual meetings (4), having an overview of what others are doing (15), and being forgotten by colleagues (16). Thus, not only must individuals possess competencies to overcome key constraints, but it is also important to be aware of the many threats that virtual communication (and virtual teamwork in general) can bring so that individuals in virtual teams can support each other's efforts in overcoming the constraints. For example, instead of one person implementing different tricks to keep people engaged during the virtual meeting, colleagues could anticipate that struggle and thus focus on the meeting, be engaged, and listen and contribute to the discussions. This kind of awareness of the challenges was included in the description as follows: Individuals competent in virtual communication are aware of the many threats that physical distance has on virtual communication and, based on that, can support others in the quest to overcome communication-related barriers in virtual teams.

Another thing that emerged strongly from the key constraints is that virtual teamwork tends to increase response time. This was expressed by respondents as follows: *"In the virtual context, you never know if the person is accessible at the moment at all and, if not then, when he or she is going to respond to your inquiry" (1),* and *"You never know whether the person is currently available, will she respond, etc." (19).* Although it is not possible to change availability, for example, when a person is in a meeting call, they cannot respond to messages. However, reacting quickly, or "*being instant in your responses*" (7), when there is a possibility to respond can help significantly reduce the negative experiences regarding response

time. Therefore, it was found that communication timeliness is related not only to the knowledge of when and with what frequency to contact people, but also to respecting other people and their time and doing it by letting them know that the message has been received.

In addition, since virtual teams often include people with more diverse backgrounds, respondents highlighted that virtual team members must be tolerant and accept diversity in ideas, for example, *"honouring your colleagues' opinions"* (17), cultures, and so on. Not accepting or valuing diversity can lead to misunderstandings and conflicts. However, respecting others and being tolerant are not enough, as people often in virtual teams do not see each other, which was found to be the root cause of problems (as can be seen in **Table 20**). Thus, there are limited opportunities to anticipate this kind of respect. Therefore, respect and tolerance towards different people (their time, their ideas, etc.) must also come explicitly out of virtual communication. Thus, the following description was added: The individual, working in a virtual team, respects other people (their time, their ideas, their feelings), and it is possible to anticipate that respect from their communication style.

Regarding misunderstanding, respondents mentioned that it is hard to deliver messages so that the other party receives and understands messages as intended: *"It is sometimes challenging to understand others or deliver your message to others"* (15). To overcome these issues, respondents mentioned having the skills to communicate clearly in both written and oral communication – that is, having *"high-level self-expressing and explaining skills"* (10) and *"clear communication skills – clarity – is key"* (25). Respondents added that good virtual communicators could explain complicated things easily – for example, explaining the *"why behind things"* (12) and using *"audio-visual tools in explaining complicated things"* (10). Respondents also mentioned that an open communication style is key in virtual teamwork, where physical distance inhibits reading nonverbal cues (19). These abilities were summarised in the following narrative: The individual, working in a virtual team, communicates openly and clearly in written and oral ways (including argumentation skills), thus successfully delivering the intended messages. They can explain complicated things easily (including explaining the "why" behind things) and, if needed, use additional audio-visual tools to make the message even clearer. They are responsive, attentive to other people, and open and transparent in their communication.

However, again, considering the situational aspects, the message's effectiveness relies not only on the communication skills of the person delivering the message but also on the receiver's ability to analyse the message. Respondent 12 explained: *"Analytical skills are very important [...] I cannot be available all the time, so my colleagues need to have the ability to analyse information by themselves before*

coming to me with questions." In addition, before analysing the messages/information, individuals must be able to listen and pay attention to the information received – as without this, there is nothing that can be analysed. Thus, listening skills, especially active listening (10), are essential. Responded 12 wrapped up the duality of communication by saying: *"You must be a good communicator, meaning that you can express yourself clearly. However, you must be a good listener also."* Therefore, the narrative was advanced with the following description: The individual, working in a virtual team, has good listening and analytical skills that enable them to understand others.

During the interviews, virtual meetings emerged strongly as a constraint. As can be seen from **Table 20**, the key constraints related to virtual team meetings were mostly (from the team members' perspective) related to adapting to virtual meetings (speaking up, using video) and the difficulties in staying focused and engaged. When dealing with the constraints in regard to adapting to virtual meetings, respondents highlighted the ability and readiness to offer a word during the meetings (ready to communicate a lot virtually, 11), not being afraid to speak up and interrupt others (21), and the readiness to use the video (*"feeling okay in front of the camera"*, 22). Respondent 20 explained that she was very intimidated by all the virtual calls at the beginning. Then, she started to learn from more experienced colleagues how to leverage video, highlight or stress important messages, and so on. Learning from others helped her become a more confident communicator in virtual teams. Another thing that helped Respondent 20 overcome the challenges related to virtual meetings was preparation. She sometimes spent hours preparing herself for meetings (including tone of voice, intonation, arguments, etc.). Thus, the narrative description was developed as follows: During virtual meetings, the individual can speak out and offer a word when needed. They know when and how to interrupt others. They observe others and learn from their best communication practices to improve virtual communication competencies. The individual uses video during virtual meetings and is always well prepared for the meetings.

Regarding staying focused, the interviewees mentioned the need to close other tabs and focus on the meeting. Respondent 20 explained*:*

> *Sometimes, when I have three calls in a row, and it takes three hours, then when things are a little bit off topic, I lose focus. I start looking at my e-mail, etc. So, I have to pay attention, to really sit there, with all the tabs closed and a pen and a paper in my hand, to no lose focus.*

At the same time, situational factors again come into play here. For example, it is easier to stay focused when other people participating in the meeting (including the meeting facilitator) use a clear and concise communication style. Respondent 17

stressed that *"it is important to be able to deliver short and concise messages"*. Thus, the following narrative description was developed: An effective virtual team member uses a clear and concise communication style and can listen to and focus on what other people are saying.

Finally, virtual communication was reported to have negative effects on socialising. Abilities mentioned by the respondents regarding socialising can be split into two categories: a) reaching out to others (e.g. taking the initiative for their own socialising) and b) monitoring and reading other people's emotional states to be supportive (e.g. taking care of others). Regarding taking responsibility and actions for one's own socialising, respondents explained how they occasionally developed a routine of going to the office to overcome the feeling of isolation (20) or organised one-to-one virtual meetings with colleagues to chat. Another interesting option for overcoming feelings of isolation is the opportunity to join online communities (21).

From a situational perspective, if it is the member's responsibility to reach out, it is also the member's responsibility to be attentive to others and notice if colleagues need emotional support. Respondents expressed that it is important to have a *"genuine interest towards your team members"* (22). Regarding overcoming constraints related to social communication, the following narrative was developed: An effective virtual team member is ready to reach out to others and set up one-to-one calls with colleagues to get to know them better and socialise. If virtual calls or coffee chats are not enough, the individual occasionally visits the office (if possible). They are willing to share personal information through virtual means and also show interest in how other team members are doing by asking questions, etc. They can monitor their own and others' feelings (virtually) and use this information to guide communication. They can select and join online communities to increase feelings of belonging.

Table 22. Virtual communication competencies (blue font refers to the narrative descriptions, additional insights and changes made to the theory-based table framework on the interview results).

VIRTUAL COMMUNICATION

| NARRATIVE DESCRIPTION | Individuals competent in virtual communication are aware of the many threats that physical distance has on virtual communication and, based on that, can support others in overcoming communication-related barriers in virtual teams. They respect other people (their time, their ideas, their feelings), and that respect can be anticipated from their communication style. They communicate openly and clearly in written and oral ways (including argumentation skills), thus successfully delivering the intended messages. They can explain complicated things easily (including explaining the "why" behind things) and, if needed, use additional audio-visual tools to make the message even clearer. They also have good listening and analytical skills, which enable them to understand others. They are responsive, attentive to other people, and open and transparent in their communication.

During virtual meetings, the individual can speak out and offer a word when needed. They know when and how to interrupt others. They use a clear and concise communication style and can listen to and focus on what other people are saying. They observe others and learn from their best communication practices to improve their own virtual communication competencies. They use video during virtual meetings and are always well prepared for the meetings.

The individual is ready to reach out to others and set up one-to-one calls with colleagues to get to know them better and socialise. If virtual calls or coffee chats are not enough, the individual occasionally visits the office (if possible). They are willing to share personal information through virtual means and show interest in how other people are doing by asking questions, etc. They can monitor one's own and others' feelings (virtually) and use this information to guide communication. They can select and join online communities to increase feelings of belonging. |
|---|---|
| Values
Values… | Other people (their time, their feelings, ideas, etc.). |
| Attitudes
Likes to… | Share knowledge, content, and resources using ICT tools, share information in a proactive way, use video, and share failures and challenges with others. |

| Knowledge and skills | COORDINATING COMMUNICATION: Knowledge about the main challenges of virtual communication; knows about project aims, status, roles of team members, etc.; maintain a shared understanding within the team; critically evaluate the need for sharing information; share and respond to information in a timely manner; manage time effectively. | QUALITY OF COMMUNICATION: Apply manipulation, argumentation, and negotiation skills; apply storytelling skills; use closed-loop communication; listen strategically; clearly present and visualise information (using different options, e.g. video, presentations, images, charts, etc.); ask good questions; apply excellent oral and written communication skills; communicate in foreign languages; switch between task-oriented and relationship-oriented communication; produce clear and concise messages; share contextual information and implicit information explicitly. | SOCIALISING: The ability to substitute emotional cues (e.g. replace body language with emoticons; use unconventional orthography, such as "nooooo"; or use facial expressions, such as smiling, more often); monitor one's own and others' feelings (virtually) and use this information to guide one's behaviour; participate in communities/teams through online engagement. |

9.2 Virtual collaboration

As mentioned earlier, the collaboration competence from the theory-based framework was kept separate. After careful assessment, the author decided to keep the name of virtual collaboration competencies the same as it was in the theory (see **Table 23** at the end of the section) to mitigate the risk of mixing it up with the name of the whole competence framework (i.e. the virtual teamworking competence framework). The theory-based framework included knowledge, skills, attitudes, and values regarding *diversity*, and since diversity formed a very small part of the results in sub-RQ1, the author decided to follow the theory-based framework and keep the diversity-related findings here. After revising the theory-based framework, some of the knowledge and skills regarding diversity and relationship building were moved from the knowledge and skills field to the narrative description field to make it easier to grasp the information from the framework.

The interview data highlighted the existence of a black box in virtual teams since team members do not see or have an overview of what others are doing, and this was connected with abilities such as being an open communicator, sharing challenges, problems, and failures, while also teaching others. According to the respondents, it feels unnatural to be explicit about implicit things (21). However, being clear about implicit things helps boost learning, relationships, and trust within the team (21). Therefore, the attitudes field was complemented with the following description: share challenges and failures with others and share knowledge and skills with others.

Narrative descriptions of a person with virtual collaboration competencies

One of the issues that strongly emerged regarding virtual teamwork was the lack of overview of what others are doing and that some people are not used to asking for help or giving feedback. The following excerpts from the interviews illustrate this:

There is no overview of what people are doing, and when they will be completing their tasks. (15)

In remote work, you are alone with your work tasks. (18)

Some people are not accustomed to giving feedback or sharing their work progress. (1)

As a response to these issues, interviewees mentioned *"open communication"*, *"the ability to ask for help"* (18), and *"the ability and willingness to give constructive feedback"* (17, 25). The narrative was developed based on these issues: A virtual team member who can effectively contribute to virtual teamwork is ready

and willing to explicitly share their working progress with others. They can explicitly state when they need help or are struggling with some parts of their work. They also know and are willing to share constructive feedback on other people's work.

Another issue closely connected with not having an overview of other people's work is that people might start suspecting that others are not working as hard as they are (1), which may ultimately affect trust. Respondent 23 explained how he handles these kinds of issues as follows: *"The next layer of trust is related to my mindset, which is that I ultimately believe that people's intentions are the good ones."* However, he also added that, in addition to trusting and believing in people's good intentions, it is also important to hold people *"accountable"* for their promises (23).

Thus, the narrative description was continued in the following way: The individual, working in a virtual team, generally trusts other people's goodness – for example, this person believes that others are working as hard as they are, until proven otherwise. At the same time, this individual holds other people accountable for their promises, while also taking responsibility for their own promises.

The second constraint that strongly emerged regarding virtual teamwork was the difficulty developing relationships in virtual teams. Virtual team communications were found to be more "*task oriented*", thus leaving less time for socialising and getting to know each other. While relationship building is mostly (in the literature) seen as a leadership responsibility, the interviewees also highlighted the responsibility to team members in this regard. Interviewees mentioned the importance of *"relationship orientation"* (17), *"reaching out to people"* (21), and *"sharing personal information, such as about a renovation that is going on in your home"* (23). According to the respondents, another aspect that helps maintain trust and is thus a foundation for good relationships is being accountable (20, 21, 23, 24) – for example, finishing tasks on time.

Based on the discussion in the paragraphs above, the narrative continued: The individual, working in a virtual team, can effectively contribute to the relationship and trust building in virtual teamwork and is ready and willing to share their work progress with others. They like to reach out to people and find time for socialising physically or virtually with their team members by sharing personal information about themself so that others can get to know them better. They are also interested in getting to know other people better and use every opportunity to learn more about their team members. They are an accountable and reliable team member.

Another ability that emerged strongly from the data was mitigating and managing conflicts. Respondents mentioned clear and concise communication – for example, "*clear communication skills – clarity is key*" (25) – as a means to mitigate conflicts. When misunderstandings arise (especially in written communication), according to the respondents, it is important not to respond to them instantly but to take time and let the emotions cool off:

I have learned to take time off before responding to messages. Sometimes, I have even written the e-mail and left it in the draft folder, as I have understood that I have been writing it based on my emotions. It has happened to me also a couple of times that I leave work at 14 and then go for my running round, after which I respond to an e-mail – just to allow my emotions to cool down. (17)

Another aspect mentioned by the respondents is that, when conflicts emerge, it is important to choose the right tools for mitigating and solving them. According to Respondent 17, a face-to-face meeting (or at least a phone or video call) is necessary to solve misunderstandings. Therefore, the following narrative was developed: The individual, working in a virtual team, can prevent and mitigate conflicts by using clear communication. When there is a risk of conflict, they take time out before they respond to the team members to avoid escalating the situation even more. If things escalate, they use proper communication tools (e.g. calling, a video meeting, or a face-to-face meeting) to solve the situation.

Finally, diversity-related issues also formed an important block in virtual team–related constraints. Here, some of the information from the knowledge and skills field (from the theory-based framework) was moved to the narrative, as the knowledge and skills description became too dense otherwise, and it was believed that the framework would be easier to follow if some of the information from there was moved to the narrative (see black-coloured text in the description section in **Table 23**). Adding to the theory-based knowledge, interviewees highlighted the ability to be tolerant (17) and forgiving (19) towards other people and accepting others as they are (1). In addition, a genuine interest in getting to know other people (17) was again mentioned. According to Respondent 17, this kind of interest can be carried out by listening more than speaking when becoming acquainted with new people.

To avoid misunderstandings due to diversity, respondents highlighted the ability to ask good reflective questions*: "In virtual teamwork, it is important to ask questions if you have the slightest feeling that you or the other party is not understanding things in the same way" (12).* Thus, based on the discussion in the above paragraphs, the following narrative was created: The individual, working in a virtual team is, in general, tolerant and forgiving in nature. They are also genuinely interested in getting to know and learn from new people. To do this, the individual listens more than speaks when meeting new people. They can use reflecting questions to ensure that they and the other party understand each other correctly.

Table 23. Virtual collaboration competencies (blue font refers to the narrative descriptions, additional insights and changes made to the theory-based framework based on the interview results).

VIRTUAL COLLABORATION COMPTENCE

NARRATIVE DESCRIPTION	A virtual team member who can effectively contribute to virtual teamwork is ready and willing to explicitly share their working progress with others. They can explicitly state when they need help or are struggling with some parts of their work. They also know and are willing to share constructive feedback on other people's work. This individual generally trusts other people's goodness – for example, they believe that others are working as hard as they are, until proven otherwise. At the same time, this individual holds other people accountable for their promises, while also taking responsibility for their own promises. This individual can effectively contribute to the relationship and trust building in virtual teamwork and is ready and willing to share their work progress with others. They like to reach out to people and find time for socialising physically or virtually with their team members by sharing personal information about themself so that others can get to know them better. They are also interested in getting to know other people better and use every opportunity to learn more about their team members. They are accountable and a reliable team member. They can prevent and mitigate conflicts by using clear communication. When there is a risk of conflicts, they take time off before they respond to the team members to avoid escalating the situation even more. If things escalate, they use proper communication tools (e.g. calling, a video meeting, or a face-to-face meeting) to solve the situation. The individual can work collaboratively with individuals representing diverse cultures, races, ages, gender, religions, lifestyles, and viewpoints. They can mitigate obstacles that come from diversity by adapting their communication style and following general netiquette. They are aware of the risks that diversity can bring and thus can choose the right communication and information management tools to mitigate those risks (e.g. writing an e-mail instead of calling, as then the other party can take time to translate the message). The individual is, in general, tolerant and forgiving in nature. They are also genuinely interested in getting to know and learn from new people. For this, the individual listens more than speaks when meeting new people. They can use reflecting questions to ensure that they and the other party understand each other correctly.
Values *Values…*	Behavioural flexibility, collaboration, professionalism (accountability), effective virtual communication, other people, equality, benevolence, good relationships, diversity, empathy
Attitudes *Likes to…*	Act cooperatively and unselfishly, new experiences (e.g. new ideas, meeting new people, etc.), participate voluntarily in new projects/tasks, give and receive constructive feedback, reach out to people, share challenges and failures with others, share knowledge and skills with others.

Knowledge and skills *Knows and can…*	RELATIONSHIP BUILDING and NETWORKING: Dynamics of collaborative processes (in virtual teams); reach out to and get to know new people virtually; create, adapt, and manage one or multiple digital identities; protect one's e-reputation; engage in online teams and communities	BUILDING SHARED UNDERSTANDING AND CONTRIBUTING COLLECTIVELY: Engage with given roles and responsibilities; demonstrate personal accountability; employ effective work habits; give and receive constructive feedback; respond to feedback; negotiate roles and responsibilities; build shared understanding.	CONFLICT RESOLUTION: Develop good relationships with colleagues; maintain emotional stability; create and follow team agreements; select the right tools for solving conflicts; mediate conflicts between others; express appreciation; apologise.	DEALING WITH DIVERSITY: Cultural intelligence (knowledge about different cultures); netiquette; clear and concise communication skills, and ICT skills for mitigating diversity-related risks.

9.3   Self-regulation

The theory-based framework treated *self-management* competencies separately from *learning* and *creative* problem-solving competencies. However, to allow better congruency with the results in sub-RQ1, the author decided to gather self-management, learning, and creative problem-solving under one umbrella and name this category *self-regulation* (see **Table 24** at the end of the section). Moreover, since sub-RQ1 revealed the challenges related to thinking about and deciding things independently, the author decided to add independent decision-making to the creative problem-solving caption to highlight this ability. Independent decision-making was found to be very closely related to creative problem-solving, as skills related to creative problem-solving are those that enable and empower individuals to make decisions on their own. Furthermore, as independent decision-making is such an important part of virtual teamworking (according to the respondents), the author decided to highlight that in the attitudes field as well.

Narrative descriptions of a person with self-regulation competencies

When the topic of time management and related issues was discussed with the respondents, they highlighted the importance of time management skills (2, 6, 10, 15) and self-discipline (15, 16, 17, 2), for example, *"responsibility towards using time and working"* (17), *"responsibility towards your promises"* (17), *self-disciplined"* (2), and "*responsible – has a sense of duty*" (3, 10). The interviewees elaborated that, in virtual teamwork, it is important to plan your months, weeks, and days ahead for the longer term (2, 6) and also to know that it takes 25 minutes to concentrate on any new activity (2, 17). The latter means that, to be productive, it is important to bundle activities of the same nature – for example, reading e-mails, having video calls, or concentrating (2, 22)*.* In addition to time management skills, respondents highlighted the ability to motivate oneself to work, that is, *"the ability to fuel your personal energy"* (23) and be a *"self-starter – the ability to motivate yourself"* (25). Respondents also mentioned the importance of writing breaks down in the calendar to make sure that they would not be forgotten. The following quote captures these insights well:

> It is important to plan your work ahead as far as you can. I, for example, mark in the calendar the days I am in the office, and days I work from home. Also, when I plan my time on the calendar, I bundle similar activities together. It is very hard to jump from concentrated work to a video call, where you have to be actively selling your ideas and vice versa – doing focus work after an intensive call. [...] You not only plan your work time in the calendar but also your leisure time, such as breaks, lunch, training, etc. (2)

Respondents also highlighted the importance of prioritising. According to their explanations, virtual teamwork allows individuals to take part in many virtual meetings and projects; thus, it is easy to become overwhelmed and, at the same time, less effective at work. Respondents 20 and 21 explained this as follows:

The second pillar in our digital transformation project was around the rhythm of working. With the transformation,[5] there were suddenly many new roles, and people had to start working differently with each other.[6] So, if you look at an account executive of a big account, for example, then at some point, she has to pull in a specialist in a certain topic (cloud architect, for example). And the rhythm was all about when to you meet with whom. How do you orchestrate the cooperation between different people in a team? How to orchestrate within those teams – how to make sure everybody is clear about their roles. In this pillar, we were looking at things like role clarification, optimising the rhythm – changing our meetings and timings to make sure we have more time to meet with the customers, and we spend less team meeting internally. (20)

Sometimes, in our organisation, we say that you are never done with work; there is always something to do. But you must think about what the impact of your work is. You can or must discuss this with your manager or leader, and I think this is important. (21)

Respondents 14 and 20 added that virtual team members must be able to say "no" to inquiries if they anticipate that saying "yes" would jeopardise meeting the main goal/priorities (14) or if saying "yes" would lead to exceeding personal limits, which can eventually lead to burnout (20). Respondent 21 wrapped up the topic regarding time management, role clarity, and prioritising in the following way: *"It is all about how to make conscious choices about how to use our time during the workday – that is, how do we make the most money with the few times we have (bottom-line)?"* (21).

Based on the previous insights, the following descriptive narrative was created: A person who can work in virtual teams is generally highly disciplined and has strong time management skills. Time management skills mean that this individual is conscious about their own working style and productive working hours and can plan their work time accordingly. They are also aware of good time management practices – for example, bundling similar work tasks (e.g. those that require more focus), having breaks during the day and between virtual meetings, and writing

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[5] The core of the business changed from selling products to selling services (author's remark).
[6] This included using much more virtual teamwork.

everything (including breaks) into the calendar. They are a self-starter – for example, they can motivate themself to start working. They are aware of their value in their current role and can prioritise work tasks based on their importance. To stay focused, they can say "no" to inquiries that may jeopardise managing highly prioritised tasks on time and minimising distractions. They make conscious choices while choosing which meetings to attend and where to use their timely resources to generate the most value in their role and maintain a good and healthy work–life balance.

Other aspects that the respondents strongly highlighted were abilities related to learning, such as *"the ability and positive attitude towards learning [lifelong learning]"* (11, 12, 19), *"open to new ideas/technology/ways of working/ change"* (11, 12, 14, 17, 2, 10), *"ready for change"* (9, 14, 19), *"change your own views and understandings"* (14, 17, 19), *"positive attitude towards challenges"* (19), *"initiative – imitating new things/change*" (19), *"motivated"* (19), and *"the ability to admit mistakes – driving force for development"* (2). Another interesting aspect, from the situational perspective, was how Respondent 14 highlighted the willingness and ability to teach others:

> *Especially when there are new team members, it becomes important that other team members are willing to explain and teach the new member – to make sure that they understand how and why different things are done the way they are done.* (12)

Based on the insights discussed above, the following narrative description was developed: A person who can self-develop in a virtual environment has a general growth mindset – meaning that they believe that everything can be learned. This individual is curious, likes to try to learn new things, imitates change, and is ready to let go of (unlearn) unnecessary behaviours, habits, and mental models. They observe their colleagues to spot best practices that they could try out by themself. They are not afraid to ask questions or ask for help if needed and are also ready to help and teach others. They accept failures as part of the learning journey.

One unique aspect of virtual teamwork highlighted by the respondents is the increased need to make decisions independently. Thus, virtual teamwork increases the need to be able to make decisions and solve problems on one's own. Respondents mentioned the following abilities regarding independent problem-solving and decision-making, which can be summarised as creative problem-solving skills: *"analytical thinking"* (12, 7), *"foresightfulness"* (13), *"critical thinking"* (14, 2), *"the ability to deal with change"* (6), *"the ability to set objectives"* (6) *"for example the target not being too low or too high (1)"*, *"the ability to deal with ambiguity"* (14), *"the ability to synthesise"* (14), *"the ability to make decisions"* (2, 19),

"creative thinking and problem-solving" (19), and *"planning skills, for example planning your actions*" (6).

According to the respondents, one very important aspect is that virtual team members should not expect any "hand-holding", especially from leaders (18). Another important aspect regarding creative problem-solving and independent decision-making is the ability to make mistakes and admit them, which, according to the respondents, is a "*driving force for development"* (21), and the willingness of admitting failure and mistakes was also said to help increase the willingness to take risks and thus make decisions independently. Respondents said that another important factor is that, while virtual team members must take on much more responsibility and make decisions on their own, they should still keep a good balance between being independent and reaching out to the team to discuss/agree on things/approaches. The following quotes from respondents illustrate the points highlighted here:

In virtual teams, it is important to almost be self-sufficient, but still, you can reach out (you just have to pick up the phone and call somebody). (21)

To make remote/virtual teamwork work, the level of professionalism and the level of independence must be really high. If people need a lot of hand-holding, it does not work. (22)

Based on the above discussion, the following narrative description was developed: An effective virtual team member is not afraid of independent decision-making. They use creative problem-solving and critical thinking techniques to make decisions independently. They are almost self-sufficient, but at the same time, they will reach out to discuss the decision with the team members if needed. This individual does not expect any "hand-holding" from their leader. They enjoy experimenting and trying out new solutions and are not afraid of failing or sharing failures/learning with others. Their team considers them a proactive contributor who is not afraid to raise their hand to help solve problems.

Table 24. Competencies related to self-regulation (blue font refers to the narrative descriptions, additional insights and changes made to the theory-based framework based on the interview results).

COMPETENCES RELATED TO SELF-REGULATION

NARRATIVE DESCRIPTION	A person who can work in virtual teams is generally highly disciplined and has strong time management skills. Time management skills mean that this person is conscious about their own working style and productive working hours and can plan their work time accordingly. In addition, they are aware of good time management practices, such as bundling similar work tasks (e.g. those which require more focus), having breaks during the day and between virtual meetings, and writing everything (including breaks) into the calendar. This individual is a self-starter – for example, they can motivate themself to start working. They are aware of their value in their current role and can prioritise work tasks based on importance. They can say "*no*" to inquiries that may jeopardise managing the highly prioritised tasks or maintaining a healthy work–life balance. This individual makes conscious choices while choosing which meeting to attend and where to use their timely resources to ensure generating the most value in their role and maintaining a good and healthy work–life balance. A person who can self-develop in a virtual environment has a general growth mindset – meaning that they believe that everything can be learned. This person is curious, likes to try and learn new things, initiate change, and is ready to let go (unlearn) of their previous behaviours, habits, and mental models. They observe their colleagues to spot best practices that they can try out themself. They are also not afraid to ask questions or ask for help if needed and are ready to help and teach others. They accept failures as part of the learning journey. An effective virtual team member is not afraid of independent decision-making. They use creative problem-solving and critical thinking techniques to come to decisions independently. They are almost self-sufficient, but at the same time, they will reach out to discuss the decision with the team members if needed. They do not expect any "hand-holding" from their leader. They enjoy experimenting and trying out new solutions and are not afraid of failing and sharing their failures/learning with others. Their team considers them a proactive contributor who is not afraid to raise their hand to help solve problems.
Values *Values…*	Team and personal goals, new technologies and ways of working, lifelong learning, flexible and modern ways of working, effective teamwork, flexibility (contrary to following traditions/rules strictly), stimulation.
Attitudes *Likes to…*	Demonstrate positive attitudes towards everyday activities, learn new things, experiment, contribute voluntarily, proactively solve (mitigate) problems, make independent decisions when needed.
Knowledge and skills *Knows and can…*	SELF-MANAGEMENT: SELF-IMPROVEMENT: Coping with changes: apply growth mindset; deal with ambiguity; develop stable relationship. INDEPENDENT DECISION-MAKING AND CREATIVE PROBLEM-SOLVING: Observation skills: gather, process, store, and analyse information (using ICT); assess

Prioritise and manage workload; apply project management skills in personal work life (set goals, plan the execution of plans, actualise plans); apply self-assessment, self-reflection, self-monitoring, and self-analysis skills; control impulses; demonstrate grit; apply emotional intelligence; demonstrate self-confidence and personal agility; self-motivate; make decisions independently; apply energy, passion, and optimism to everyday activities; mitigate health-related risks in virtual teamwork.

Self-directed learning skills: identify learning opportunities; set (learning) goals; plan and actualise learning goals using relevant means; monitor own learning processes (including self-assessment, self-reflection, self-analysis).
Learning online: seek opportunities for self-development and empowerment in using technologies and digital environments; use online communities and organisational communities of practice with learning purposes; search, enroll, and participate in relevant online courses; make digital notes.

source validity; use reflective judgement; use foreign languages.
Critical thinking skills: think analytically; conceptualise, synthesise, and use logical reasoning; make decisions, apply knowledge (in new settings), and use reflective judgement; interpret from pieces of knowledge.
Creative thinking skills: recognise opportunities for problem-solving; synthesise; apply the creative mindset.

9.4 Digital competencies

In the theory-based framework, this aspect was named *digital competencies*, and the author decided to keep it that way, as this name is broad, short, and easy to grasp. After reviewing the theory-based framework, the author decided to move some parts from ethical thinking and communication under digital competencies since they resonated well with the other topics here (see **Table 25** at the end of the section). After reviewing the results from the theory-based framework, the author decided that some parts would be moved from the knowledge and skills field to the narrative description field to allow an easier overview (see the black-coloured text in the descriptions in **Table 25**). One additional knowledge/skill that emerged from the interviews was staying focused and minimising distractions (17). While minimising distractions was highlighted in the self-management section, it was still decided to add it here based on the ICT perspective. For example, a person working in virtual teams should also know how to use ICT tools to help minimise distractions (turning off notifications, etc.). One attitude also strongly emerged from the data – the openness to try out new technologies – which was added to the attitudes field (see blue text in **Table 25**).

Narrative descriptions of digital competencies

Regarding IT-related competencies, respondents highlighted the need to be aware of and follow the organisation and team-based agreements regarding information management and protection (16, 17). While the cybersecurity aspect is extensively discussed in the theory-based framework, general information management and processing skills are highlighted on a general level. Here, the interviews helped shed light on how to stay effective and help others stay effective regarding information management. According to the respondents, effective virtual team members are well organised and structured. For example, they save files in the correct places and use flags or any other systems to differentiate between important and not-so-important information (22, 25).

    Additionally, regarding the situational aspect, virtual team members must also make sure that they do not overwhelm other team members with excessive information flow. Thus, effective virtual team members bundle similar messages and can critically assess who to put as the direct respondent, who to put in the CC, and who should be left out of the information flow (3,18). Therefore, the narrative description was enhanced with the following description: The individual, working in a virtual team, follows the team and organisational agreements about information exchange (where, when, and how to share and store information). They are well organised – they save files with correct names in the correct places. They can use different practices for managing information flow – for example, using flags and

other systems to differentiate between important and unimportant information. They can critically assess whom they need to inform and what the best way would be to do so (e.g. gathering small pieces of information into one more message, not adding everyone in the team in CC, when there is no need for it, etc.). This individual is aware of the organisation's data protection and cyber security policies. They know the general best practices of cyber security and data protection.

While the theory explicitly explains which abilities help virtual team members overcome digital obstacles, one aspect to add to this topic is the acceptance that ICT does not work 20% of the time. According to Respondent 1, this kind of acceptance helps individuals in virtual teams overcome the fear of failure and shame when they face technological obstacles and do not know how to manage them on their own. Accepting that technology fails occasionally increases virtual team members' willingness to ask for help from colleagues. Respondent 1 explained:

> *I believe that virtual team members find it hard in the beginning to accept that, 20% of the time, technology fails – and this does not mean that you are silly. You just have to admit that 20% of ICT is a mystery, and the only thing that helps sometimes is restarting your PC/phone. So, effective virtual team members are willing to say to their colleagues that they cannot listen to the meeting and will do a restart of the computer.* (1)

Another aspect related to ethics that the respondents highlighted is that virtual teamwork makes it easier to take credit for other people's work. In virtual teams, people should always acknowledge those who actually did the work or contributed significantly to the results (15). Based on this and previous discussions, the following narrative description was added to the description field in Table 25: An effective virtual team member accepts that technology fails occasionally. They do not take credit for other people's work.

Table 25. Digital competencies (blue font refers to the narrative descriptions, additional insights and changes made to the theory-based framework based on the interview results).

DIGITAL COMPETENCES

NARRATIVE DESCRIPTION	The individual follows the team and organisational agreements about information exchange (where, when, and how to share and store information). They are well organised – for example, they save files with correct names in the correct places. They use different practices for managing information flow – for example, using flags and other systems to differentiate between important and unimportant information. They can critically assess whom they need to inform and what would be the best way of doing it (e.g. gathering small pieces of information into one more message, not adding everyone in the team to the CC, when there is no need for it, etc.).
	They are aware of the organisation's data protection and cyber security policies and know the general best practices of cyber security and data protection.
	The individual can assess their own needs regarding resources, tools, and competence development to match these needs with possible solutions. They can adapt tools to personal needs and critically evaluate possible solutions and digital tools. They can select the appropriate means for communication and task solving. They can interact through various digital devices and applications and use ICT tools to minimise distractions if needed. They can express themself creatively through digital media and technologies. They accept that technology fails occasionally.
	The individual does not take credit for other people's work. They can explicitly express implicit norms and guidelines to new team members and adapt to the norms of new teams/organisations. They can protect themself and others from possible online dangers (e.g. cyberbullying).
Values *Values…*	Digital innovation
Attitudes *Likes to…*	Share knowledge, content, and resources by using ICT tools; try out new technologies

Knowledge and skills *Knows and can…*	INFORMATION MANAGEMENT: access and search information online; select resources effectively; gather, process, understand, and critically evaluate information; store and organise information for easier retrieval; share with others the location and content of information found; use appropriate citation practices; integrate new information into an existing body of knowledge; deal with the data produced through several accounts and applications.	SECURITY AND DATA PROTECTION: protect own devices and understand online risks and threats; know about individual and organisational safety and security measures; knowingly and ethically share content (aware of the general data protection rules and the rules in the organisation); understand copyright and licences related issues; apply reflective judgement; evaluate source validity.	DIGITAL PROBLEM-SOLVING: use contemporary software and hardware; have growth mindset regarding ICT; adapt tools to personal and team needs; use proper tools to minimise distractions; have open digital mindset.	E-ETHICS: code of conduct for (virtual) collaboration (in organisation/team); privacy-related rights in the virtual environment; apply netiquette; analyse and adapt one's own behaviour in virtual collaboration/communication; discover and report inappropriate behaviour.

9.5   Virtual leadership

After reviewing the theory-based framework and analysing the data, the author decided to merge the following topics: a) the ability to develop a company culture that, on the one hand, supports virtual teamwork (data) and, on the other hand, facilitates ethical business-related decisions (theory), and b) the ability to select members for virtual teams (theory) and facilitate learning (theory and data) (see **Table 26** at the end of the section). The competencies emerging from the data on developing goals and ensuring good workflow were merged with virtual project management knowledge and skills (from the theory-based framework), and the whole topic as renamed *virtual project and process management*.

Competencies for developing team feeling in virtual teams that emerged from the data were in line with the team-building competencies in the theory-based framework, and thus, the caption *team building* was kept. Reviewing the competencies from the interview data revealed knowledge and skills regarding change management, which were added to the framework under the knowledge and skills related to developing a supportive company culture. Since the data (and theory about competence actualisation) strongly stressed the need to develop an open and learning-oriented organisational culture, psychological safety and the ability to create it were added to the knowledge and skills regarding culture development. As in previous cases, some items from the knowledge and skills field were moved to the description field to enhance the readability of the table.

Narrative descriptions of competencies related to virtual team leadership

According to respondents, developing successful virtual teams starts with developing an organisational culture that supports virtual teamwork (1, 20, 22). In the organisation, it is important to make sure that everyone accepts that it is okay if some people do not wish to work in the office. One respondent expressed:

> *For some people, it might not be okay in the beginning that their colleagues wish to be somewhere else other than the office. [...] And this is the role of the top management, to explain that this is okay and we are accepting that people wish to work from other places than the office.* (1)

Also important is making sure that there are tools and a collaborative structure (agreements of how, when, and where to share information) in place and that the necessary tools are available for everyone: "*As an organisation, you have to learn how you structure this collaborative environment. There are some tools that help to do that*" (24).

These vast cultural changes cannot be made at the team level only. They are done at the organisational level, and thus, it is important to ensure that there is top management support for virtual teamwork. Respondent 20 explained, *"What we learned is that, when you are doing a change like this, it is important to start from the top"* (20).

According to respondents, a learning culture in virtual teams helps individuals better adapt to the changes in their ways of working. To foster a learning culture, it is important to make sure that people feel safe and secure to share the obstacles they are facing and ask for help and that there is leadership and collegial support for overcoming obstacles:

The cultural aspects were the biggest issue – to make sure that we are creating a learning culture. Because everything is changing so fast, we have to become good learners instead of knowing everything. (20)

[Virtual team members] acknowledging that you can say that you are having problems with technology, for example, and nobody will think you are stupid because of that. (1)

In the beginning, we make sure that the person learns how to use the technology, etc., and leaders and colleagues are helping in this regard – we do not expect that the person has to learn everything on their own. (1)

Another thing to pay attention to is that there is enough time for discussions, as discussions are where learning happens. During these discussion times, it is also important to ensure that everyone shares their viewpoints: *"The other thing that we are doing is actually planning for more time for discussion. […] Because learning takes place during the discussions"* (23).

Based on the discussion in the above paragraphs, the following descriptive narrative was developed: A person who can develop a culture that supports virtual teamwork can first ensure that there is general support from the top management and leadership team to work in such a way. In the next phase(s), this individual develops an open culture with the leadership team in which people have enough time for discussions and are invited to feel safe speaking their minds, asking for help, and sharing their mistakes. In this way, this individual and their colleagues will foster a learning culture that is not afraid of change. To maintain trust, it is important to explain to all employees that it is okay to work from home. The leader is also responsible for developing an infrastructure (tools, connections, licences) that supports virtual teamwork. They will lead the development of common agreements for communication and collaboration.

According to the respondents, successful virtual team leaders value outputs, and for them, it is not important where their team members are located. Leaders must also be willing to let go of traditional control measures (e.g. having people sitting in the same room with you) and should instead implement leadership activities that enable having an overview of their team members' outputs no matter where they are located:

Virtual teamwork for me is a culture of leadership – it means that leaders organise work so that it does not matter where your subordinates are located. (1)

The mentality of leadership has to change. It is not about being at work; it is about doing work. (2)

A successful virtual team leader first recognises the value that each team member brings to the team and organisation. After that, they make sure that they and their team members understand it in the same way. Respondent 1 elaborated:

A good leader first makes sure that she knows what the person is doing and what value that person brings to the organisation. Then, she discusses this with the team members (once every half a year) to make sure that both understand it in the same way.

According to the respondents, after a mutual understanding of the value that each position brings is developed, the team leader, together with the team members, discusses what measurement tools/indicators could be used for measuring whether the value has been brought:

When the leader and the team member understand in the same way the value that each role brings, then it is important to discuss how to measure that value. Is it the client who gives feedback? Are there some numbers that can be measured? After measurement tools are in place, it is possible to develop goals for the next period – for example to increase client satisfaction or sales volumes, etc. (1)

After the indicators are selected, the goals for the upcoming period should be developed and agreed upon. According to the respondents, it is also very important to have regular one-to-one and team meetings in which the KPIs are looked over together to develop a mutual understanding (between the leader and members and between the team members) of how things are going:

The outcomes need to be looked over at least twice a year during one-to-one meetings and with the team. (1)

The one-to-one and team meetings held four times a year are intended to have an overview of how things are going, what the challenges are, and where the leader or other team members can help. (24)

In addition to one-to-one and team meetings, there are also collaborative tools that can help generate an overview of how each team member or team is doing regarding his/her KPIs (23). Respondent 22 explained: "*There are certain technologies where you can create and share goals, objectives, tasks, and see the progress of them*" (22).

Based on the above, the following narrative description was developed: A successful virtual team leader first values work outputs more than the hours that people work or spend in the office. They understand the value that each position brings to the company. They agree, together with the employee, on the value and the main role that the employee is performing to ensure that things are understood in the same way. It is best if the leader asks the employee what the KPIs could be for their role, and then together, the leader and employee can agree on the goals that would be set for an upcoming period. When the KPIs and goals are agreed upon, the leader will organise regular meetings (one-to-one and team meetings) in which the progress is analysed to see whether the goals or KPIs should remain the same or change and whether the employee(s) require guidance or help in reaching the goals. The leader can introduce collaborative platforms that would help generate a better and faster overview of how different team members are progressing with their tasks.

The next important task of the leader is to agree on how, where, and when the information will be shared. During the interviews, it came out that, in some teams/organisations, there is a general rule that everyone will use their videos during meetings to overcome the key constraints regarding the lack of physical cues (1). According to the respondents, it is important to make sure that no one is left out of the information (even jokes need to be made in the virtual environment). One respondent explained: "*It is the role of the manager to agree on the rules of the game. We made some agreements – to always use video during virtual calls, to make memos, and to share information in chat (even jokes)*" (1).

Another thing that helps increase the effectiveness of communication is making sure that everyone knows what information should be shared to whom, in which channels, and how often and also understands which information is "good to know" and which information needs action. As previously mentioned in the quotes above, effective virtual leaders leverage technologies to make more time for discussions, sharing learning, and so on:

The other thing is to be even more conscious of how to leverage the potential of technology in the distributed team to ensure effective communication. [...] And we now have a concrete rhythm for communication (Week 1, Week 2, Week 3). [...] We agreed clearly on what is just for informing, what is for action, etc. It sounds very basic, but it helps a lot to communicate in this very well thought-through and clear way. (23)

Based on the insights discussed above, the following description was added to the narrative: A leader who can develop effective communication and information exchange within their team first agrees with their team on how they are going to exchange information (what tools will be used, etc.). They support that process by ensuring that there is a logical process of information exchange agreed upon and that the chosen tools fit the task. Then, the leader ensures that there is a proper infrastructure supporting information exchange, as agreed upon within the team.

According to the respondents, leading virtual teams requires a great amount of preparation – for example, to set the agenda and make sure that there is clarity regarding what is expected of the meeting. It is also important to summarise at the end of the meetings so that everyone understands in the same way what activities are expected of them as the next steps. The following excerpts from the interviews elaborate on this:

The key thing that we try to do is put the agenda in place. You would be surprised how the lack of an agenda or the fluffiness of the agenda creates a waste of time. (24)

It is important to make sure that everyone understands what the goal of the meeting is [...] virtual meeting leaders must know how to facilitate virtual team meetings – following the agenda and keeping in mind the goal of the meeting. (17)

Virtual team leaders must have the skills to summarise things. I have found myself on calls where we discussed everything but ended without a summary, so I did not know where did this call leave us? (20)

Virtual team meetings also require good facilitation skills. According to the respondents, they should be similar to face-to-face meetings. Still, in virtual environments, personal styles become amplified – for example, those who usually like to speak, speak even more, and those who are usually quiet are quieter. Thus, it is essential to ensure that everyone has a chance to share their ideas:

The second thing is to have someone to lead the meeting a little bit. Somebody to say, "Okay, we went over this twice now. Let's move on and make a decision or let's come back to it next week." That is what you would do in the real world, but you have to be stricter and more structured about this during virtual meetings. [...] And you need to work on those that are quieter. In the virtual world, it is very easy to hide behind the technology – if there is a requirement for everybody to dial in and share the video, they can always say, "Hey, my camera or connection is not working." (24)

It is also the leader's responsibility to know their team members' communication styles and use that information to understand, for example, whether they are having doubts about the topic. Respondent 23 explained:

If I have a feeling that somebody is not on board, I typically try to come back on this during the one-to-one ,meeting. [...] If their style is to be quieter in general, it is fine; it does not mean they did not buy into it. But if they are generally quieter when they are having doubts, then you know it and can work on it.

Respondents also mentioned that preparation is important, especially during more important calls, and storytelling skills can help engage people in the meetings:

Preparation skills [are important to effectively facilitate a virtual meeting] – to prepare virtual meetings in advance (the presentations, the main topics that need to be stressed) – also wordings that help to stress these topics. (17)

So, we got a lot of training in storytelling to ensure that we can deliver a story with the right impact. [...] I became a lot more prepared for the meetings. (20)

Finally, since virtual communication tends to be more task-oriented, respondents stressed the importance of having time for socialising – either at the beginning of regular meetings or by establishing separate meetings for socialising:

It is very difficult to set up a virtual meeting with the topic of celebrating somebody getting married. It does not feel natural anymore. Seems weird and artificial. So, what you need to do is to create an environment where it can naturally happen. So, you just set up a meeting where people can share whatever they want. If somebody does not want to talk about their marriage, it is fine. But it helps to be more connected. (22)

The following description was added to the narrative based on the insights discussed above: An effective virtual team leader has general meeting facilitation skills (preparation, facilitation, finalisation) and storytelling skills for engaging people during virtual calls. They are a good communicator who can argue as well as listen to the team members carefully. They show genuine interest in team members and their ideas. They make sure that the team will have enough opportunities for discussion and socialising. They consciously build coffee moments by setting up separate calls with no agenda or at the beginning of regular calls.

In addition to task-focused activities, it is also important to ensure that the team develops and maintains team feeling. According to the respondents, it is important to find a *"rhythm"* between virtual and physical meetings – to not *"lose touch between people"* (12). Physical meetings were found to be especially important at the beginning of the collaboration. For some teams, meeting once or twice annually is enough, while others try to meet at least once a month in face-to-face conditions:

> *The lack of physical proximity made me rethink what I know about the rhythm of engagement. How to make the right balance between leveraging virtual and physical meetings. With the team, we agreed on the minimum number of physical meetings.* (22)

> *In my opinion, there will be no real team feeling before the team members see each other in face-to-face conditions. Without the face-to-face meeting, team members will not have an emotional connection – they are just people who are forced to do something together*. (12)

> *We have established a routine in which the leader sees their subordinates at least once per month either in face-to-face conditions or at least in a video meeting – to see their facial impressions, hear their tone of voice, etc.* (22)

Leaders also stressed that, in virtual teams, it is essential to build a good employee–leader relationship and develop a communication strategy that supports knowing how team members are doing. Regular one-to-one meetings were found to be essential because they ensure that the virtual team members know that there is a place and time where they can share their problems and that managers can become well informed about how their team members are doing.

> *Having routine one-to-one meetings is essential so that the team members can know that there is a time and place where they can share their worries. […] The main question is: How do I know and make sure that the people in my team feel that I am interested in them and that I support them? That is also important if*

you are a manager in a physical location. But in remote teams, I would say you would have to work a little harder on that. (22)

Based on the above insights, the following narrative description was developed: A leader who can develop team feeling in virtual teams makes sure that the team has at least one meeting where they can meet each other face to face (preferably at the beginning of the collaboration). If the team has been working together for a longer time, then the team leader can ensure that the team will find a good balance between virtual and physical meetings. It is important to set up regular one-to-one meetings (physically or through video) to learn how team members are doing.

Table 26. Virtual leadership competencies (blue font refers to the narrative descriptions, additional insights and changes made to the theory-based framework based on the interview results).

VIRTUAL LEADERSHIP COMPETENCIES

| NARRATIVE DESCRIPTION: | A virtual team leader who can develop a culture that supports virtual teamwork can first ensure that there is general support from the top management and leadership team to work in such a way. In the next phase (s), the leader develops an open culture with the leadership team in which people have enough time for discussions and are invited to feel safe to speak their minds, ask for help, and share their mistakes. In this way, the leader and their colleagues will foster a learning culture that is not afraid of changes. The leader explains to all employees that it is okay to work from home to avoid mistrust. Also, the leader is responsible for developing an infrastructure (tools, connections, licences) that support virtual teamwork. They will lead the development of common agreements for communication and collaboration.

A successful virtual team leader first values work outputs more than the hours that people work or spend in the office. They understand the value that each position brings to the company. They agree, together with the employee, on the value and the main role that the employee is performing to ensure that things are understood in the same way. It is best if the leader asks the employee what the KPIs could be for their role and then, together with the employee, agrees on the goals that would be set for an upcoming period. When the KPIs and goals are agreed upon, the leader will organise regular meetings (one-tone and team meetings) in which the progress is analysed to determine whether the goals or KPIs should remain the same or change and whether the employee(s) require guidance or help in reaching the goals. The leader can introduce collaborative platforms to help generate a better and faster overview of how different team members are progressing with their tasks.

A leader who can develop effective communication and information exchange within their team first agrees with their team on how they are going to exchange information (what tools will be used, etc.). This leader supports that process by ensuring that there is a logical process of information exchange agreed upon and that the chosen tools fit the task. They then ensure that there is a proper infrastructure supporting information exchange, as agreed upon within the team.

The leader has general meeting facilitation skills (preparation, facilitation, finalisation) and storytelling skills for engaging people during virtual calls. They are a good communicator who can argue as well as listen to the team members carefully. They show genuine interest in team members and their ideas. They make sure that the team will have enough opportunities for discussion and socialising. They consciously build coffee moments by setting up separate calls with no agenda or at the beginning of regular calls.

A leader who can develop team feeling in virtual teams makes sure that the team has at least one meeting where they can meet each other face to face (preferably at the beginning of the collaboration). If the team has been working together for a longer time, then the team leader ensures that the team will find a good balance between virtual and physical meetings. It is important to set up regular one-to-one meetings (physically or with video) to learn how team members are doing. |
| --- | --- |

Values *Values…*	Diversity; nonhierarchical leadership styles; benevolence; empathy; employee development; employee autonomy; universalism; diversity; other people.				
Attitudes *Likes to…*	Try out new ways of managing virtual teams; try out new technological tools in virtual collaboration; give and receive constructive feedback; inspire and empower team members; learn and think about ethical and sustainability-related issues.				
Knowledge and skills *Knows and can…*	DEVELOPING VIRTUAL and ETHICAL COMPANY CULTURE: psychological safety and how to create it; global, local, and intraorganisation business ethics and standards; sustainability-related issues; ethical reasoning; reflective judgement; change management.	VIRTUAL PROJECT AND PROCESS MANAGEMENT: apply a synergetic leadership style (e.g. combine explicit managerial activities with nonhierarchical leadership styles); apply project management skills; form meaningful relationships with employees; facilitate virtual meetings (prepare, engage, and finish with clear task division); best practices of virtual team leadership; monitor team and individual progress; create a common understanding about team progress.	VIRTUAL TEAM BUILDING: lead team-forming processes and team dynamics (e.g. facilitates early face-to-face meeting or virtual kick-off); engage in best practices of virtual team leadership; select ICT tools for mitigating conflicts; embrace (explicitly) the skills and knowledge that everyone brings to the team.	COMMUNICATION AND INFORMATION EXCHANGE: develop team agreements; select the right communication tools; develop an effective communication strategy; facilitate a high level of consistent communication within a virtual team; apply coaching and mentoring tools; analyse behavioural cues to understand how team members are doing; engage individuals while using ICT; monitor how team members are doing; possess storytelling skills; conduct different interactive check-in and warm-up activities to increase engagement during virtual meetings.	SELECTING MEMBERS AND FACILITATING LEARNING: possess virtual teamwork–related competencies and future competencies; apply human psychology and personality type indicators (Big Five, DiSC, Belbin, etc.) to selection processes; give employees motivating tasks.

The analysis of the interview also revealed that, of the four attributes that form competence (knowledge, skills, attitudes, and values), values and attitudes are the most important attributes. According to the respondents, values and attitudes are most important because skills and knowledge are much more malleable (1, 2, 9, 11, 12, 20, 21). Respondents stressed that, when people have the right attitudes, they will learn the necessary knowledge and skills. Respondent 1 summarised the point of view that emerged from many interviews: *"Attitudes are most important when we talk about competencies. When employees have the right attitudes, they can learn everything else. Knowledge and skills can be easily taught."*

9.6 Findings and discussion regarding the individual competencies needed in virtual teamwork

While competencies have been acknowledged to play one of the most crucial roles in organisational adaptability (Lans et al., 2014), they have, for some reason, not received much attention in studies on virtual teams. This is perhaps related to the fact that competencies, in general, have become a fuzzy term (Le Deist and Winterton, 2005), thus inhibiting their study or implementation in different contexts. This kind of challenge can be anticipated from studying different competence frameworks (in the virtual teamwork literature and other streams of literature). For example, it is possible to witness a struggle to identify attitudes as part of competence frameworks. One such example of theoretical confusion regarding competence attributes can be seen in the DigComp framework (Ferrari, 2013), in which the attitudes portion mostly includes examples of knowledge and skills. Another example can be seen in the virtual team literature (e.g. Schulze and Krumm, 2017), where attitudes are mostly replaced with aspects related to individual motivation.

As previously mentioned, the above examples can result from general confusion related to what exactly constitutes competence – and how to identify different competence attributes. Therefore, the current study's first contribution concerning virtual teamwork–related competencies is that it systematically defines and delimits the concept of competencies and each competence attribute. The thorough and systematic approach to defining competence and each of its attributes before actual competence identification takes place helped in developing a theoretically consistent competence framework. However, in addition to providing value and theoretical consistency in the current study, it can also be used as a basis for research in other streams of literature where researchers would like to apply the competence as a lens to study certain phenomena. In other words, the current study contributes by providing a conceptual map of competence and its related attributes for future competence research.

Regarding virtual team–related competencies, the systematic approach of defining the competence concept and related attributes highlighted the importance of values and attitudes. Based on the theoretical literature on values and attitudes, values and attitudes form much more constant characteristics of an individual than knowledge and skills. At the same time, the literature regarding virtual team competencies has not stressed the importance of values and attitudes (Albarracin and Shavitt, 2018; Rohan, 2000). In contrast with the dominant literature, the study by Schulze and Krumm (2017) discusses virtual team–related attitudes (and to some extent also values) at the very end of the article – which suggests that values and attitudes are not as important as skills and knowledge. The analysis of the theory and empirical findings suggests otherwise; thus, it was decided that values and attitudes would be placed on the top of the competence framework (for the whole competence framework, see Appendix 2 at the end of this dissertation).

In addition to the existing fuzziness regarding competence and related attributes, one of the reasons that research has paid more attention to skills and attitudes might be related to the general definition of competence, which lists competence attributes in the following order: knowledge, skills, attitudes, and values. It is possible that the current definition of competencies, which starts with knowledge and skills, directs research to emphasise knowledge and skills more than attitudes and values. Thus, this dissertation proposes changing the order of the competence attributes to be defined in the future as a combination of values, attitudes, skills, and knowledge. According to the author of the current research, in the competence identification process, it would make sense to start from the deeper, longer-lasting, and more implicit competence attributes (such as values and attitudes) and then build the more explicit and measurable competence attributes, such as knowledge and skills, on top of those. This would help develop deeper and more holistic competence frameworks with more explanatory power.

Returning to the topic of virtual teams, the analysis of the virtual team literature revealed that current research on virtual team–related success factors tends to treat individuals as passive agents impacted by situational characteristics (e.g. having trust in teams) without playing an active role or having control in these situations. Here, applying the competence-based approach helps advance the theory by shedding light on individuals' roles in virtual team success. Moreover, it could be time to have more research on virtual teams focus on the individual as a central element, as individuals are ultimately those who form the teams and carry the responsibility of meeting the teams' objectives.

At the same time, it cannot be left unacknowledged that one group of individuals – namely, virtual team leaders – has received much research attention. However, the literature on virtual team leadership seems to neglect the role that competencies play in leaders' (and virtual teams) success. Most of the literature has

focused on either leadership styles or leadership activities. There was one attempt to identify virtual team leadership competencies by Maduka and colleagues (2018). However, this study remained at a very general level – for example saying that virtual leaders must possess the competencies of developing trust, and thus, the study did not provide a thorough overview of the elements of such competency. The current study extends the knowledge of virtual team leadership competencies by providing a thorough and systematic overview of values, attitudes, skills, and knowledge in virtual team leadership. Moreover, after careful analysis of both the theory and the empirical findings, it is possible to say that the approach based on virtual team leadership competencies helps systematise and summarise previous findings regarding virtual team leadership and activities research.

To summarise, the careful analysis, synthesis, and combination of existing theory and empirical findings regarding virtual team competencies allowed for the development of a comprehensive competence framework (which can be found in Appendix 2). This framework advances the current literature on virtual team–related success factors, virtual team–related competencies, and virtual team leadership–related competencies. Moreover, the current research helps systematise the conceptualisation of competencies and related competence attributes, which can enhance the theoretical consistency of competence frameworks developed in the future. The following chapter, discussing sub-RQ3, addresses the situational aspects that can support the application of individual competencies and develop a better P-E fit, which will help increase individual performance and well-being and the overall success of virtual teams.

10 Support Mechanisms to Advance the Actualisation of Virtual Teamwork-Related Competencies

The current chapter describes the results and insights developed based on the empirical data to answer sub-RQ3: *How can organisations support the actualisation of virtual teamwork–related competencies?* Answering the previously posed question was the third step in the whole research process in the quest to understand how individuals (and thus teams) can better adapt to virtual teamworking. As explained in the theory and research design chapters (see chapter 6 and 7), individual characteristics are not alone responsible for individual behaviours and coping mechanisms. According to studies on human behaviour, individuals are always exposed to certain situational characteristics that may support or hinder their ability to operationalise their inner coping mechanisms, such as competencies (Shin, 2004).

10.1 Results regarding the organisational support mechanisms that can advance adaption to virtual teamwork

To answer sub-RQ3, the current study chose a collective case–study approach, which enabled analysing the situational characteristics that interviewees were exposed to in their prior experiences with virtual teamwork. Although respondents were not precisely asked what situational characteristics helped advance the application of virtual teamwork–related competencies, it was possible to identify some of these characteristics using a deeper analysis and synthesis. The current chapter uses the logic of previous chapters by presenting the results from the interviews and then discussing the findings and implications for theory and practice.

Table 27 at the end of the section summarises the key findings.

Most of the respondents stressed the importance of the workplace context in regard to making virtual teamwork effective. The respondents mentioned the following aspects of workplace context: *infrastructure*, *technology*, *leadership mentality*, *leadership activities*, *the leader–member relationship*, a *working culture*, *trust*, *meaningful work*, and *training*. Each of these will be discussed separately, with

example quotes, and will be connected to the findings for the previously discussed RQs.

Respondent 1 explained how she and her colleagues were the first pioneers in adopting virtual teamwork and implementing it in the rest of the organisation. They first had to create a proper *infrastructure* that supported virtual teamwork, for example, meeting rooms with fish-eye cameras and microphones. Proper infrastructure was needed to even start experimenting with virtual collaboration. Respondent 1 concluded: *"It is the role of the organisation to make sure that technology supports virtual teamwork – that there are servers, where to store information, that everyone has access to certain collaborative tools, internet, etc."* Even though this example does not directly discuss competence actualisation, it could be argued that infrastructure is needed so that there can be an opportunity to start using (and developing) competencies regarding virtual teamwork.

Technology is a major contributor to virtual teamwork, as it helps overcome physical dispersion. However, when virtual team members experience technological challenges, the mere existence of competencies may not be enough. Choosing the wrong technologies (e.g. those that do not meet the task or do not work properly) may result in virtual team members "burning their fingers" and not being willing to try again. Another insight from the interviews was that, in addition to ensuring that everyone has the right tools, it is also worthwhile to test the new collaborative tools in a smaller setting (test group) before launching them to a wider audience. In this way, it is possible to ensure that individuals will experience success with technology and thus be eager to apply new technologies based on their existing competencies and learn more, if needed. Respondent 20 said the following about this situation:

> But I also feel that if you are launching a new tool, and it is not working, then people "burn their fingers once or twice", and they might not want to give it another shot. So, that is something we must be careful about: to have focus groups who test it at the beginning, and when it is certain that the technology works and fits the tasks, then launch it to a wider audience.

Respondents also stressed the importance of a *leadership mentality* (or culture), *activities,* and *leader–member relationships*. Regarding the leadership mentality, respondents stressed that virtual team leaders need to let go of their need to control people by using old-school methods of having people in their sights. According to the respondents, micromanaging is the least effective thing to do in virtual teams. Instead, virtual team leaders should trust their employees and lead by setting roles, goals, and objectives. The following quotes illustrate the importance of a trust-based (not location- or clock-based) leadership culture and leadership activities, such as role clarification and setting KPIs and objectives.

Virtual teamwork, for me, is a culture of leadership – it means that leaders organise work so that it does not matter where your subordinates are located. Everything works without the need to know where your people are. (1)

Management must be much more based on the outputs. This is the same with my manager. He would never ask where I am or what I am doing (I am going on a safari on Friday). He would not mind because he knows that I will deliver what I must deliver. I think it would be a good idea to have the monthly calls (or face-to-face meetings), where you try to determine this employee's impact. Approaching it from this angle is much more powerful than micromanaging (looking at how many hours they have spent in the office). (21)

The last organisation where I worked had this 8.30-to-17.00 work culture. The organisation's leader thought that this was the most effective way to ensure that people are working. So, once, when I had been late for work 5 minutes for three days in a row, I was invited to the leader to explain myself. I asked him, "What happens if a client calls me at 17.30, but my workday ends at 17.00? Should I pick up the phone or not?" In my opinion, micromanaging does not work. It creates a lot of tension, and people will eventually be unengaged and change organisation as soon as they have the opportunity. (6)

However, leading virtual teams effectively is not only about having an overview of what team members do through contemporary management practices but also about leaders being available and actively engaged with their teams. One of the respondents shared the following story about how the team leader was not available and failed to meet his leadership responsibilities:

My friend who worked in company X, which is a 90% remote company, had to change his team because the team leader was not present. It was not about the fact that the team leader was working remotely – it was about that he was not doing the leadership activities. For example, he did not understand that the team has inner conflicts, that the members do not understand their responsibilities, etc. To me, leadership is an activity – not a position. And leaders need to be in contact with the team members, to know how they are doing, etc., to be able to provide support. (6)

Respondent 3 also stressed the importance of a leader being available, trusting employees, and providing autonomy:

Our leader is almost never in the building – but she is always reachable. She always responds to our concerns ASAP. She trusts us and gives us autonomy.

Starting from the moment she came to be our leader, we have had a very good working atmosphere and the best results throughout the history of our department. (3)

Thus, it can be summarised that the output-based leadership approach helps the manager and the team develop a common understanding about the work processes, which means that team members know what they need to do, how they support others, and how others can support them. It can also be argued that the output-based leadership approach, combined with trusting your employees and being available to address their concerns, increases employee autonomy and satisfaction, which, in turn, increases the motivation to put in extra effort into doing things (e.g. utilising existing competencies), all of which brings good results on both the individual and team levels.

Another aspect that, according to the respondents, impacts the effectiveness of working in virtual teams is the *working culture*. One of the things that respondents stressed was the importance of being accountable, delivering on time, and keeping each other accountable. This can be done by using certain tools to generate an overview of work processes and asking team members about deliverables. It could be argued that having an overview of the progress of the whole team helps increase motivation, which, in turn, supports the application of competencies. The following excerpts from the interviews illustrate this:

The third point is critical from a trust perspective – holding each other accountable for agreement. It goes in all directions. We agreed within the team (let's call them rules of engagement) that we hold each other accountable whatever the relationship is (manager to leader, member to member). So, our team is as strong as the weakest link of accountability. Holding each other accountable, no matter what the hierarchical connection is, creates a lot of trust. (23)

There are certain technologies where you can create and share tasks and see their progress. And people will get automatic reminders. It needs the technical component – to make things visible. And then, also somebody or someone that holds the person accountable. And the way we do it now is that we start the meeting with action items. We make it visible who has open action items, has finished them, and has a deadline in two days. So, we try to make things visible and transparent. Making things transparent is probably the biggest tool that you can have in virtual work. (22)

Another aspect mentioned often in the interviews was the importance of using video. Surprisingly, not many respondents worked in teams in which using video

was the norm. In many cases (even if the respondents worked in IT-driven organisations), the right technologies (e.g. fish-eye cameras) were not even in place to use video during bigger conference calls. However, interviewees stressed that video is the only thing that helps with overcoming the physical distance and understanding each other. It could be argued that using video helps with understanding each other better and building stronger relationships, which are both important triggers for maximising the potential for individual competencies. The following examples from the interviews elaborate on this:

Video is a good tool, as it helps include facial expressions in communication. We use only audio in Skype. It is a bit embarrassing to think about it now – because we are an IT company, and we do not even have proper tools at the conference rooms to have video meetings. (12)

I think it can also be connected to the culture [working culture]. Because the people who work with X team tend to put on the video all the time. And I have even asked, "Did you put on your video by accident?" And they are like, "No, we always use the video in our team." (20)

Respondents also mentioned that, in virtual teams, it is important to have a common understanding of how to collaborate with one another. For example, Respondent 1 explained how they had to put extra effort into their organisation to make sure that each meeting invitation was sent out with a virtual meeting invite – which significantly increased the effectiveness of each employee since they did not have to spend time searching for virtual meeting links anymore and could instead prepare for the meeting. Respondent 21 explained that, without making sure that there is a working culture developed on top of applying new tools, *"people will continue sending e-mails instead of using collaborative platforms"*. In sum, a working culture in which individuals deliver what they promised and follow common agreements regarding collaboration (e.g. video during meetings) allows for leveraging new technologies and thus being more effective and for concentrating on the objectives and thus maximising individual competencies.

Respondents also mentioned the importance of formal and informal training regarding tools and soft skills. Respondent 1 said that leaders should show their employees how to use collaborative platforms (such as Slack), while Respondents 9 and 20 shared how training in soft skills has helped them master communication in virtual teamwork:

When we talk about completely new people, then we always do things together in the beginning – we do not expect them to learn all the technologies on their own. (1)

So, we got a lot of training in storytelling to make sure that we can deliver a story with the right impact. [...] We have a huge training pack for employees – also about disruption, for example, language skills, etc. (20)

I have, in my work, used the DISC [personality assessment tool] approach. It helps me understand people – how to approach them, which tools to use when connecting them, etc. (9)

Therefore, it can be summarised that acquiring the right competencies for virtual teamwork is a necessary prerequisite in actualising virtual teamwork–related competencies. It must be acknowledged that the virtual teamwork competence framework (see Appendix 2) consists of competencies in many areas, and the ability to improve competencies in one area can help maximise the potential of competencies in another area. Also, based on the results from sub-RQ1, it is important to pay attention to the process of individuals adjusting to a virtual team and provide training (and other types of support) according to individuals' needs. This means that, in the *adjusting* phase, individuals need different training and support than in the *maturing phase*.

Respondent 1 also stressed the need to find a good fit between what employees want to do and what the company can offer (the role). A story told by Respondent 3 supported this argument. Respondent 3 shared that one person was working in their business unit and did not meet the expectations of his role. This employee also exhibited other problems (e.g. not answering the calls when he was working from home). However, since his position has changed, he has had superior results. The new role also includes a great amount of virtual teamwork, and no problems have been raised in that regard. Therefore, it could be argued that the job design (role, activities, etc.) – the nature of the work – must meet employees' preferences to maximise their potential for competencies. Respondent 1 explained this as follows:

It is important to pay attention to how people feel about their work – is it meaningful to them? For example, are they learning something new during their work activities? You need to change employee work responsibilities when needed.

Finally, respondents also mentioned the importance of relationships. According to the respondents, without the opportunity to get to know each other, people do not know what is expected of them, how to understand their colleagues, and how to make themselves understood (20). Strong relationships were reported to increase employees' willingness to share feedback (20), support each other mentally and task-wise (3), increase collaboration in teams (3), and increase knowledge sharing (12).

Thus, it could be argued that, when relationships are strong, employees can better understand each other, provide more constructive feedback, and share knowledge, which will all support the actualisation of competencies. The following story by Respondent 20 illustrates this:

> *Because I started somewhere in August, in November, we had the change-management training, where we met with people. I did notice that it was so nice to meet them face to face. And after the [face-to-face] meeting, it became easier to go on calls with them. So, I think it is important to see people before you start collaborating with them.*

Table 27. A summarising table about activities that support individual competence actualisation

Categories	Activities to support competence actualisation
Infrastructure and tools	Ensure everyone has access to the right tools, internet connection, etc. Test new tools in a smaller group to avoid employees "burning their fingers".
Leadership	Outputs-based leadership style, setting clear roles, goals, and objectives, trusting employees, and being available to employees.
Working culture	Accountability as a working culture (always deliver what was promised and hold others accountable for their promises), common agreements on how to collaborate and communicate (e.g. always use video, attach virtual meetings links to meeting invitations, etc.).
Training	About communication strategies (e.g. storytelling skills) and tools (e.g. how to use Slack), both formal and informal (leader or mentor teaching, or formal educational programmes/training). It is important to consider the process of adjusting; e.g. individuals in the *adjusting* phase need different support and training than individuals in the *maturing* phase.
Meaningful work	Ensure role and tasks are meaningful and motivating to employees – if not, change them.
Relationships	Have occasional face-to-face meetings, team-building events, etc. – this is especially important at the beginning of teamwork.

The following section summarises the key findings regarding organisational support mechanisms that emerged from the empirical data.

10.2 Findings and discussion about the organisational support mechanisms that aid individual adaption to virtual teamwork

Sub-RQ3 aimed to identify support mechanisms that organisations could apply to increase the actualisation of individual virtual teamworking competencies and

provide a better P-E fit (for more on P-E fit, see Shin, 2004). After analysing the literature, the author proposed that the SDT model (Deci et al., 2017), which evolved from the motivational theory, could be used to explain the mechanisms that can support actualising employee virtual teamwork–related competencies. According to SDT, intrinsic motivation is the main factor supporting employee productivity and well-being. Moreover, SDT stresses how certain aspects (e.g. the workplace context, employee inner goals, relationships with colleagues, feeling competent, and experiencing autonomy) help increase intrinsic motivation.

SDT was extended in the current research context by adding one step between motivation and results – competence actualisation (for a reminder, see **Figure 16**). The competence actualisation step is suggested to be triggered by motivation and lead to employee productivity and well-being. First, from the SDT perspective, adding the competence actualisation step to the SDT model helps advance the SDT model. The current study argues that motivation is not enough to produce results. In the advanced model of SDT developed in the current study, motivation is considered an important prerequisite for applying competencies that will lead to expected results.

The extended SDT model can thus now work as a general (not virtual team–specific) model to be used in the competence literature to explain the relationships that well-being has with environmental aspects, individual competencies, and individual performance. Applying the SDT model in the current study could be considered a proof of concept, which showcases that it is possible to use the SDT model in competence and OL research to a) explain the complex relationship between the individual characteristics (competencies) and situational aspects, and b) explain how and which situational aspects can impact the application of individual competencies.

Regarding the aim of the current study, the SDT model proved to be a useful framework for identifying and systematising the situational factors that, together with the development of employee competencies, can help increase the success of virtual teams. The synthesis of theory and empirical data led to the development of **Table 28**, which summarises the main workplace-related aspects to be considered in virtual teams. From a practical viewpoint, combined with the competence model developed in RQ2, these findings can help HR managers develop HR interventions to enhance the effectiveness of virtual team members and teams in general. Moreover, while the results for the current RQ highlight *what* HR managers can do to support the effectiveness of individuals and their competencies in virtual teams, the findings from the sub-RQ1 (namely, the phases of the virtual team–related constraints) can help answer the question of *when* to apply certain interventions.

Table 28. Examples of aspects that can positively impact the actualisation of competencies in virtual teams, based on the empirical findings (developed by the author)

Main cate-gory	Subcategory	Examples of aspects that influence competence actualisation	Basic psycho-logical needs
External workplace related context	Physical workplace	Offering possibility to work in a quiet area (in the office); compensating workplace-related costs at home to increase workplace ergonomics (e.g. buying chairs, tables etc.).	Feelings of being competent, feelings of autonomy, and feelings of relatedness
	Tools	Providing fast internet connection and quality tools (laptops, phones, big screens, headphones) at home and in the office; testing new tools in a smaller group to avoid employees burning their fingers.	
	Applications	Providing access to licences and different applications.	
	Basic physical needs	Job security and competitive salary.	
	Job design	Tasks that are not too easy nor too complex; meaningful work.	
	Organisational culture	Nonhierarchical; cooperative; a culture that values open communication, learning, teamwork, and diversity; psychological safety; trust (managers trusting employees).	
	Leadership	Having frequent one-to-one meetings; getting to know the team members; outputs-based leadership style; establishing clarity on roles, goals, and objectives (individual and team levels); transformational leadership style; shared leadership; providing feedback; effective and clear communication; strong relationships with team members; being available for team members.	
	Team culture	Team cohesion; team feeling; support between team members; mutual understanding; empathy; tolerance; affective trust between team members; relationship building (team-building events, face-to-face meetings); healthy social bonds; occasional face-to-face meetings to develop and maintain social bonds.	
	Communication	More time for discussions; feedback; attentive and considerate communication style; effective communication forms and tools (which tools to use, double-loop communication style).	
	Working culture (organisation and team levels)	Frequent feedback loops (e.g. applying retrospect); accountability as a working culture (always deliver what was promised and hold others accountable for their promises); common agreements on how to collaborate and communicate (e.g. always use video, attach virtual meetings links to meeting invitations, etc.).	

Main category	Subcategory	Examples of aspects that influence competence actualisation	Basic psychological needs
	Training (both formal and informal; leader or mentor teaching; or formal educational programmes/ training)	How to deal with diversity and different cultures; how to overcome challenges in virtual teams; how to use communication technologies; how to communicate effectively in the virtual environment; how to establish trust and solve conflicts; the importance of rest time; different communication strategies (e.g. storytelling); foreign languages. It is important to consider the process of adjusting, e.g. individuals in the adjusting phase need different support and training than individuals in the maturing phase.	
Individual factors		Personal goals and values and their fit with the work.	

From the viewpoint of the literature on virtual teams, the use of the SDT model can be as a useful in systematising and organising the literature about virtual team–related success factors. So far, the virtual team literature has looked at several aspects from the organisation and team levels – such as trust, leadership, working culture, tools, etc.) and, to some extent, the individual factors (competencies, motivation, etc.) – and their effect on virtual teamwork. However, all of the studies about different organisational, team-level, and individual aspects tend to be carried out in isolation. Thus, one of the benefits of the SDT model is that it allows for including aspects from all three levels (organisation, team, and individual) and systematically explaining their relationships to one another.

11 Conclusion

The current chapter provides an overview of both the theoretical and practical contributions of the current study. Additionally, the limitations of the current study will be explained to acknowledge the boundaries and constraints that may impact the interpretation of the findings. The chapter finishes with suggestions for additional research avenues with the aim of contributing to the continual evolution of the field of virtual teamwork and related competences.

11.1 Theoretical contributions

The analysis of the data for RQ1 found certain distinct yet connected phases that novel virtual team members go through when they start working in virtual teams. These phases were called *adjusting*, *developing*, and *maturing*. This finding adds to the current knowledge about the discontinuity approach by Chudoba and colleagues (2005), which highlights that virtual team members experience the virtual team–related boundaries (physical dispersion, technology, and diversity) differently based on their prior experiences, competencies, job design, and so on. At the same time, the approach by Chudoba and colleagues (2005) does not explain *how* different aspects from prior experiences are related to each other and to virtual team members' effectiveness. The three phases (adjusting, developing, and maturing) revealed in the current study might be the first attempt to provide a more structured approach to illustrate and explain the different ways that individuals perceive virtual teamwork–related constraints throughout the lifespan of working in a virtual team. Thus, the current research extends the discontinuities theory proposed by Chudoba and colleagues (2005).

The current study revealed that physical distance can be considered the root cause of all other boundaries and discontinuities affecting virtual team members. The literature has so far treated virtual team–related boundaries equally (e.g. Krumm et al., 2016; Schulze and Krumm, 2017; Morrison-Smith and Ruiz, 2020). However, the data analysis suggests that physical distance is the primary cause of other boundaries and discontinuities. From the academic perspective, such findings help advance the conceptualisation and understanding of the boundaries, the relationship

of boundaries to each other, and their effect on virtual team members' performance, communication, mental and physical well-being, and so on.

The current study adds a holistic and comprehensive overview of virtual teamwork–related competencies to the existing literature and extends the research on virtual team competencies by Mukherjee et al. (2012), Krumm and colleagues (2016), and Schulze and Krumm (2017). The competence framework developed in the current study highlights certain competencies or attributes that have not been considered in the virtual teamwork competence context (e.g. digital mindset, business ethics, etc.). The current framework also highlights that individual values and attitudes are the most important aspects when considering individual competencies in the virtual teamworking context, as they lay the foundation for developing necessary skills and knowledge.

The current research adds to the existing body of literature by extensively explaining the competencies that support successful virtual team leadership. As mentioned in the theory section, the existing body of literature on virtual team leadership focuses mainly on two aspects: a) virtual leadership styles and b) activities that support leading virtual teams. In addition, when leaders' competencies or abilities are approached in the existing literature (e.g. Mukherjee et al., 2012), they are approached from a very high level, such as saying that leaders should have the ability to build trust in a virtual team. The current study connects the knowledge about preferred leadership styles and activities in one framework and provides a more detailed overview of the competence attributes that, for example, support developing trust. This provides an academic contribution by summarising and extending the current knowledge about virtual team leadership.

In addition to a virtual team–specific competence framework, the current study developed a thorough conceptualisation and clarification of the similarities and differences of competence attributes (knowledge, skills, attitudes, and values). This overview can work as a guideline for competence researchers and extends the current attempts to provide conceptual clarity to competence, such as that provided by Le Deist and Winterton (2005), Mulder and colleagues (2009), and Mulder (2015). One of the suggestions of the author of the current research is that the developing process for a competence framework should start by first identifying the deeper and more constant psychological attributes, such as values and attitudes, and then move to the more short-term and malleable attributes, such as knowledge and skills. The author of the current thesis argues that, by following the conceptualisations, definitions, and suggestions regarding the competence and competence framework development made in the current study, it is possible to advance the consistency and academic and practical implications of competence frameworks developed in the future.

The current research suggests that SDT (Deci et al., 2017) could be used to explain the support mechanisms that trigger competence actualisation in virtual teams. Although such a suggestion is made in the virtual teamwork context, it is also possible to suggest that the SDT model could be applied in any context where the aim is to increase individual competence actualisation. The suggestion to use SDT to explain the supporting mechanisms of competence actualisation is important from an academic point of view, as, so far, the academic focus has been mostly on identifying and developing competencies. The suggestions for supporting competence actualisation can be a valuable extension of the identification-development understanding. From a theoretical point of view, the current research thus extends the competence literature and the applicability of SDT.

Furthermore, the current research extends Shin's (2004) proposition suggesting that an individual's success in virtual teams relies on the congruency of the individual's attributes and the external environment. While Shin (2004) mainly considered competencies when talking about individual characteristics, it is possible to extend that theory by proposing that individual processes of adjusting to virtual teamwork should be considered in addition to the individual competencies. For example, the success of applying virtual teamwork relies on the congruency among three aspects: a) individual experiences with virtual team–related constraints (e.g. the phases identified in the current study), b) individual competencies, and c) team- and organisational-level support mechanisms. It is important to note that individuals also play an important role in the third aspect, as their behaviour impacts situational characteristics, such as working climate, trust, and communication with team members.

Based on the discussion in the previous paragraph, it is possible to answer the call in Gilson and colleagues' (2015) review paper to study virtual team adaptation. In their paper, Gilson and colleagues (2015) suggested that virtual team adaption is one of the most critical aspects impacting virtual teams' success. As stated in the research aims, the current research argues that *team adaption* is the sum of its members' abilities to adapt to the virtual working environment. After answering the three sub-RQs, the current research suggests that an individual's adaption mechanism will increase if there is a congruency between the constraints that the individuals are currently experiencing, the individuals' competencies, and the team- and organisational-level support mechanisms (see **Figure 23**). Increased individual adaption will, in turn, result in increased team adaption.
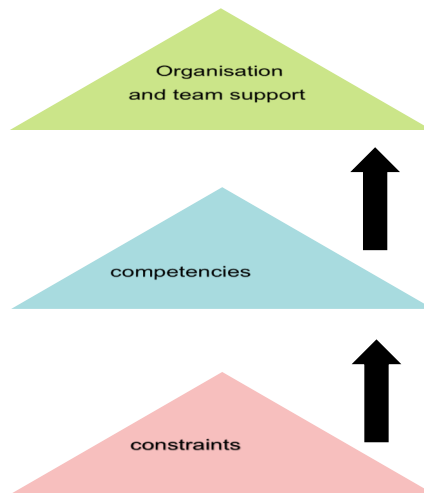
Figure 23. The congruency among the indivudally experienced constraints, the indiviudal competencies, and the team- and organisational-level support mechanisms.

This finding can be extended as a framework to systematise the research on virtual team success factors. When the researcher of the current dissertation started her investigation, she missed a map or a layout that would help frame the knowledge currently available in the virtual team literature. Many different studies have attempted to explain the success of virtual teams; however, there is currently no framework available that would systematise these studies and explain the relationship among these different research streams and findings. Thus, the author argues that the research about virtual team–related success factors could be organised into three distinct yet interconnected streams: a) research regarding virtual team–related constraints, b) research on individual characteristics (e.g. competencies, motivations, personal goals, etc.) that help with adapting to virtual teamwork, and c) research on team- and organisational-level support mechanisms (e.g. leadership, culture, tools, compensation, etc). The relationship among these streams is the same as proposed in the previous section: the better the congruency between these three streams, the better the virtual teams' and team members' results.

11.2   Managerial contributions

The virtual teamwork competence framework developed in the current study enables HR managers and team leaders to make more knowledgeable choices in the employee-selection and training processes. Furthermore, it can be anticipated that such a thorough overview of virtual teamwork–related competencies comes with practical implications not only in the present moment (e.g. employee preferences, development of technologies, etc.) but also in the longer term, considering the

general ageing of the populations in all EU countries (Eurostat, 2023). Although automation can replace some of the manual tasks performed by humans, numerous roles and tasks still require human interaction and intervention (David, 2015). With the ageing population, it can be anticipated that an increasing number of organisations face the pressure to look farther away from their headquarters in the hiring processes or to apply flexible working policies to retain their existing employees to postpone their retirements (Stirpe et al., 2018). Hybrid and remote work can thus be part of the solution to overcoming the labour shortage faced in developed countries.

The current study provides a clear roadmap for HR managers or team leaders to apply when helping their new or existing employees adjust to the new ways of working. To start, the current study describes the phases (called adjusting, development, and maturing) that a person who is new to this type of work goes through in the adaption process. Every person is, of course, unique with their own unique competencies and experiences, but the study revealed (based on 24 interviews) that these phases are very similar despite different backgrounds and competence levels. Combining the knowledge about these stages with the identified competencies and organisational support mechanisms provides a possibility to provide a systematic, scientifically proven, and effective process to support employees in becoming accustomed to remote/hybrid working (see an example in **Table 29**).

The empirical data revealed, for example, that individuals in the *adjusting* phase are trying to get used to the fact that their colleagues prefer being somewhere other than the office and that nobody is looking over their shoulders. In this phase, it is usually enough if colleagues and the leader support individuals morally and show them the tools that the team uses – no specific training is needed. In the *development* phase, individuals become interested in making the most of their time, communication, relationships, and so on. In this phase, training is a good tool to deepen the knowledge about different tools and best practices that can help build effectiveness. The last phase – *maturing* – mostly involves evaluating the different tools and methods learned and letting go of those that have not brought the expected results. Team members benefit from discussion clubs, mentoring, and coaching in this phase.

Table 29. Examples of combining the insights about the adaption phases, competencies, and organisational support mechanisms based on the examples of the *adjusting* phase (developed by the author)

Phase:	Adjusting
Organisational support	Provide tools and licences and, if needed, a quiet place to work in the office; schedule a physical get-together to get to know the new team member and vice versa; clarify the goals, roles, and responsibilities of team members; create psychological safety, including moral support from managers and colleagues (ensuing that, for example, it is okay to work from home when the person prefers to do so); have a leader who is available; develop a collaboration agreement; share company values (open communication, licence to make mistakes, etc). Enable swift trust to develop – by highlighting the new team members competencies while introducing them to the team.
Competence development	Show which tools are used in everyday work and the basic functionality of the tools (can be done by the leader or colleagues).

After the employees who are less experienced with virtual teamwork have adapted to virtual teamwork, constraints will still emerge in the everyday working processes. These constraints can be related to changing external situations, changes in tasks and responsibilities, or simply because the team member has moved to the next phase in the adapting process. Hence, it makes sense to have regular reflections (feedback loops) to analyse whether some new needs for competence or organisational support mechanisms have emerged. Here, again, the knowledge developed in the current study regarding phases, competencies, and organisational support mechanisms can be a good starting point in the process of identifying necessary interventions.

At the same time, it is good to keep in mind that, according to the current study, physical distraction is the main source of constraints experienced by virtual team members. From a managerial standpoint, knowing this may help gain a better understanding and more effectively solving these constraints. For example, if there seems to be a high level of miscommunication among team members, instead of looking for additional technological tools to overcome these issues or communication-related training, it might be worthwhile to bring the team members to one physical location to enable them to recreate and strengthen their psychological bonds and understanding about, for example, each other's communication styles. Note that the current research does not in any way wish to diminish the importance of selecting the right tools to aid virtual team communication processes or the need for related competencies. However, to highlight that even when the communication tools are in place and the competencies to use them are sufficient, the need for occasional physical meetings remains.

In addition to tools that can help support employees in adjusting to virtual teamwork, the current study developed a clear overview for understanding

competence and its related attributes (knowledge, skills, attitudes, and values). This overview can help HR managers better understand the meaning of the different attributes and how they are manifested in real life. Moreover, it can help in understanding where the possible problems are rooted and selecting the proper means to overcome them. For example, if an employee is not including their remote teammates in a work-/task-related discussion, this might be related to a) not knowing how to use digital collaboration/communication tools, b) applying higher value to those teammates who prefer to work in the office, or c) not having a clear overview of the roles, responsibilities, and overall goals of the team. Depending on where the problem is rooted, a different reaction is needed. In the case of a or c, it is usually sufficient to increase employee knowledge about the roles and responsibilities of team members or skills for using ICT. This can be done rather easily. However, if the employee does not value individuals who prefer working remotely or flexible working opportunities in general, changing those values requires different types of activities that are more complex. Some examples include developing an organisational culture that appreciates flexibility and constantly communicates this.

To summarise, based on the current study, it can be concluded that the success of adapting to virtual teamwork relies on the congruency among three aspects: a) individual experiences with virtual team–related constraints, b) individual competencies, and c) team- and organisational-level support mechanisms (see **Figure 23**). The current research is the first attempt to provide a thorough understanding of the interplay among these three pillars and practical examples of how the combination of the three aspects can be used to help employees better adapt to changes in the world of work. This can work as a valuable source of knowledge for HR managers and team leaders when adapting to the challenges that the external environment brings today and in the future in the context of teamwork.

11.3 Limitations of the research

One of the limitations of the current research is linked to *researcher bias*. Although the critical realism paradigm generally accepts that the researchers are not "*tabula rasas*" and have both an academic understanding of the questions at hand and unique personal experiences that guide their thinking, it is perhaps worthwhile mentioning that the researcher of the current study has been volunteering at an Estonian nonprofit organisation called Smartwork starting from year 2019. One of the main aims of Smartwork is to promote smart work, including remote work and virtual teamwork, in Estonia to enable people to work in a suitable form and place for them. Being a volunteer (and today the chief executive officer) at Smartwork has allowed the researcher to have contact with HR managers and team leaders from many organisations and participate in remote work–related research projects outside of the

current research. In addition, the researcher herself has been working 100% remotely starting from 2015. In addition, Smartwork Association is run as a 100% remote organization. The previously mentioned experiences have broadened the researcher's understanding of the implications of contemporary work practices for firms, teams, and individuals. However, this experience has also impacted the researcher while analysing the research data and creating the theoretical framework and thus should not be overlooked.

Another aspect related to *researcher bias* is the researcher's limited experience in the academic research field. Being a novice researcher impacted the way the research project described in the current dissertation was carried out. There are things that more experienced colleagues would have done differently. However, there are two aspects to consider here. First, the university's supervision system for PhD research has been specifically designed to support novice researchers in learning how to conduct quality research. Second, applying the growth mindset, mistakes and failures are part of the learning journey, which will never end. In other words, no researcher will ever be perfectly ready to conduct their research. Each project is unique, and there is always a need to experiment and learn from the experience what works and needs to be changed. In that sense, the current process was no different. Carrying out the current research project gave the author a preliminary toolbox to continue conducting research. However, the process of developing this toolbox as a researcher is ongoing and will continue from here.

Finally, the research is also limited by the fact that competence frameworks are by nature static and do not evolve with changes in the external environment. Work life and workplaces are changing so quickly that any kind of framework with the intention of capturing competencies for coping with these changes can be considered outdated to some extent by the time it is ready. For example, due to the events that have happened during the last few years (including Covid-19) and the ongoing economic pressure from high inflation, many companies are in the process of reducing or letting go of their office spaces. This increases "forced remote work" on employees, which may increase new challenges when teams and individuals are adapting to virtual teamwork. Moreover, the general ageing of the population and the need to retain older employees may change the need for organisational support mechanisms when applying new ways of working. However, based on the method developed in the current dissertation, it is possible to refine the proposed competence framework when the external environment changes drastically.

11.4   Suggestions for future research

The current study adopted an individual-driven approach to analyse virtual teams' adaptability and success. This approach is in line with the trend in modern

organisations to move towards a more human-centric or *humanised* approach when approaching different aspects such as leadership, organisational culture, and organisational support mechanisms:

> *The new reality forces us to think differently. New ways of working, as a term, is obsolete. Instead, we need to think of work, workforce and workplace in a more holistic way and more than ever focus on the human aspect in the organization.*
> (Deloitte Consulting, 2020)

Thus, the author of the current research suggests that it is time for the literature on virtual teams, as well as managerial and business-related literature, to generally move towards a more human-centric approach. Putting the individual at the centre of the research can help in understanding and creating a work environment in which individuals and teams are empowered to contribute their full potential.

The current study revealed that virtual teamwork, specifically remote work from home offices, might start interfering with employees' personal spaces and lives. As one of the respondents shared, she did not want to eat at her dining table after a while of working there. Following the same line, the home office (the home environment per se) may have certain psychological effects on virtual team members that are undermined by research and practice, especially now that the scale of working from home has increased significantly. While there is separate literature that investigates the psychological effects that offices have on employees, it might be worthwhile to conduct the same type of research considering the home environment. The study results may reveal that, for example, with certain support from the organisation, employees may significantly increase their productivity and decrease the negative effects or feelings that remote work may, in certain conditions, pose on virtual team members when they work in a home office.

The current study revealed that virtual teamwork significantly increases team members' need to perform managerial activities. While the increase in autonomy, individual decision-making, and managing oneself suits those individuals who highly value independence, it might have severe adverse effects on virtual team members who value, above all, tradition and security. Thus, it would be worthwhile to further study the relationship between values and the adaptability to increased autonomy in virtual teams and mechanisms that can support those who find it hard to manage the increase in autonomy. At the same time, an analysis of the existing literature suggests that increasing certain knowledge and skills may trigger value change (Kohn and Schooler, 1982; Rohan, 2000). This might be an extremely valuable insight for organisations transforming from traditional to virtual or hybrid teamworking. Thus, the connections between values and skills and independent

working would be worth studying further to provide organisations and HR managers with tools to support the value change of existing employees.

In addition – there could be ways to balance the increased autonomy for those virtual team members who prefer more traditional and secure workplaces. For example, by using certain interventions and HR practices that make virtual team members feel secure about their job. Also, creating a "rhythm" that is predictable – e.g. regular one-to-one and team meeting times, clearly outlined decision making processes, etc. may help to balance the otherwise increased autonomy. This could be an interesting avenue to study – to understand better whether and how certain HR and managerial practices could be used to balance the increased autonomy for people whose value priorities to not support working under such high autonomy like in virtual teams.

The current study revealed certain phases that virtual team members go through when adapting to virtual teamwork. This is an important insight, as it helps in better understanding the process that individuals go through when adapting to virtual teamwork. While the existing literature seems to take a rather static approach to analysing virtual team–related boundaries and constraints and the mechanisms to overcome them, it might be worthwhile to approach the topic more from a process-based view. The process-based approach to analysing the impact of virtual teamwork on individuals could offer additional insights and significantly increase the understanding of how to support individuals in this process and thus build more effective virtual teams.

As mentioned in the implications section, the current research suggests paying attention to concept clarity and consistency in approaching the competence attributes in competence-based research in the future. Furthermore, highlighting the role of values and attitudes in the competence literature and framework could help increase both the theoretical and practical impact of competence research and the developed framework. Therefore, one of the suggestions based on the current research is to approach competencies as a combination of *"values, attitudes, knowledge, and skill"* in future research (as opposed to the current approach of knowledge, skills, attitudes, and values). This would make it possible for research to focus on the deeper and more constant competence attributes, which ultimately lay the foundation for acquiring more short-term and easily malleable attributes, such as knowledge and skills.

The current research applied the P-E fit theory (first suggested in the context of virtual teams by Shin, 2004) to the development of the competence framework. The P-E fit approach to developing competence frameworks is not used frequently – probably due to the complexity of analysing the many contextual factors that may impact the competence application. However, after developing a competence framework with such an approach with the help of SDT, it can be said that a) it is

possible to analyse both aspects while developing competence frameworks, and b) with the application of the P-E fit approach to competence frameworks, it is possible to increase the academic and practical utility of the developed framework(s). Thus, the author of the current study invites future studies to adopt the P-E fit approach when developing competence frameworks to develop more holistic understandings and tools to explain and support employee performance at work.

Moreover, current research can be considered a "proof of concept" that the SDT model can be applied in the development of competence frameworks to better understand and explain the external mechanisms that can support competence application. Therefore, the author of the current research suggests conducting further research to determine the potential of SDT to explain the application of individual competencies in general. As such, it would be possible to extend a) the competence literature, which, at the moment, is more concerned with identifying competencies and their development processes than the process of competence application; and b) the OL research, which calls for more concrete tools to aid HR managers in developing interventions to support employee competence application.

12   Summary

While virtual teamwork brings many benefits to organisations, teams, and individuals, it has also been found to possibly have severe adverse effects on individuals and, thus, team effectiveness. In some cases, virtual teams' success has been reported to drop by as much as 50% (Sobel-Lojeski, 2015). At the same time, globalisation, the development of IT, the war for talent, and employee preferences (also global pandemics) demand businesses to adapt to the new ways of working and thus to implement virtual teamwork. Now, the question from the business (and academic) side is how to apply virtual teamwork in the organisation so that it will still bring the expected results. In 2015, Gilson and colleagues proposed that a virtual team's success lies in its ability to adapt to changes from the external environment (e.g. the development of technologies, globalisation, changing working culture, etc.) and called for more research to explain how virtual teams can better adapt.

Much of the research that has tried to explain virtual team success and adaptation processes has been dominated by team-based research and team theories (Gilson et al., 2015; Raghuram et al., 2017). Team-based research has examined more general aspects, such as team dynamics, forming processes, communication strategies, and team leadership. Another stream of research related to virtual team success has focused on very granular-level aspects, such as looking at the impact of certain communication technologies on virtual team' success (Raghuram et al., 2017). What is common to most virtual team–related research is that it has treated virtual team members – the individuals – as passive agents under the influence of different variables of the external environment, without having *agency* in changing the course of their work and actions in the virtual team context.

The current study takes a different perspective. It starts by giving *agency* to the virtual team members and analyses virtual team success factors from an individual perspective. Similar to Shin (2004), the current study proposed that virtual team success is related to team members' abilities or inabilities to adapt to the demands of the virtual working environment, such as increased use of technology, diversity, and the proximity between team members. Thus, the focus in the current study was on adaptation, as mentioned in Gilson et al. (2015) – but the assumption is that individuals determine the ability or inability of teams to adapt. In other words, in the

current study, it is believed that a team's ability to adapt is the sum of its members' abilities to adapt.

First, attention was turned to individual competencies, as they have been considered the primary tool in the individual adaption process, as well as a tool to explain superior work behaviour (Kotsiou et al., 2022; Le Deist and Winterton, 2005; Wesselink et al., 2015). However, individuals do not operate in solitude (detached from the external environment, social context, etc.) (Staw and Ross, 1985; Chatman, 1989; Shin, 2004). Thus, in addition to individual competencies, the current study looked at external characteristics that may exhibit or inhibit individual competent behaviour. For example, without clarity of the team and individual roles and goals, even the most competent virtual team members would be unable to maximise their competence potential. Thus, team- and organisational-level aspects were included in the current study. However, instead of believing that virtual team members are merely *objects* of team- and organisational-level aspects, the present research acknowledges that virtual team members' individual characteristics relate to contextual and situational factors, and vice versa. The key to preferred individual behaviour (e.g. performance at work) relies on *congruence* between the individual characteristics and environmental characteristics (also referred to as P-E fit) (Shin, 2004).

Thus, the following overarching RQ and related subquestions were posed:

Main RQ: *Which individual competencies and other factors enhance individuals' adaptation to a virtual working environment?*

Sub-RQ1: *What are the main constraints on individual effectiveness in virtual teams?*

Sub-RQ2: *Which competencies help individuals overcome key constraints in virtual teamwork?*

Sub-RQ3: *How can organisations support the actualisation of virtual teamwork–related competencies?*

Effectiveness was understood in the current study as virtual team members' abilities to perform taskwork and teamwork – for example, take care of their team's health in addition to performing tasks (Salas et al., 2005). This type of approach is also in line with the critical realism paradigm applied in the current study. The term *effectiveness* indicates (similar to in critical realism) that, not only are the virtual team members influenced by their situational characteristics, but they also play an essential role in determining what those situational characteristics are, based on their behaviour.

The above brings us to the topic of methods. The research aimed to create an understanding of the relationship between virtual team–related constraints, individual competencies, the team- and organisation-level contexts, and individual behaviour. For such an aim, it was necessary to analyse individual experiences in their contextual settings. Critical realism and an instrumental case–study approach supported reaching such a purpose. Critical realism has its unique way of theorising – which considers the actors in their social context. Critical realism highlights that actors are impacted by their internal mechanisms (e.g. competencies) and social structures, and vice versa. In addition, an instrumental case-study approach supports the development of causal explanations of complex events (Wynn and Williams, 2012). In the instrumental case study, the focus is not on describing the context in all its details but on using it in the analysis process to develop additional insights.

Regarding data gathering, a qualitative approach with in-depth interviews was used to give voice to the respondents. The interviews worked as a tool to provide *agency* to the virtual team members. In such a way, the current research differed significantly from existing research on virtual team competencies (e.g. Krumm and colleagues, 2016; Schulze and Krumm, 2017), as prior research has approached the topic from a deductive, theory-driven approach. In the current study, 24 individuals with virtual teamwork experience were interviewed. The interviews helped systematise what is known about virtual team–related competencies, integrate competencies from other fields, and understand the complex relationship between virtual teamwork–related constraints, individual competencies, and contextual characteristics.

The data were analysed first using a content analysis approach. The content analysis approach helped categorise the key constraints experienced by virtual team members. However, after finalising the content analysis in sub-RQ1, it was acknowledged that this analysis method does not support developing contextual insights. Therefore, the narrative analysis method was selected to support the research aims. Narrative analysis is a process in which the researcher creates narratives based on qualitative data. Narrative analysis was useful, as it helped make connections between different parts of the data, such as individual behaviour and situational/contextual aspects. It is also important to note that an iterative approach was used in the current research to combine empirical data and the academic literature. The iterative process means that the researcher moves iteratively between theory and data. The iterative approach to analysing and combining theoretical knowledge with empirical insights helped develop data-driven and theory-supported results.

Regarding sub-RQ1, the current research provided a comprehensive and systematic overview of the main constraints that virtual team members experience.

This overview helped develop the virtual teamwork–related competence framework and analyse the contextual factors that can help individuals apply competencies and, thus, more effectively adapt to virtual teamwork. Moreover, the application of narrative analysis for sub-RQ1 highlighted the phases – *adjusting*, *developing*, and *maturing* – that virtual team members go through while adjusting to virtual teamwork. This is an important finding regarding the main RQ, as it helps with a better understanding of how to support individuals in virtual teams in adapting to a virtual teamworking context.

The combination of the results from sub-RQ1, the interview data, and the existing competence literature helped develop a systematic and holistic understanding of virtual team–related competencies and their role in overcoming key constraints – and thus to answer to the sub-RQ2. One of the important findings regarding virtual team competencies, which was supported by the theory and interviews, is that values and attitudes are key to individuals' adapting to virtual teamwork. Therefore, values and attitudes were placed at the top of the competence framework developed in the current study (see Appendix 2). In addition to the developed competence framework, the current dissertation provided a systematic and thorough overview of the concepts of competencies and competence attributes, which can help clarify the conceptual fuzziness related to competence and its related attributes in the literature (Le Deist and Winterton, 2005).

Combining SDT (Deci et al., 2017) and interview results helped answer sub-RQ3, which was concerned with the role of contextual aspects in competence application and individual adaption processes. SDT provided a framework for understanding the relationship between individual and external organisational aspects and competence application, which leads to individual effectiveness. The SDT framework was used to synthesise and report the findings from the existing literature and interview results. From a practical point of view, the analysis resulted in a table highlighting the most important aspects to pay attention to for supporting virtual team members in maximising their competence potential and thus being more effective in a virtual teamwork context.

Answering the three previously discussed subquestions helped with answering the main RQ. The main question was concerned with the individual competencies and organisational support mechanisms that would enhance the actualisation of competencies and thus increase the success of virtual teamwork in organisations. It can be summarised that paying attention to congruence among the individual process of adapting to virtual teamwork and experienced constraints, individual competencies, and team and organisational support mechanisms will increase the virtual team members' abilities to adapt to virtual teamwork. Individuals who have the right set of competencies and whose external workplace-related needs are met will be able to overcome the constraints experienced and thus become more effective

and adaptive to a virtual team context. Individual adaptiveness and effectiveness will lead to the team's ability to adapt to external changes. Appendix 2 includes the most important findings for supporting HR managers and team leaders in creating congruence among the constraints, competencies, and organisational support mechanisms.

Abbreviations

VT	Virtual teams
OL	Organizational learning
SDT	Self-determination theory
P-E fit	Person-environment fit
KPI	Key performance indicator
EU	European Union
HRM	Human resource management
HRD	Human resource development
HRM	Human resource management

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Appendices

Appendix 1. Competencies related to creative problem-solving

Table 30. Description of competencies related to creative problem solving (developed by the author based on Rahman, 2019, European Commission, 2018, Ferrari et al., 2012, Dwyer, 2017 and Krumm et al., 2016).

Compe-tence	Compe-tencies	Skills	Description
Creative problem solving	Obser-vation	Gathering information	*Finding and collecting relevant information systematically from different sources (also foreign) and analysing the source validity.*
		Information processing	*Understanding and interpreting meaning by identifying key points.*
		Analysing information	*Recognising patterns and finding similarities and differences.*
	Critical thinking	Analytical thinking	*Collecting information, articulating, visualizing, and solving complex problems in a creative way.*
		Conceptualising	*Identifying the topic and recognising the problem partially or completely.*
		Synthesising	*Combining parts of a whole in new and different ways.*
		Logical reasoning	*Drawing logical conclusions based on facts, statements, or arguments and to identify the strengths and weaknesses of those arguments.*
		Decision making	*Making choices, selecting the best alternatives.*
		Interpreting and Application	*Using knowledge in new or familiar situations, generalising ideas from explored facts, and generating new ways to achieve a specified task.*
		Reflective judgment	*Understanding that there are limits to knowing; for example - what is true for one individual might not be true for another.*
	Creative thinking	Opportunity recognition	*Using imagination and existing pieces of knowledge/resources to identify opportunities for creating value; contributing to problem-solving voluntarily and proactively.*
		Flexibility	*Generating new ideas, a novel integration of existing ideas, and application of new ideas in a real-world setting.*
		Synthesizing	*Combining knowledge and resources to achieve new and innovative solutions.*
		Experi-menting	*Exploring and experimenting with innovative approaches, being open to experiences, value stimulation*

Appendix 2. Virtual teamwork competence framework. Executive summary.

1. COMPETENCE DEFINITION

Competence in the current framework refers to the individual's ability to respond to complex demands from the external environment by combining their internal resources (Kotsiou, et al., 2022). A person's **competence** (for example virtual teamworking competence) **consists of smaller units called competencies** (competency in singular) (op. cit).

Competencies consist of the four attributes: **values, attitudes, skills, and knowledge**, and those are approached in the current study as follows:

Values: General transsituational goals that guide individuals' attitudes, judgments, and actions. *An example: valuing independence.*

Attitudes: An evaluative judgment (positive or negative) regards an object, behavior, or activity. *An example: liking to try out new technologies.*

Skills: Given the context of the current study, the attention is turned to **complex cognitive** and **non-cognitive skills**. **Complex cognitive skills** consist of cognitive, metacognitive skills, and epistemic cognition. *An example: critical thinking and problem-solving skills.* **Non-cognitive skills** consist of hot-cognitive and social skills. An example: *extraversion, agreeableness, argumentation skills, impulse control.*

Knowledge: Given the context of the current study higher emphasis is given to **personalised knowledge**, which consists of knowledge elements (e.g., factual, conceptual, procedural, and metacognitive knowledge) that have been personalised through action. *For example: knowledge about the main challengies in virtual teams.*

2. VIRTUAL TEAMWORK RELATED CONSTRAINTS AND COMPETENCIES TO OVERCOME THEM

The following part describes the most common constraints that individuals experience while working in virtual teams and individual competencies that help to overcome the constraints. According to the current study, virtual teamwork-related constraints and competencies can be divided into five distinct yet interconnected areas: **virtual collaboration**, **virtual communication**, **self-regulation**, **using digital tools,** and **virtual leadership**.

2.1. COLLABORATION IN VIRTUAL TEAMWORK

Constraints regarding **collaboration** in virtual teams can be categorised in three main themes: **task-related constraints**, constraints related to **building relationships, and trust,** and **diversity related constraints**. The following table highlights how can these constraints be experienced in virtual teams:

Table 31. Collaboration related constraints in virtual teams

Constraints	Description	Effect of constraints on individual and team efficiency
Task-related coordination and synchronisation	Decreased overview of work processes.	Decreased task-related support from colleagues, uneven workload, increased time to complete the tasks, and poor management of tasks within the team.
Relationships and trust	Difficulties in building trust and relationships.	Decreased team feeling -> decreased motivation and commitment to team goals.
Diversity	Harder to spot and respond to national, role-based, organisational, and work-culture related differences.	Misunderstandings, mistrust.

A **competent virtual team member**, who can effectively overcome collaboration-related constraints, is ready and willing to explicitly share their working progress with others. They can explicitly state when they need help or are struggling with some parts of their work. They also know and are willing to share constructive feedback on other people's work. This individual generally trusts other people's goodness – for example, they believe that others are working as hard as they are until proven otherwise. At the same time, this individual holds other people accountable for their promises, while also taking responsibility for their promises.

This individual can effectively contribute to the relationship and trust building in virtual teamwork and is ready and willing to share their work progress with others. They like to reach out to people and find time for socialising physically or virtually with their team members by sharing personal information about themself so that others can get to know them better. They are also interested in getting to know

other people better and use every opportunity to learn more about their team members.

They can prevent and mitigate conflicts by using clear communication. When there is a risk of conflicts, they take time off before they respond to the team members to avoid escalating the situation even more. If things escalate, they use proper communication tools (e.g. calling, a video meeting, or a face-to-face meeting) to solve the situation.

The individual can work collaboratively with individuals representing diverse cultures, races, ages, gender, religions, lifestyles, and viewpoints. They can mitigate obstacles that come from diversity by adapting their communication style and following general netiquette. They are aware of the risks that diversity can bring and thus can choose the right communication and information management tools to mitigate those risks (e.g. writing an e-mail instead of calling, as then the other party can take time to translate the message). The individual is, in general, tolerant and forgiving in nature. They are also genuinely interested in getting to know and learn from new people. For this, the individual listens more than speaks when meeting new people. They can use reflecting questions to ensure that they and the other party understand each other correctly. See **Figure 24** below for a full overview of values, attitudes, skills, and knowledge related to collaboration in virtual teams.

Figure 24. Values, attitudes, knowledge, and skills related to collaboration in virtual teams.

2.2. COMMUNICATION IN VIRTUAL TEAMWORK

Constraints regarding **communication** in virtual teams can be categories in three main themes: constraints related to **task-related information exchange and management, social interactions,** and **virtual meetings**. The following table (**Table 32** below) highlights how can these constraints be experienced in virtual teams by its members.

Individuals, who are **competent** in virtual communication (see **Figure 25** for a full list of virtual team collaboration-related attributes) is aware of the many threats that physical distance has on virtual communication and, based on that, can support others in overcoming communication-related barriers in virtual teams. They respect other people (their time, their ideas, their feelings), and that respect can be anticipated from their communication style. They communicate openly and clearly in written and oral ways (including argumentation skills), thus successfully delivering the intended messages. They can explain complicated things easily (including explaining the "why" behind things) and, if needed, use additional audio-visual tools to make the message even clearer. They also have good listening and analytical skills,

which enable them to understand others. They are responsive, attentive to other people, and open and transparent in their communication.

Table 32. Communication-related constraints in virtual teams.

Constraints	Description	Effect of constraints on individual and team efficiency
Task-related information exchange and management	Misunderstandings due to not seeing the body language of other people, due to misinterpreting the written text, etc. Increased response time. Uneven distribution of information. Information overload, and information being scattered.	Risk of conflicts, decreased productivity, need to complete the same tasks twice, increased decision-making time, decreased productivity, poorly managed tasks, delays and loss in work quality, negative effects on trust.
Social interactions	Difficulties in getting to know each other, communication more task-focused. Decreased emotional support, increase in aggressive and disrespectful communication behaviour. Isolation, feeling of loneliness.	Decrease in motivation, decreased efficiency, less engagement with team members, and decreased commitment to team goals.
Virtual meetings	Difficulties in adjusting to virtual meetings (speaking up, getting the message delivered, etc.). Decreased engagement and focus	Decrease in motivation, not harnessing the benefits of remote meetings, and less effective meetings.

During virtual meetings, the individual can speak out and offer a word when needed. They know when and how to interrupt others. They use a clear and concise communication style and can listen to and focus on what other people are saying. They observe others and learn from their best communication practices to improve

their own virtual communication competencies. They use video during virtual meetings and are always well prepared for the meetings.

The individual is ready to reach out to others and set up one-to-one calls with colleagues to get to know them better and socialise. If virtual calls or coffee chats are not enough, the individual occasionally visits the office (if possible). They are willing to share personal information through virtual means and show interest in how other people are doing by asking questions, etc. They can monitor their own and others' feelings (virtually) and use this information to guide communication. They can select and join online communities to increase feelings of belonging.

VALUES people (their time, their feelings, ideas, etc.).

LIKES to share knowledge, content, and resources, **using ICT tools**, **share information in a proactive way**, use **video** while having virtual calls, and **share failures** and challenges **with others.**

COORDINATING COMMUNICATION	**QUALITY OF COMMUNICATION**	**SOCIALISING**
Knows about the main challenges of virtual communication; project aims, status, roles of team members, etc.; how to maintain shared understanding within the team; **Can** critically evaluate the need for sharing information; share and respond to information in a timely manner; manage time effectively.	**Can** use argument, and negotiate; use story-telling approach; use closed-loop communication; listen strategically, clearly present and visualise information (using different options: video, presentations, images, charts, etc.); ask good questions; apply excellent oral and written communication skills, communicate in foreign languages, switch between task-orientated and relationship orientated communication; produce clear and concise messages; share contextual information and implicit information explicitly.	**Can** substitute emotional cues (for example, body language with emoticons, unconventional orthography such as "noooo", or facial expressions – such as smiling more often); monitor one's own and other's feelings (virtually) and to use this information to guide one's behavior; participate communities/teams through online engagement.

Figure 25. Values, attitudes, knowledge, and skills related to communication in virtual teams.

2.3. SELF-REGULATION IN VIRTUAL TEAMWORK

Constraints regarding self-regulation in virtual teams can be categories in three main themes: constraints related to **self-management, independent decision-making,** and **self-improvement**. The following table (**Table 33** below) highlights how can these constraints be experienced in virtual teams.

Table 33. Constraints related to self-regulation in virtual teamwork.

Constraints	Description	Effect of constraints on individual and team efficiency
Self-management	Blurring boundaries between work and personal time. Increased effort in finding suitable workplaces and/or tools. Increased need to manage own work time and tasks. Increased effort to stay focused.	Risk of overworking and burnout, not being as productive as planned, being late with tasks, or delaying tasks, which leads to working evenings and weekends, physical and mental health-related risks.
Independent decision-making and problem-solving	Increased need to solve problems and make decisions independently.	Misunderstandings, delays in decision making, poor quality of work.
Virtual meetings	Increased need for continuous (independent) learning.	Not being capable of doing your work and reaching expected results.

A **competent person** who can work in virtual teams is generally highly disciplined and has strong time management skills. Time management skills mean that this person is conscious about their own working style and productive working hours and can plan their work time accordingly. In addition, they are aware of good time management practices, such as bundling similar work tasks (e.g. those that require more focus), having breaks during the day and between virtual meetings, and writing everything (including breaks) into the calendar. This individual is a self-starter – for example, they can motivate themself to start working. They are aware of their value in their current role and can prioritise work tasks based on importance. They can say "no" to inquiries that may jeopardise managing the highly prioritised tasks or maintaining a healthy work–life balance. This individual makes conscious choices while choosing which meeting to attend and where to use their timely resources to ensure generating the most value in their role and maintaining a good and healthy work-life balance.

A person who can self-develop in a virtual environment has a general growth mindset – meaning that they believe that everything can be learned. This person is curious, likes to try and learn new things, initiates change, and is ready to let go (unlearn) of their previous behaviours, habits, and mental models. They observe

their colleagues to spot best practices that they can try out themself. They are also not afraid to ask questions or ask for help if needed and are ready to help and teach others. They accept failures as part of the learning journey.

An effective virtual team member is not afraid of independent decision-making. They use creative problem-solving and critical thinking techniques to come to decisions independently. They are almost self-sufficient, but at the same time, they will reach out to discuss the decision with the team members if needed. They do not expect any "hand-holding" from their leader. They enjoy experimenting and trying out new solutions and are not afraid of failing and sharing their failures/learning with others. Their team considers them a proactive contributor who is not afraid to raise their hand to help solve problems.

VALUES...team and personal **goals**, **new technologies** and **ways of working**, **lifelong learning**, flexible and modern ways of working, effective **teamwork**, **flexibility** (contrary to following traditions/rules strictly), and **stimulation**.

Likes to...demonstrate positive attitudes towards **everyday activities**, **learn new things**, **experiment**, **contribute voluntarily**, proactively **solve** (mitigate) **problems**, and **make independent decisions** when needed.

SELF-MANAGEMENT	SELF-IMPROVEMENT	INDEPENDENT DECISION MAKING
Can prioritise and manage workload; apply project management skills in personal work life (set goals, plan the execution of plans, actualise plans); apply self-assessment, self-reflection, self-monitoring and self-analysis skills; control impulses; demonstrate grit; apply emotional intelligence; demonstrate self-confidence and personal agility; self-motivate; make decisions independently; apply energy, passion, and optimism to everyday activities. **Knows** health-related risks in virtual teamwork.	**Can** cope with changes: apply growth mindset; deal with ambiguity; develop stable relationships; identify learning opportunities; set (learning) goals; plan and actualise learning goals; monitor own learning processes (incl. self-assessment, self-reflection, self-analysis). Learning online: seek opportunities for self-development and empowerment in using technologies and digital environments; use online communities of practice with learning purposes; search, enroll and participate in relevant online courses; make digital notes.	**Can** observe, gather, process, store and analyse information (using ICT); assess source validity; use reflective judgment; use foreign languages; think analytically; conceptualise, synthesise, use logical reasoning; make decisions using critical thinking skills, apply knowledge (in new settings) use reflective judgment; interpret from pieces of knowledge; recognise opportunities for problem-solving; synthesise; apply creative mindset.

Figure 26. Values, attitudes, skills, and knowledge related to self-regulation in virtual teamwork.

2.4. TECHNOLOGY USE IN VIRTUAL TEAMWORK

Constraints regarding using ICT in virtual teams can be categorised in three main themes: **adopting new technologies**, **security/data protection,** and **technical**

problems. The following table (**Table 34** below) highlights how can these constraints be experienced in virtual teams.

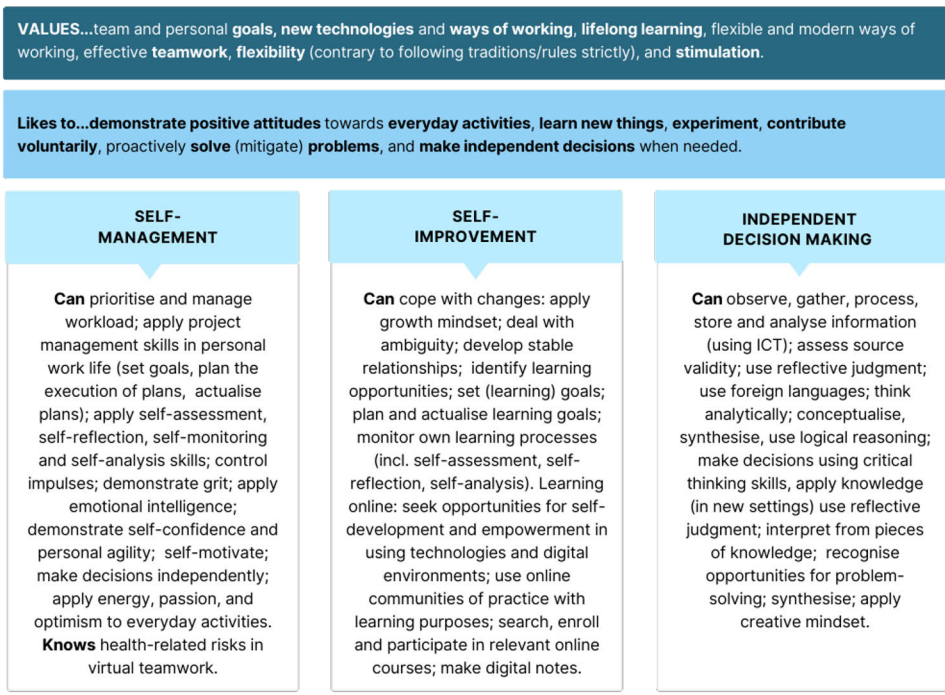**Table 34.** Constraints related to technology use in virtual teamwork.

Constraints	Description	Effect of constraints on individual and team efficiency
Adapting to new technologies	Difficulties in leveraging the technologies, poor task-technology fit. Difficulties in learning and adjusting to new technologies.	Decreased efficiency, decrease in trust, communication, and collaboration.
Security and data protection	Risk on information security, while working in public places, etc.	Risk of data leakages or inability to participate in meetings/decision-making when being in public places.
Technical problems	Internet connection or other technical tools/features failing.	Not being capable of doing your work and reaching expected results.
	Increased effort in managing workplaces and tools	Risk of not being as productive as planned, risk of not harnessing the potential of remote work because lack of tools or knowledge of how to use the tools

The individual **competent** in using digital technologies in virtual teams follows the team and organisational agreements about information exchange (where, when, and how to share and store information). They are well organised – for example, they save files with correct names in the correct places. They use different practices for managing information flow – for example, using flags and other systems to differentiate between important and unimportant information. They can critically assess whom they need to inform and what would be the best way of doing it (e.g. gathering small pieces of information into one more message, not adding everyone in the team to the CC, when there is no need for it, etc.).

They are aware of the organisation's data protection and cyber security policies and know the general best practices of cyber security and data protection.

The individual can assess their own needs regarding resources, tools, and competence development to match these needs with possible solutions. They can adapt tools to personal needs and critically evaluate possible solutions and digital tools. They can select the appropriate means for communication and task solving. They can interact through various digital devices and applications and use ICT tools

to minimise distractions if needed. They can express themself creatively through digital media and technologies. They accept that technology fails occasionally.

The individual does not take credit for other people's work. They can explicitly express implicit norms and guidelines to new team members and adapt to the norms of new teams/organisations. They can protect themself and others from possible online dangers (e.g. cyberbullying).

VALUES digital innovation			
LIKES to share knowledge, content, and resources by using ICT, try out new technologies			
INFORMATION MANAGE-MENT	**SECURITY AND DATA PROTECTION**	**DIGITAL PROBLEM SOLVING**	**E-ETHICS**
Can access and search information online; select resources effectively; gather, process, store, understand, share and critically evaluate information; use appropriate citation practices; integrate new information into an existing body of knowledge; deal with the data that is produced through several accounts and applications.	**Can** protect own devices understanding online risks and threats; apply reflective judgment; evaluate source-validity. **Knows** individual and organisational safety and security measures; general data protection rules and the rules in the organisation; copyright and licenses related issues;	**Can** use contemporary software and hardware; apply growth mindset regarding ICT; adapt tools to personal and team needs and use proper tools to minimise distractions;	**Can** apply net etiquette; analyse and adapt own behavior in virtual collaboration/communication; discover and report inappropriate behavior. **Knows** code of conduct regards (virtual) collaboration (in organisation/team); privacy-related rights in the virtual environment;

Figure 27. Values, attitudes, skills, and knowledge related to technology use in virtual teamwork.

2.5. LEADERSHIP IN VIRTUAL TEAMWORK

Constraints regarding leadership in virtual teams can be categories in five main themes: constraints related to **developing** proper **company culture**, constrains related to developing **shared understanding** about goals and work proccesses, **communication and information exchange** related constraints, **developing relationships** and **team feeling** and difficulties in **fostering learning**. The following table (**Table 35** below) highlights how can these constraints be experienced in virtual teams.

Table 35. Constraints related to leadership in virtual teams.

Constraints	Description	Effect of constraints on individual and team efficiency
Communication and information exchange	More difficult to run team meetings.	Team members are not engaged -> resulting in missing information and fewer quality decisions made.
	Challenging to brainstorm virtually.	Feeling of frustration, misunderstandings, loss of productivity, and innovation.
	Communication and information exchange is more challenging.	Information blockages, people feeling that they are left out, decrease in productivity.
	Difficulties in creating personal contact and feeling of availability.	Leader is not aware of the problems that employees are facing, employees burning out, quitting, etc., leader not supporting enough team members, team members' motivation declining.
Company culture	It takes extra effort to create a company culture that supports remote work.	Colleagues not trusting each other, those who are in the office not considering those who are not, information blockages, etc.
Learning	Difficulties in fostering innovation and knowledge transfer	Loss in productivity, less innovative and quality work results.
Relationships and team feeling	Takes more effort to build team feeling (building trust and rapport among team members).	Less helping behavior towards colleagues and from colleagues, motivation decreasing, and less knowledge exchange.
	Difficulties in acknowledging employees (birthdays, *problems*, small wins at work, etc.).	Loss of motivation.

A **competent** virtual team leader who can develop a culture that supports virtual teamwork can first ensure that there is general support from the top management and leadership team to work in such a way. In the next phase (s), the leader develops an open culture with the leadership team in which people have enough time for discussions and are invited to feel safe to speak their minds, ask for help, and share their mistakes. In this way, the leader and their colleagues will foster a learning culture that is not afraid of changes. The leader explains to all employees that it is okay to work from home to avoid mistrust. Also, the leader is responsible for developing an infrastructure (tools, connections, licenses) that support virtual

teamwork. They will lead the development of common agreements for communication and collaboration.

A successful virtual team leader first values work outputs more than the hours that people work or spend in the office. They understand the value that each position brings to the company. They agree, together with the employee, on the value and the main role that the employee is performing to ensure that things are understood in the same way. It is best if the leader asks the employee what the KPIs could be for their role and then, together with the employee, agrees on the goals that would be set for an upcoming period. When the KPIs and goals are agreed upon, the leader will organise regular meetings (one-tone and team meetings) in which the progress is analysed to determine whether the goals or KPIs should remain the same or change and whether the employee(s) require guidance or help in reaching the goals. The leader can introduce collaborative platforms to help generate a better and faster overview of how different team members are progressing with their tasks.

A leader who can develop effective communication and information exchange within their team first agrees with their team on how they are going to exchange information (what tools will be used, etc.). This leader supports that process by ensuring that there is a logical process of information exchange agreed upon and that the chosen tools fit the task. They then ensure that there is a proper infrastructure supporting information exchange, as agreed upon within the team.

The leader has general meeting facilitation skills (preparation, facilitation, finalisation) and storytelling skills for engaging people during virtual calls. They are a good communicator who can argue as well as listen to the team members carefully. They show genuine interest in team members and their ideas. They make sure that the team will have enough opportunities for discussion and socialising. They consciously build coffee moments by setting up separate calls with no agenda or at the beginning of regular calls.

A leader who can develop a team feeling in virtual teams makes sure that the team has at least one meeting where they can meet each other face to face (preferably at the beginning of the collaboration). If the team has been working together for a longer time, then the team leader ensures that the team will find a good balance between virtual and physical meetings. It is important to set up regular one-to-one meetings (physically or with video) to learn how team members are doing. See **Figure 28** below for a full overview of virtual team leadership-related values, attitudes, skills, and knowledge.

VALUES diversity, non-hierarchical leadership styles, benevolence, empathy, employee development, employee autonomy, universalism, diversity, people

LIKES to try new ways of managing virtual teams, try new **technological tools** in virtual collaboration, **give and receive constructive feedback, inspire and empower team members,** learn and **think about ethical and sustainability-related issues.**

DEVELOPING VIRTUAL AND ETHICAL COMPANY CULTURE

Knows about psychological safety and how to create it; global, local, and intraorganisation business ethics and standards; sustainability-related issues, ethical reasoning; reflective judgment; change management.

SELECTING MEMBERS AND FACILITATING LEARNING

Can apply human psychology and personality type indicators (Big 5, Disc, Belbin, etc.) to selection processes; give employees motivating tasks. **Knows** virtual teamwork-related competencies and future competencies;

VIRTUAL PROJECT AND PROCESS MANAGEMENT

Can apply a synergetic leadership style (e.g., combine explicit managerial activities with non-hierarchical leadership styles); apply project management skills; form meaningful relationships with employees; facilitate virtual meetings (prepare, engage and finish with clear task division); monitor team, and individual progress; create a common understanding about team progress. **Knows** best practices of virtual team leadership;

COMMUNICATION AND INFORMATION EXCHANGE

Can develop team agreements; select right communication tools; develop an effective communication strategy; facilitate a high level of consistent communication; use coaching and mentoring tools; analyse behavioral cues to understand how team members are doing; engage individuals using ICT; use story-telling skills. **Knows** different interactive check-in and warm-up activities to increase engagement during virtual meetings.

TEAM BUILDING

Knows theory about forming processes and team dynamics; best practices of virtual team leadership; **Can** select right ICT tools for mitigating conflicts; embrace (explicitly) skills and knowledge that everyone brings to the team.

Figure 28. Values, attitudes, skills, and knowledge regarding leadership in virtual teamwork

3. ORGANISATIONAL SUPPORT MECHANISMS

The organisational support mechanisms that aid individual adaption, comeptence operationalisation, and development, can be divided into seven categories (see **Figure 29** below): 1) **basic physical needs**; 2) **organisational and team culture**; 3) **communication**, 4) **leadership**, 5) **training**, 6) **working culture,** and 7) **job design**. The following subchapter will open up the main actvities to pay attention to in each category.

Figure 29. mechanisms to support virtual team members' competence actualisation.

1) **Basic physical needs**: Job security and competitive salary.
2) **Organizational and team culture:** Non-hierarchical and cooperative culture that values open communication, learning, teamwork, and diversity; psychological safety; trust (managers trusting employees and vice a versa); relationship building (team building events, face-to-face meetings). Team cohesion and team feeling; support between team members; mutual understanding between team members; empathy, tolerance and affective

trust between team members; healthy social bonds, occasional face-to-face meetings to develop and maintain social bonds.

3) **Communication:** More time for discussions and feedback; attentive and considerate communication style; effective communication forms and tools (ICT, double-loop communication style, etc).

4) **Leadership:** Having frequent 1-1 meetings; learning to know the team members; outputs-based leadership style; establishing clarity on roles, goals, and objectives (individual and team level); transformational leadership style, shared leadership; providing feedback; effective and clear communication; strong relationships with team members; being available for the team members.

5) **Working Culture:** Frequent feedback loops (e.g., applying retrospect); accountability as a working culture (always deliver what was promised and hold others accountable for their promises), common agreements on how to collaborate and communicate (e.g., always use video, attach virtual meetings links to meeting invitations, etc.).

6) **Training (examples of possible training):** How to deal with diversity and different cultures; how to overcome challenges in virtual teams; how to use communication technologies; how to communicate effectively in the virtual environment; how to establish trust and solve conflicts; the importance of rest time; different communication strategies (like storytelling), foreign languages.

7) **Job design:** Tasks that are not too easy nor too complex; meaningful work.

4. THE PHASES OF ADAPTING TO VIRTUAL TEAMWORK

The current study revealed three distinctive phases (see **Figure 30** below), that most virtual team members go through depending on their familiarity with virtual teamworking. These phases were called **adjusting**, **developing,** and **maturing**. There are typical questions that individuals in these phases ask from themselves (and others) depending on the issue they are dealing with. The following sub-chapter describes these questions related to each phase.

Figure 30. Illustration of the phases that virtual team members go through.

4.1. ADJUSTING

The current study revealed that the first phase – **adjusting** – involves a lot of unlearning from novice virtual team members. In this phase, those that have come from more traditional organisations (where work time was controlled) find it hard to adjust to the flexibility offered and used by their colleagues. In this phase, they might be doing some "silly" things – like touching their mouse from time to time to let others know that they are active. Although, after a while, they understand that nobody is watching them.

These people who come from more traditional organisations might also find it hard to accept that their colleagues prefer to be somewhere else than the office. They might get a feeling that they are the only ones working and others have time off. Although after a while, they realise that the work is measured based on outputs and the worktime and location are not important measurements of work effort.

In the adjusting phase, individuals need mostly moral support from their leader and colleagues. From time to time, it is good when somebody reassures that everything is fine and explains (perhaps several times) the company culture and its working style. When individuals have basic IT skills, they usually do not need any training – it is enough when someone shows how to use everyday communication

tools, how to book virtual meetings, etc. Supportive leaders and helpful colleagues are the most critical success factors in this phase – helping to reduce many stress factors of less experienced virtual team members. **Table 36** below summarises the main questions individuals ask in the adjusting phase.

Table 36. typical questions asked by the virtual team members in the adjusting phase.

Issues	Typical questions
Me and my work	
Flexibility, mobility	Is it okay to work outside the regular office time and from other locations? How to make sure my team members do not forget me? Feeling bad about not working overnight or on weekends when others do. How to cope with prejudice and opposition from colleagues?
Location and tools	Do I have access to the necessary environment and work tools from other places besides the office?
Discipline, productivity	How to make sure I really start working when I am not in the office?
Me and my colleagues	
Trust	How can I trust my colleagues' work when I do not see them? How to make sure my team lead knows I am working hard?
Relationships and social ties	How do I maintain a healthy balance between working in isolation and with others?
Virtual meetings	How do I overcome the *"awkward"* feeling while communicating via virtual communication tools (e.g., when using the video during conference calls)?
Written communication via ICT	Do I understand the messages in an intended way?
Information management	How to make sure I find all the necessary information?
Choosing communication channels	Which channels do I prefer for contacting others?
Me and technology	
Software and applications	How do I use the technological advances I`m supposed to use in my team?

4.2. DEVELOPING

The second phase – **developing** – involves learning new "tricks" and "hacks" for being more productive. In this phase, individuals learn a lot about themselves (their working and communication styles and habits). Most of the emphasis in this phase goes to self-improvement – own communication skills, technological skills, time-management skills, etc. Thus, external trainings help to accelerate learning. Also, it is important that individuals are encouraged to try out new ways of doing things – thus colleagues and managerial support is still very important. The company culture

that supports learning is one of the key aspects of the developing phase. Without this type of culture, there is a risk that the trainings – no matter how good they are – will not materialise into actions. **Table 37** below summarises the main questions indiviudals may ask in the developing phase.

Table 37. typical questions asked by the virtual team members in the developing phase.

Issues	Typical questions
Me and my work	
Flexibility, mobility	How to increase efficiency, e.g., how to manage my time better? How to sync my working cycles with the rest of the team?
Location and tools	How do I ensure better task-technology fit?
Discipline, productivity	How to stay motivated about my work while working alone?
Me and my colleagues	
Trust	How can I better get to know my team members and how they are doing?
Relationships and social ties	How to build relationships with colleagues in the virtual environment? E.g., how to be more connected?
Virtual meetings	How do I make sure I engage my team members in what I have to say and deliver the most important message to them?
Written communication via ICT	How do I ensure my team members receive my messages in an intended way?
Information management	How to make sure my colleagues receive and orientate between all the information I am sending out?
Choosing communication channels	Which channels do my colleagues prefer for contacting?
Me and technology	
Software and applications	How to make technological advances work for my team and me?

4.3. MATURING

The final phase – **maturing** - involves a lot of refining and defining what the individual has learned. In this phase, the individuals make selections between what they have learned so far. Individuals use the unlearning function to eliminate some behaviors and patterns that are not beneficial or have not brought the expected results. Self-reflection brings out knowledge gaps that still need improvement – usually related to deeper questions – like how can I bring more value to my work or make more conscious choices of time? Also, regarding technology, individuals learn more advanced options to leverage the technology even better to their and their team's advantage.

In the maturing phase, the focus shifts more from self to others. Here individuals might find themselves thinking of how to support their colleagues better. In this phase, certain training with the opportunity to discuss with other more mature colleagues (or mentors/coaches) will help accelerate learning. **Table 38** below summarises the main questions individuals may ask in the maturing phase.

Table 38. typical questions asked by the virtual team members in the maturing phase.

Issues	Typical questions
Me and my work	
Flexibility, mobility	When am I most productive?
	How to make the most out of my time – e.g., "have more life in a day"?
Location and tools	How is the environment affecting my work, mental health, etc.?
Discipline, productivity	How to make smart decisions between different options (meetings, tasks, training opportunities)?
Me and my colleagues	
Trust	How can I contribute to the process of increasing trust within the team?
Relationships and social ties	How to manage my connections and connecting time in a smart way?
Virtual meetings	How can I support others in feeling better in communicating in the virtual environment?
Written communication via ICT	How can I be even more precise and concise in my communication?
Information management	Are there any better ways of sharing or managing information?
Choosing communication channels	Are there any new channels that could improve the communication in our team?
Me and technology	
Software and Applications	How to support others in using the technologies in our team?

The data also revealed that some questions are overarching and go through all phases almost unchangeable. Those questions are related, for example, to finding a **healthy balance between work and personal life**, **dealing with diversity**, and **what to do when technology fails**? It can be assumed that these questions are so much impacted by external factors and less under personal control that there is a continuous search for balance to cope with these aspects.

Also, the data refers to the continuity of learning, and it can be assumed that the learning cycle will never end due to the technologies changing fast. Thus, if an individual in the mature phase is confronted with some new technology, the learning cycle will start again from adjusting to developing to maturing, with new questions to answer.

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