Developing Delphi methodology for studying future market change

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Abstract

Purpose – The purpose of this paper is to develop Delphi methodology toward a holistic method for forecasting market change. Delphi methodology experienced its culmination in marketing research during the 1970s–1980s, but still has much to offer to both marketing scholars and practitioners in contexts where future market changes are associated with ambiguity and uncertainty.

Design/methodology/approach – This study revives the Delphi methodology by exemplifying how a recently developed framework on market change can be combined with the Delphi technique for data collection to support forecasting activities and research. The authors demonstrate the benefits of the improved methodology in an empirical study on the impact of the fifth generation of wireless communications technologies (5G) on the Finnish media market.

Findings – The developed methodological approach aids marketing scholars in categorizing and analyzing the data collected for capturing market change; and better guiding experts/respondents to provide holistic projections of future market change. The authors show that using a predefined theoretical framework in combination with the Delphi method for data collection and analysis is beneficial for studying future market change.

Originality/value – This paper develops Delphi methodology and contributes with a novel methodological approach to assessing market change.

Keywords Delphi, Market change, Research method, 5G, Media industry

Paper type Research paper

1. Introduction

Firms constantly respond to market change and aim at creating and identifying business opportunities (Alvarez and Barney, 2007), as entrepreneurs script markets alone (Storbacka and Nenonen, 2011a) or through a collective (Baker and Nenonen, 2020). The role of emerging technologies is vital in such endeavors (cf. Gruber *et al.*, 2008) by driving the development of new business models (Leminen *et al.*, 2020) and shaping consumers and societies (Lowe *et al.*, 2019). Researchers have reported on the impact of these changes, such as managing organizational change (cf. Pan *et al.*, 2008). However, less is known about the changes caused to the market level, i.e. changes to the institutional arrangements framing commercial exchanges when something triggers radical changes in a market. This is alarming, as organizational performance may be negatively affected when organizations do not keep up with environmental change (Audia *et al.*, 2000).

One of the challenges in the context of identifying, forecasting and evaluating the impact of market change relates to methodology and methodological rigor. Research on market change rarely demonstrates forecasting and futures studies. In fact, forecasting, prediction and futures studies within the

business marketing discipline are limited. Mora Cortez and Johnston (2017) and Palo and Tähtinen (2011) have successfully demonstrated how to conduct futures studies in business marketing, but only recently have researchers initiated a discussion on how to study possible and probable futures of markets (Hyman and Kostyk, 2019; Anderson *et al.*, 2019). Concurrently, we have witnessed a shift toward a perception of markets-as-systems (Mele *et al.*, 2015; Vargo *et al.*, 2015). This view helps business marketing scholars to take a step beyond the neoclassical view of static and deterministic conceptualization of markets and understand them more dynamically and holistically.

In addition to a limited number of futures studies on business marketing, scholars have not used frameworks to study market changes, nor used expert narratives to a great extent to illuminate future projections. In general, there has been little interest in exploiting the expertise of practitioners to discover

and apprehend market changes beyond assessments of likelihood and desirability of predefined projections. Thus, research on forecasting requires more comprehensive perspectives on how to capture market change.

A common futures research data collection tool for pooling expert opinions is the Delphi technique. However, the Delphi technique seems to have lost its position as a prominent data collection tool within the marketing discipline–only a few studies aiming at advancing marketing theory or contributing to business marketing practitioners have been published since the 1970s. Even then, Delphi studies predominantly dealt with marketing decision-making (Jolson and Rossow, 1971). Delphi studies are commonly based on literature reviews or background descriptions of the studied context, that in turn are used to develop projections or inform data collection. Another strategy to provide input to the data collection empirically is through interviews, focus groups or panels (Engels and Powell Kennedy, 2007). However, if proper frameworks are not used, studies can result in covering only parts of future market change without providing a holistic view of changes in market systems.

We propose a novel approach to using Delphi methodology that builds on selecting an established theoretical or conceptual framework, at the initial stage of the research process, to incorporate in the data collection and analysis. As noted by Lindgreen *et al.* (2021), frameworks are crucial for advancing academic and practical knowledge and for integrating existing knowledge. Our methodological approach thus contributes to scholars studying future market change by demonstrating how to design a rigorous research process that enables theory advancement.

The purpose of this paper is to introduce a holistic method for studying market change and to demonstrate and discuss the application of the proposed method. By a holistic method, we refer to a methodological approach that anchors the Delphi technique in a verified theoretical framework to discover future market change. The methodological approach aims at aiding marketing scholars in conducting forecasting and futures studies in various research settings, by relying on a set of principles, namely, the Delphi technique that draws on industry expertise; and the integration of a theoretical framework in the data collection stage. We demonstrate the suggested method by identifying various potential changes in the market according to the market change index developed by Nenonen *et al.* (2019a). Hence, we use and test the method by studying the perceptions of the anticipated impact of 5G technology on the Finnish media market.

The proposed method allows for forecasting the importance, likelihood and trigger dependence of these changes, which are novel approaches to literature on market change. We thus extend previously used research methods and contribute with a novel perspective on the market change literature, by detailing how to assess the projections of market changes. We identify key points in research design and discuss what this requires from a researcher and supporting activities.

The paper is structured as follows. First, we review the literature on market change and present futures forecasting using the Delphi technique (Section 2). We discuss Nenonen *et al.*'s (2019a) market change index as a valuable addition to the Delphi method (Section 3). Second, we detail the context and the data collection procedures of the empirical study (Section 4). Third, we elaborate on the empirical findings

(Section 5) and conclude by discussing methodological contributions to market change forecasting, future research avenues and limitations of the study (Section 6).

2. Capturing market change

Möller *et al.* (2020) suggested that business marketing research should shift from managing dyadic business relationships to orchestrating networks, ecosystems, fields and market systems. The main argument is that viewed through dyadic relationships, business marketing scholars have a narrow and relatively static view of the market. Instead, scholars are encouraged to build on a holistic market conceptualization (Mele *et al.*, 2015), which views markets as socio-technical systems (Vargo and Lusch, 2011; Vargo *et al.*, 2015). Hence, markets are not restricted to buyer–seller dyads or a set of customers, value chains or industries, but larger systems co-created by market actors through their engagement in market practices (Storbacka and Nenonen, 2011b). There are no objective boundaries in markets as systems, as they are socially constructed (Callon, 1998). Also, markets cannot be regarded as pre-determined structures in which actors compete for fixed positions (Araujo *et al.*, 2008); market actors can, and do, change the way markets are configured (Nenonen *et al.*, 2020).

Market change, furthermore, is increasingly incorporated in literature on consumer research (Martin and Schouten, 2014) and strategic management (Lee *et al.*, 2018). While alternative terminology is used in different fields, there is a common basis in studies on market-driving strategies as well as proactive market and customer orientation (Blocker *et al.*, 2011; Jaworski *et al.*, 2000), constructing markets (Mair *et al.*, 2012; Santos and Eisenhardt, 2009), institutional work and institutional entrepreneurship (Battilana *et al.*, 2009; Lawrence *et al.*, 2011) and, more recently, market shaping (Diaz Ruiz *et al.*, 2020; Fehrer *et al.*, 2020; Windahl *et al.*, 2020). Market shaping literature perceives that markets are not merely about production and consumption but wider systems that enable and govern actions supporting value co-creation (Nenonen *et al.*, 2019a). Hence, the focus shifts from a single company's resources to the recognition and mobilization of a system of organizations and individuals. This provides novel insight compared to, for instance, strategic management and radical innovation literature (Chang and Sokol, 2020; McDermott and Colarelli O'Connor, 2002); these typically focus on the new product developed by a company in explaining market-driving strategies and the subsequent changes in consumer and competitor behavior. Instead, market shaping literature recognizes that any idea that transforms (or stabilizes) the system can initiate market-shaping processes. Moreover, the *locus* of interest expands from consumer and competitor behavior to wider institutional arrangements. The examples vary from the emergence of a circus (Baker *et al.*, 2019) to cryptocurrency markets (Breidbach and Tana, 2021).

Market change is studied through a variety of concepts or lenses, for example, market driving (Jaworski *et al.*, 2000; Humphreys and Carpenter, 2018), market visioning (Reid and De Brentani, 2010), market innovation (Kjellberg *et al.*, 2015), market shaping (Lawrence and Suddaby, 2006; Baker and Nenonen, 2020), market scripting (Storbacka and Nenonen, 2011a) and market creation (Nenonen *et al.*, 2020) (see Table 1). In this paper, we follow the definition of market change suggested

Table 1 Overview of concepts of market change

Concept	Definition	Authors
Market driving	"Influencing the structure of the market and/or behavior of market players in a direction that enhances the competitive position of the firm"	Jaworski *et al.* (2000, p. 53)
Market shaping	The interdependent process of institutionalized practices, beliefs and expectations, and the intentional activities of market actors at any institutional level	Lawrence and Suddaby (2006)
Market visioning	". . . a clear and specific mental model/image that organizational members have of a desired and important product-market for a new advanced technology . . ."	Reid and De Brentani (2010, p. 500)
Market scripting	"Conscious activities conducted by a market actor in order to alter the current market configuration"	Storbacka and Nenonen (2011a, p. 251)
Market creation	". . . new market creation is the result of managing a set of events and activities that appear linear, but are not. They include (1) generating application possibilities for the technology and choosing which to pursue, (2) discover-ing the business model, (3) stimulating the value chain, (4) priming the market, (5) initial market entry, and (6) managing market evolution"	Colarelli O'Connor and Rice (2013, p. 224)
Market innovation	". . . the emergence and institutionalization of new solutions (i.e., the temporal durability of new integrative, normative and representational practices)"	Vargo *et al.* (2015, p. 70)
Market change	". . . occurs through an interplay of institutional arrangements and market practices (e.g. a macro-social-collective or a micro-stilts-walker) by both formal actors (e.g. policy makers) and informal actors (e.g. street performers)"	Baker *et al.* (2019, p. 317)

by Baker *et al.* (2019), which highlights both the markets-as-systems-view and a broad range of actors involved in inducing change: *market change takes place in an iterative process between institutional arrangements and market practices, by both formal and informal actors.*

2.1 Market change index

There are still questions about what changes in the markets when market actors drive and transform markets. Nenonen *et al.* (2019a), however, identified such elements of market change as the following: products and price; customers and use; channels; supply-side network; representations; and norms (see Table 2). These elements were tested through formative indicators and validated as a composite index, measuring market change. The market change index postulates that markets undergo transformation through changes in the proposed elements. Nevertheless, not all elements or categories require change for market change to occur. Nenonen *et al.* (2019a) highlight that markets develop unexpectedly, which adds pressure for firms to identify, benefit from and curate emergent development. Firms (or managers) should then envision the future and focus on experimentation and learning based on how the market responds to activities undertaken by the firm. Perceiving markets as systems allows for removing objective market boundaries and focuses foremost on the subjective perspectives of focal actors (organization or individual).

2.2 Forecasting market change

Forecasting methods reduce uncertainty among companies (cf. Colarelli O'Connor and Veryzer, 2001). However, the focus often lies in forecasting the long-term potential for a market in terms of size and importance (Reid and De Brentani, 2010), rather than on anticipating potential changes to the markets that call for reactions or proactivity. Notably, any firm undertaking forecasting does so in a specific setting or context (Waluszewski *et al.*, 2014), not only related to the business area or market in which the firm is formally active. In other words,

the studied events and triggers may induce new markets or changes in existing markets.

Research on forecasting market change has only recently been published (cf. Kaartemo and Nyström, 2021). A literature survey in Web of Science (timespan: 2000–2020), based on the concepts listed in Table 1, shows that studies on forecasting and prediction of market change are scarce [1]. The identified articles cover a range of industries, such as health, transport and tourism. Market change is approached indirectly in all identified articles; in fact, contributions are directed to practical and contextual levels rather than to advancing market change theoretically. The literature survey indicates that it is not conventional to use a verified theoretical framework in structuring data collection and analysis when studying future market change. Conversely, background descriptions and literature reviews precede and inform data collection in the identified articles. Gnatzy and Moser (2012) and Jiang *et al.* (2017) are exceptions: they use the PESTE-framework (political, economic, socio-cultural, technological, environmental factors) as a basis for identifying scenarios. The literature survey thus echoes a common critic in foresight and futures studies, namely, the lack of a coherent theoretical basis (Öner, 2010) (Table 3).

Regarding using industry experts' perspectives, Sommarberg and Mäkinen (2018) provide pioneering work in the context of anticipating the disruptive nature of emerging technologies. The authors propose capturing managers' perceptions of potential changes based on a survey method, including visual presentations of results for detecting those views. The authors were able to show, for instance, that firms transform their industry through services and highlight the importance of learning and experimentation in such efforts. We consider Sommarberg and Mäkinen's (2018) work as an important effort to develop an effective method for capturing industry experts' views on the future changes in a market. However, while the authors collected data efficiently (with a seminar-based sampling) and widely (from different parts of the value chain), there is room for development from a methodological perspective. As a response, we argue that three critical aspects

Table 2 Formative indicators of market change

Element of change	Indicators
Products and price	The products and/or services offered in our industry have radically changed (i.e. ours and/or our competitors')
	The way products/services are combined into offerings has changed (i.e. the way offerings are bundled or configured)
	The pricing structure of products or services in our industry has changed (from pricing on an hourly basis to flat-rate pricing, from selling ownership to renting or leasing, etc.)
	The price levels of the products and/or services in our industry have changed considerably (e.g. from higher to lower–or vice versa, more variation in prices)
Customers and use	Customers have started to use existing products and/or services in different ways or for different purposes (than our industry originally intended)
	The kinds of customers who buy our industry's products and/or services have changed (i.e. the traditional customers have exited the market and/or new kinds of customers have entered the market)
	Within our industry, what customers are looking for in products and/or services has changed
	Within our industry, the options customers have regarding full-service versus self-service have changed (e.g. gone from more full-service to more self-service – or vice versa)
	Physical or technological infrastructures that enable customers to use our industry's products and/or services have changed (i.e. things our industry does not directly produce but that enable usage such as roads for cars and internet for online shops)
Channels	There are new or different channels that our industry uses to find and/or service customers
	Customers are using new or different channels to find and/or contact potential service providers in our industry
Supply-side network	The number of competitors operating in our industry has changed (i.e. there are fewer or more than five years ago)
	The ways in which competitors in our industry interact and cooperate have changed
	There has been significant changes in the number of suppliers and/or partners that we and/or our competitors work with (there are fewer or more than five years ago)
	We and/or our competitors have started to work with new kinds of suppliers and/or partners
	There have been changes in how we and/or our competitors outsource work to suppliers and/or partners (i.e. outsourcing occurs to a greater or lesser extent than five years ago)
Representations	The terminology commonly used in our industry has changed
	The language and/or descriptions that media use to report on our industry has changed
	The categories used by official statistics and/or research agencies to report on our industry and/or its products/services have changed (new categories have been created, old categories have been renamed, etc.)
	The key events and/or awards (trade fairs, exhibitions, competitions, prizes, etc.) related to our industry have changed their focus
	The industry associations (sometimes known as trade associations) we are connected to have changed their focus (the types of businesses they represent, the themes they promote, etc.)
Norms	There have been changes in our industry's standards (technical standards, specifications, voluntary codes of conduct, etc.)
	There have been changes to the government regulations (regional, national or international) relevant to our industry
	In our industry, the types of products, services or activities perceived as generally acceptable have changed (e.g. environmental values have become more important)

Source: Nenonen *et al.* (2019a, p. 255)

need to be addressed to understand how markets change, namely, which elements of change to study; how important and likely the change is; and whether the change can, in effect, be linked to the trigger, such as emerging technology. We use selected articles from the literature survey to demonstrate the issue at hand.

2.2.1 Which elements will change?
Sommarberg and Mäkinen's (2018) simplified survey method focuses on the impact of digitalization on a set of objects. The studied objects are future products, future services, future operations and future business models. The challenge with the study is the limited view on market change when portrayed through four main objects. This dilemma mirrors current foresight research: too narrow a categorization may open up the can of worms with various interpretations of, for instance, what business models are.

Conversely, the market change index (Nenonen *et al.*, 2019a) categorizes elements of change (Table 1), which allows

researchers to design the data collection process according to a verified framework. Even though researchers are innovative in merging and combining different data collection methods, there is a challenge to capture market change in specific contexts, and in some cases, to guarantee the generalizability of the results. To that end, the market change index allows for a basis to design research purposefully, structure data collection and analysis and potentially reach generalizable results across industries and markets.

2.2.2 How important and likely is the change?
The study by Sommarberg and Mäkinen (2018) showcases another challenge in mapping market change, namely, a causal connection. The authors were able to show that a technology has a critical influence on market change, but the discussion on the impact of that technology in driving market changes is lacking. As all change triggers might not impact the market to a large extent, the perceived importance of suggested market changes should be brought to the fore in foresight studies.

Table 3 Summary of the Web of Science literature survey on predicting and forecasting market change (2000–2020)

Theoretical concept	No. of articles covering the theoretical concept and forecasting and prediction	No. of articles covering the theoretical concept and the Delphi methodology	No. of relevant articles on future market change	Author(s) and year of publication	Contribution	Framework used in the research	Probability, significance, dependence measured
Market driving	45	20	2	Griffith et al. (2008)	Research agenda		
				Giunipero et al. (2012)	List of barriers/drivers		
Market shaping	16	7	0				
Market visioning	2	7	4	Czaplicka-Kolarz et al. (2009)	Scenarios		Probability
				Vivanco-Aranda et al. (2011)	Scenarios		
				Horng et al. (2018)	Theoretical framework		
				Rane et al. (2019)	List of barriers		
Market scripting	0	0	0				
Market creation	5	8	2	Lowe et al. (2016)	Verification of theories		
				Pohlmann and Kaartemo (2017)	Trajectories		
Market innovation	64	37	11	Scott (2000)	List of issues	PESTE	
				Gnatzy and Moser (2012)	Scenarios		
				Tseng et al. (2012)	Scenarios		
				von der Gracht and Stillings (2013)	Scenarios/business models		
				Keller and von der Gracht (2014)			
				Prokesh et al. (2015)	List of drivers/barriers		
				Mora Cortez and Johnston (2017)	Macroeconomic indicators		
				Mullan et al. (2017)	Research questions		
				Postma et al. (2007)	List of drivers		
				Höhne and Tiberius (2020)	Scenarios		
				Vural et al. (2020)	Scenarios		
					List of barriers		
Market change	148	29	3	Hameri and Hintsa (2009)	List of drivers		
				Tuominen and Ascencao (2016)	Scenarios		
				Huan-Niemi et al. (2017)	Scenarios		

Furthermore, Sommarberg and Mäkinen (2018) emphasize the importance of market change (from continuous improvement to disruption) and the impact of pre-selected elements of digitalization. However, the method does not aim at capturing or allowing for the analysis of the likelihood of changes. This question was tackled by Jiang *et al.* (2017), who projected the firm and social impact of three-dimensional (3D) printing in a Delphi study including experts from both industry and academia. They were able to assess changes that were both impactful and probable. However, as their research focused on the impact of additive manufacturing on firms and society and the results were reflected against the PEST (political, economic, social and technological) structure, their discussion on market change remained somewhat limited. Hence, we argue that there is room for methodological development to understand the market changes and to assess how significant and likely the changes are.

2.2.3 Dependence on the change trigger
Evolutionary economics states that the introduction and diffusion of new rules in economic systems induces market change (Brennan, 2006). When mapping market change, one of the most vital questions relate to the assessment of the change trigger dependence: Would the anticipated and projected changes occur regardless of the event, or are they, in fact, a consequence of an event or a trigger, such as an emerging technology? For instance, studies on emerging technologies tend to neglect the assessment of whether market changes occur, in fact, due to the emerging technology. Therefore, we build on Jiang *et al.*'s (2017) methodology for forecasting the impact of the change trigger by adding the element of change trigger dependence, i.e. the importance of the trigger to drive the anticipated change.

2.3 Delphi method for studying future market change
The Delphi technique is a valuable method in academic research (Linstone and Turoff, 2011), showcasing a variety of options for how to use the method (Paré *et al.*, 2013). Despite this, some scholars argue that Delphi fails to provide solutions to the researched problem (Bonaccorsi *et al.*, 2020). The question becomes whether it is useful to know about future scenarios and projections and how to turn that knowledge into explanations about the observed phenomenon. Skulmoski *et al.* (2007) argue that there is insufficient methodological guidance on how to conduct Delphi studies. While there is value in identifying scenarios, agendas and future projections, there is also a need to link the outcomes of Delphi studies stronger to the process of advancing theory (Öner, 2010) in research contexts. Piirainen and Gonzalez (2015) note that foresight methods, such as Delphi, should develop a theory of why foresight has the observed or expected impact: why is the system of interest in its observed state, which drivers have caused the state and which are plausible future states. Foresight, and the Delphi method, is thus a knowledge creating activity, rooted in "context-dependent theories of the future" (Piirainen and Gonzalez, 2015, p. 192). Next, we explicate the Delphi process further.

The Delphi method facilitates structured communication between selected experts, allowing them to present ideas, responses and evaluations to the surfacing perceptions of the group (Dalkey and Helmer, 1963). Characteristic of the Delphi method, the conjectural views of an expert group allow for both

a critical examination of current paradigms and norms and exploration of future issues. The first step in the Delphi process involves expert selection following a set of primary features, namely, anonymity, controlled feedback and group response (Jolson and Rossow, 1971). Anonymity reduces the risk of dominant individuals and collision of opposing views, thus separating opinions and suggestions from the personae. Consequently, it provides room for novel thought without being limited by social expectations. Focus is ensured using controlled feedback through a series of data collection rounds and notifying the panelists of the opinions of their anonymous colleagues from previous rounds. These feedback loops enable the experts to revise their initial assumptions and participate responsively in forming a group consensus (Dalkey and Helmer, 1963). Group response relates to taking the opinion of every member of the expert panel into account. However, the outcome or results of Delphi studies generally consist of "elements of shared and non-shared reality, i.e., elements of consensus and divergence" (Engels and Powell Kennedy, 2007, p. 435). This means that the participants in a Delphi study construct reality and knowledge in a context. Therefore, knowledge of the context, how the context has evolved and boundary conditions are prerequisites in the creation of realistic futures (Piirainen and Gonzalez, 2015), which should be noted when choosing participants.

The first round of the Delphi process may be structured with statements presented to experts for assessment. In such cases, experts have no opportunity to highlight issues they believe to be of interest (Rowe and Wright, 1999). However, an unstructured first round allows for the experts' free identification and elaboration on issues they identify as important and relevant. Van Dijk (1990) suggests the use of individual interviews, focus group interviews or open-ended questions. The thoughts are then summarized into a single set or questionnaire for further rounds in the Delphi process (three to four). The Delphi iterative process generally produces statistical summaries, which are presented to the panelists and potentially revised: medians, likelihood ratios, means, frequency distributions, *et cetera.* (Dalkey and Helmer, 1963; Jolson and Rossow, 1971; Rowe and Wright, 1999). However, there is a risk of valuable qualitative data being lost or left uncollected in favor of estimates and assessments. Therefore, while the estimates offer information for decision-making, we highlight the use of panelist narratives for advancing theory, especially when the rounds contain elements in which panelists can freely express their thoughts. Of note, participants can also be asked to provide written notes or rationale that support their estimates and judgements (Meijering and Tobi, 2016), especially in computer-aided real-time Delphi studies (Aengenheyster *et al.*, 2017).

3. Holistic method for capturing market change

Qualitative data is essential for providing explanations to the assessments of the projections. This may require combining the Delphi method with other methods or theoretical frameworks. The latter aids researchers foremost in data analysis, especially if the Delphi study commences with free associations by the experts. In our paper, we have noted that:
- markets are socio-technical systems, socially constructed and malleable;

- experts' and managers' views of the development is considered valuable in forecasting the impact of the change trigger; and
- the market change index by Nenonen *et al.* (2019a) offers a framework to structure data collection and analysis.

Furthermore, based on the shortcomings and delimitations of previous future studies (Jiang *et al.*, 2017; Sommarberg and Mäkinen, 2018), we argued for the inclusion of importance; likelihood; and trigger dependence as important characteristics to cover in the data collection and analysis phase. Figure 1 provides an overview of the proposed research process for capturing market change. We strongly highlight that forecasting takes place in a context (Waluszewski *et al.*, 2014) and that it is not merely representatives of a specific market area that can provide perspectives on market change, but also representatives of those who are experts in the change trigger matter, such as technology developers. For instance, Rowe and Wright (1999) note that the use of nonexperts (e.g. students) or professionals from an irrelevant domain distort the data. Thus, we propose using subpanels covering market actors that are both central and peripheral to the market. This is in line with the markets-as-systems view (Mele *et al.*, 2015; Vargo *et al.*, 2015). We also illustrate how the market change index may be used during the Delphi process and at which stage in the data collection the industry experts should assess the importance, likelihood and trigger dependence of the identified future market changes.

4. Data and methods

Our research design is based on a Delphi study incorporating Nenonen *et al.*'s (2019a) framework on market change. In our case, various market actors may have differing views on changes and how value is created (Sommarberg and Mäkinen, 2018), which increases the role of plurality in expert selection. Next, we detail the context, in which we place our empirical study, and the data collection and analysis processes.

4.1 Empirical research context: 5G technology in media sector

5G technology is expected to accelerate the development of the so-called hyperconnected society, in which an enormous number of devices are connected. 5G technology is thus presumed to encourage the development of innovative services,

per se enabling radical innovation, and increase revenue opportunities within numerous industry areas (Paglierani *et al.*, 2020). As 5G networks are currently being rolled out, one of the expected changes is the increase in media usage (Oughton *et al.*, 2018). More specifically, Gallagher *et al.* (2018) envision 5G technology impacting media content consumption through the emergence of enhanced mobile media (video, music and games), enhanced mobile advertising (videos, banners, in-game placement over 5G and other visual advertising formats that may appear in virtual reality [VR] and augmented reality [AR] environments), home broadband and television (TV) (5G is used as the primary home internet connection bundled with a TV package, also referred to as fixed wireless access), immersive media (AR, VR and cloud gaming) and new media (new applications that do not yet exist and that 5G will enable in the future, for example, self-driving car entertainment, 3D holographic displays, connected haptic suits in gaming). The expected media services translate into many new opportunities for firms, customers and users to create innovative content and new experiences.

5G technology is thus causing both uncertainty and ambiguity as new service concepts emerge, relying on fast and reliable wireless connectivity. Like other emerging technologies, it has potential to create new market opportunities while simultaneously damaging, destroying or transforming demand (Hill and Rothaermel, 2003). Hence, 5G technology corresponds with Rotolo *et al.*'s (2015) definition of emerging technology. The utilization of 5G technology is expected to change actor roles, business models and institutional arrangements in the media sector. The context of an emerging wireless communications system in the media industry is therefore fruitful to study, as there are high expectations and assumptions related to technical performance and functionality and value creation by faster and more reliable 5G wireless solutions.

4.2 Research design and process

Due to prior experience in the field, we had knowledge of the most active developers of 5G technology in Finland and access to the key contact persons in these organizations. We identified individuals who had been actively involved in developing 5G networks in Finland and listed them. In terms of the media market, we first gathered a list of the largest media companies in Finland. We chose to invite people in managerial positions and specialist roles associated with either technology or market

Figure 1 Process description for studying future market change through combining the Delphi technique and chosen theoretical framework
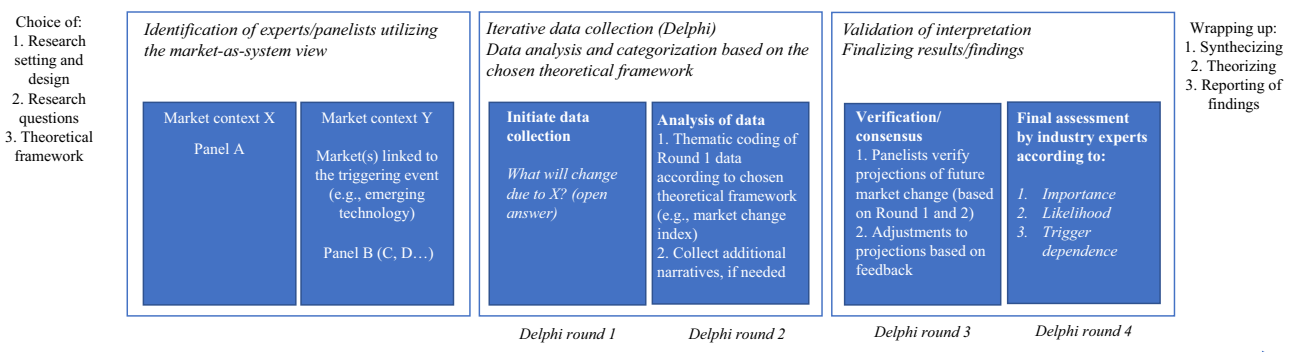
change or ideally both. To achieve a plurality of views, we also identified the most promising media and media technology startups based on industry overview articles in local business magazines published in 2018.

The number of participants is typically kept modest to reduce complexity; this is due to the purpose of the Delphi method not being to elucidate phenomena based on statistical variance. Okoli and Pawlowski (2004) suggest 10–18 experts in a group, whereas Loo (2002) recommends 15–30 experts for a heterogeneous group. An adequate number of respondents for a closely selected expert group is five to ten (Loo, 2002). Consequently, we established a goal to commit five to ten experts to both subpanels (5G networks and the media market). Regarding ensuring respondent/expert commitment, Nowack et al. (2011) recommend inviting on average 4.4 times more experts than what participates in Round 1 of a Delphi study. We invited 21 5G network experts and 25 media market experts to participate in the study by e-mail in June 2018. We considered that several invitees might decline or not respond to the invite, as we required them to participate in a long-lasting study.

This procedure culminated in a final panel including 18 anonymous experts (response rate 22%), namely, ten 5G network experts and eight media market experts (see Table 4). This was an appropriate panel size offering a sufficiently broad and diverse quality of responses and allowing for fluent management of categorizing and consolidating responses. Our panel covered male and female experts, while we noted an overrepresentation of men in the 5G network expert panel. This can be considered a limitation of the study and reflects the current situation of the Finnish telecom industry, where men outnumber women in managerial and senior specialist roles. The experts represented diverse organizations; only two experts represented the same organization. The panelists' organizational roles were managerial or senior specialists, such as CEO, CTO, CMO, head of research, country manager and development manager. In addition, considering that the average dropout rate of the first round is 18% (Nowack et al., 2011), we managed to maintain the active involvement of all experts throughout the entire process.

4.3 Data collection and analysis

The data collection and analysis procedure lasted over seven months (September 2018–March 2019) (see Figure 2). In line with recommendations by Day and Bobeva (2005), data was collected and analyzed promptly. To the best of our knowledge, there were no significant events or news in 5G technology or the media market, or significant changes to the experts' circumstances, knowledge or situational context, that would have influenced the empirical findings. Next, we elaborate further on the four Delphi rounds.

Table 4 Respondent information

Expert group	Male	Female	No. of different organizations
Media market experts	5	3	7
5G network experts	9	1	9
Total	14	4	16

In the first round (Round 1), we exposed the experts to a task: "Please, mention 5–10 things that 5G changes in the media market." Round 1 was thus designed to facilitate idea generation using an open-ended question as a source of input (Nowack et al., 2011). The experts were able to discuss both close changes and long-term developmental trajectories succeeding the introduction of 5G technology, as we did not delimit the task by any specific time scale. The experts were asked to mention five–ten things to encourage them to widely think about the potential changes. The Round 1 answers were coded according to their conformity to Nenonen et al.'s (2019b) framework on market change. We used NVivo to code each suggestion as *products and price*, *channels*, *customers and use*, *supply-side network*, *representations* and *norms*. In addition, the code "outcomes" was used for suggestions that described the outcomes of the market changes, for example, "more efficient production and distribution of media content," "market growth," "negative growth of the conventional media market to be expected," and "domestic commercial media suffers from increasing competition."

After coding the first-round responses, we noticed that two change categories, namely, *representations* and *norms*, received few answers. To complement the data, Round 2 then explicitly aimed at unraveling thoughts on the potential changes in representations and norms. To be comprehensible rather than theoretical, we asked for a clarification to a comment given by one of our expert panelists. In Round 2, the experts were subsequently given the following task: "[As a result of 5G technology] norms, language and rules need to be rethought. What could this mean in practice in the media market?" Correspondingly, we received more ideas from the panelists on potential changes that 5G technology could bring to representations and norms in the media market and added these ideas to the original list of suggested changes. When summarizing the list of changes for the third round, we excluded full and near duplications and combined similar themes (e.g. AR- and VR-based services) under broader topic areas. While consolidating the themes, both authors rechecked that nothing was missing from the list. In addition, to strengthen the trustworthiness of the coding scheme and the entire research process, one of the authors discussed the suggested market changes and the coding scheme with Professor Suvi Nenonen (the lead author of Nenonen et al., 2019a) face to face. The discussion resulted in eliminating the code *outcomes* from this study, as these changes were outcomes of the actual market changes rather than market changes following the introduction of the emerging technology *per se*. The aim of Round 3 thus became ensuring that all insights were covered in the list.

Therefore, in Round 3, a consolidated list of market changes was shared with the experts. As suggested by Nowack et al. (2011), we aimed for a controlled feedback mechanism and iteration procedure. The experts' task was thus formulated as follows:

> In case you have something to add/amend or comment, please make changes to the attached Word document or send comments by replying to this email. If you do not have any comments, simply reply to this email by sending us "OK."

The experts were offered an opportunity to participate in their panel's views of market change, which may arouse further

Figure 2 Data collection and analysis process
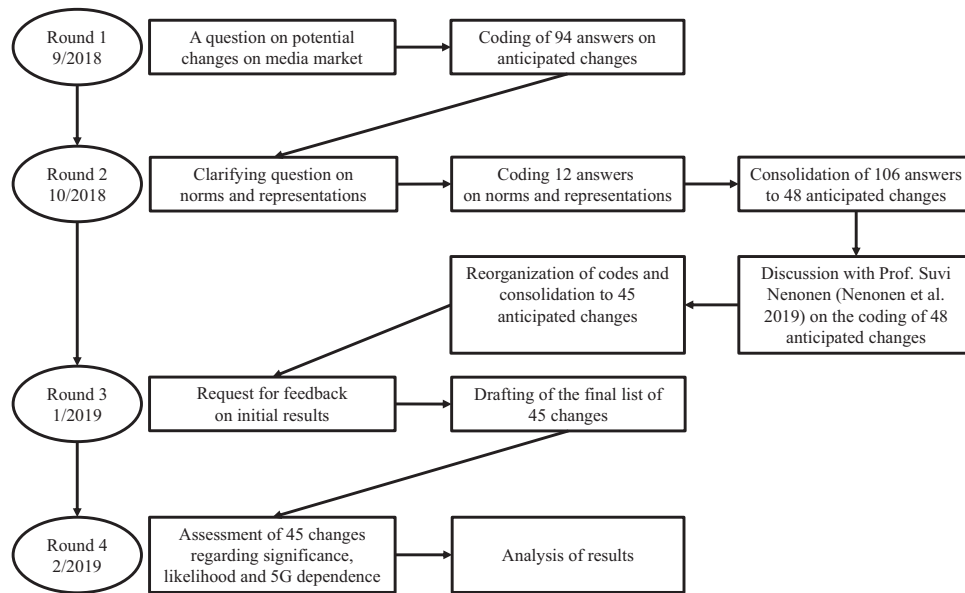
visions of change. Some minor comments facilitated us when outlining the final list of anticipated changes.

After reaching a consensus on the anticipated market changes, Round 4 was planned so that the respondents were able to assess the importance (estimated impact on the market), likelihood (estimated probability of change) and trigger (5G technology) dependence of the suggested changes. We used closed-ended questions in Round 4 for the consolidation function (Nowack *et al.*, 2011) to present the results as a statistical group response. The constructs of importance and likelihood are congruent to earlier studies, i.e. Jiang *et al.*'s (2017) concepts of impact and probability of occurrence. However, novel to our research, we added the reference to the trigger dependence of market change. In doing so, we were able to expose likely and impactful market changes, perceived to be driven by the change trigger (here: 5GG dependence).

5. Results

The outcomes of Rounds 1–3 of the Delphi study were 45 suggested market changes. They were generally perceived as important, likely and 5G-dependent: on a scale of 1–5 (5 being highest), the means were 3.62 for the importance, 3.80 for the likelihood and 3.18 for the 5G dependence of suggested market

changes. Furthermore, when analyzing the data, we found eight market changes that scored above average on all questions (importance, likelihood and 5G dependence) and can thus be considered the essential market changes when forecasting the impact of 5G technology on the media market. These eight changes were as follows:

1 wireless solutions are increasingly used in media production;
2 5G becomes a substitute technology for distributing TV and radio content;
3 more AR- and VR-based services;
4 increased quality of service;
5 easier and more flexible production and distribution;
6 mobile as a communication channel strengthens;
7 media consumption with mobile devices continues to increase; and
8 new video products and services.

The market changes are summarized in Table 5. In addition, excerpts from the respondents are listed in Appendix 2.

The identified eight market changes in the Finnish media market relate to four of the six market change categories, namely, *supply-side network*, *channels*, *products and price* and *customers and use* (see Table 5). Hence, the framework enabled

Table 5 Industry experts' view on the most important and likely 5G-dependent changes in the media market

Market change	Category of market change	Importance	Likelihood	5G dependence
Wireless solutions are increasingly used in media production	Supply-side network	3.94	4.59	3.76
5G becomes a substitute technology for distributing TV and radio content	Channels	3.94	3.89	4.28
More AR and VR-based services	Products and price	3.89	4.00	3.78
Increased quality of service	Products and price	3.83	4.00	4.00
Easier and more flexible production and distribution	Supply-side network	3.82	4.35	3.76
Mobile as a communication channel strengthens	Channels	3.72	4.50	3.89
Media consumption with mobile devices continues to increase	Customers and use	3.72	4.50	3.83
New video products and services	Products and price	3.65	4.11	3.44

us to study major changes in business and industrial markets business-to-business (B2B), while also reflecting changes in consumer markets business-to-consumer (B2C) that have an indirect effect on business markets. The experts thus project significant and likely changes driven by 5G technology in various categories of market change. However, none of the market changes related to *representations* and *norms* were ranked above average in all three questions (importance, likelihood and 5G dependence).

6. Discussion and conclusions

Extant literature on market change does not approach their contexts holistically from a methodological point of view. This is most likely due to the research design, which, for inducing and advancing theory on market change, should be clearly anchored in the studied context (context-dependency) and rooted in the markets-as-systems view to allow for accurate identification of experts/panelists. Our literature survey indicated that current forecasting studies on market change produce barriers, opportunities, drivers, research questions and themes and scenarios related to market change. Occasionally, studies on market change using Delphi methodology result in conceptual or operational frameworks (cf. Horng *et al.*, 2018). However, adopting a view on context-dependency and markets-as-systems allows for proper framing of the forecasting and futures research (cf. Bonaccorsi *et al.*, 2020). Context-dependency acknowledges that change occurs in a context, with specific characteristics and boundaries. The markets-as-systems view highlights the lack of objective boundaries of markets, their nature of being socially constructed through interaction and market practices, as well as the fact that market actors may, and do, reconfigure markets (Vargo *et al.*, 2015; Nenonen *et al.*, 2020). We suggest these as starting points for designing futures studies on market change. Next, we elaborate further on contributions to Delphi methodology and market change research, implications for research practice, as well as limitations of the study and future research opportunities.

6.1 Implications for Delphi methodology and market change

Our primary focus in this paper is on developing a holistic futures methodological approach for studying market change. We provide a novel approach for conducting futures research related to markets (Hyman and Kostyk, 2019). Only recently has the Delphi technique been reintroduced in marketing research (Garg and Kashav, 2021; Kaartemo and Nyström, 2021; Wagstaff *et al.*, 2021) and business marketing research (Mora Cortez and Johnston, 2017; Alonso-Garcia *et al.*, 2021). While several reviews of the Delphi methodology and research process have been conducted (Landeta, 2006; Rowe and Wright, 2011; Flostrand *et al.*, 2020), less attention is given to how to frame futures studies properly (cf. Bonaccorsi *et al.*, 2020) and how to promote rigor to achieve both theoretically and practically meaningful results. Most Delphi studies result in scenarios, projections or the identification of enablers, barriers and opportunities, which inform practice, policy and/or decision-making (Alder and Ziglio, 1996). Our method enables staying updated on the impact of various triggers on market change, allows for interpreting market actions more broadly and

anticipating customer needs. As revealed by our literature survey, Delphi studies, which have predicted and forecasted market change, have not in general used theoretical frameworks for understanding market changes, measured the significance of these changes or assessed the dependence of changes on triggers. We contribute to methodology and the practice of forecasting by exposing how the Delphi method, when appropriately combined with a theoretical framework, can be used to study market changes. We particularly illuminate how the use of Nenonen *et al.*'s (2019a) framework of market change provides insight on the market categories that will be most impactfully and likely altered following the introduction of the change trigger. The method can be used in studying changes in various B2B and B2C markets.

The benefits of incorporating this framework in the Delphi study are many. First, the use of market change categories allows researchers to guide the experts to provide more holistic projections of market change. Asked differently, experts might only respond to changes in product features or the number of competitors and thus neglect other important aspects of the market system. Thus, the selected framework has the potential to guide empirical research iteratively in both data collection and analysis. Experts may regard changes probable and significant, but without reference to a change trigger, the changes may not even occur. A method based on a holistic market change framework enables scholars and practitioners to focus on market changes, such as products and prices, customers and use, which are not covered in studies relying solely on the PEST framework (cf. Gnatzy and Moser, 2012; Jiang *et al.*, 2017).

Second, we reveal that there is room for methodological development to understand the role of a particular change trigger on the projected changes and how significant and likely the changes are. This is an important addition to futures research on market change. Our study reveals that some of the changes that individual experts suggested were perceived as 5G independent; i.e. the likelihood of the market change is not dependent on the introduction of the studied change trigger. As a result, we consider this a crucial question in studies on forecasting and market visioning.

Third, the proposed method can also be used in corporate foresight for "identifying, observing and interpreting factors that induce change, determining possible organization-specific implications, and triggering appropriate organizational responses" (Rohrbeck *et al.*, 2015, p. 2). Thus, our research responds to Rohrbeck *et al.*'s (2015) call to develop research methods for corporate foresight. While our study focuses on understanding the changes in the market with a limited view on operational or strategic responses, we show how the combination of the Delphi method with Nenonen *et al.*'s (2019a) market index framework and a market-as-system view (Mele *et al.*, 2015) can provide important insight in identifying changes that require proactive measures.

All in all, while Sommarberg and Mäkinen (2018) criticize that Delphi studies require a lot of effort, time and resources, we highlight that our method has benefits that outweigh the extra time required from the industry experts to partake in data collection. In addition, we also highlight the opportunities that the Delphi technique offers to marketing scholars when combined with appropriate theoretical frameworks. The Delphi technique should not be regarded as merely a routine

and classic data collection method on current and future opinions but as a flexible data collection tool for modern marketing.

6.2 Implications for research practice

We set out to study future market change, taking a stance in the market change index by Nenonen *et al.* (2019a). Had we conducted a "traditional" Delphi study, we would have identified projections solely based on empirical data, which *per se* informs practice and decision-making (Alder and Ziglio, 1996). However, when choosing a theoretical framework to support the study, we were able to integrate the study in a research discipline, concurrently addressing essential issues of market change. We were thus able to address a major issue in mainstream foresight research, namely, the link to theory and thus contributions to scientific knowledge, which is criticized for being relatively weak (Piirainen and Gonzalez, 2015). The choice of linking a theoretical framework to the research design prior to data collection (Delphi) has certain practical advantages. We detail the following key points in the holistic method:
- identify the context of the study;
- anchor the study in a view on markets for guidance in the selection of relevant industry experts linked to an observed or perceived phenomenon;
- ensure that data collection is purposeful in the sense that it collects analyzable data and guide the respondents based on the theoretical framework;

- conduct data collection and analysis from the theoretical framework;
- detail whether the market changes are perceived as important, likely and trigger dependent (dependent on a specific event or development); and
- explain the observations to advance theory.

Table 6 details the process and summarizes the discussion above in impact on research design and methodological choices.

Another challenge of futures studies lies in their ability to inform theory and theory development (or theory generation). Brady (2015) notes that methodological studies on the Delphi technique fail to show how researchers should approach data reduction and analysis, especially of qualitative Delphi studies, and what kind of end-results can be expected from Delphi studies. Our study attempts to fuel this discussion by suggesting a research process or holistic research method, that emphasizes the advantages of combining a theoretical framework with the Delphi methodology. We are thus able to guide researchers how to study future market change or how to use a theoretical framework for structuring data collection and analysis in Delphi studies in novel ways that lean more toward theory advancement compared to earlier Delphi studies.

Furthermore, research questions and aims must be anchored in a conceptual discussion on what market change is and how the results from the Delphi study contributes to previous studies on market change (or a related, more specific concept,

Table 6 Key points in the holistic method research design

Key points in the research design	Acknowledgement of the researcher's stance on	Impact on research design	Methodological choices, examples
1. Identify the context of the study	Context dependency	Choice of empirical context Choice of observable or perceived trigger and evaluation of its origin	Systematic literature review Individual interviews Focus groups Panel(s), subpanels
2. Anchor the study in a view on markets for guiding the selection of relevant industry experts linked to an observed or perceived phenomenon	View of markets	Choice of theoretical framework Choice of number of panels ("core" market and "trigger" market) Choice of panelists	Systematic literature review Development of conceptual framework based on extant literature
3. Ensure that data collection is purposeful in the sense that it collects analyzable data; guiding the respondents based on the theoretical framework	Methodological rigor	Choice of questions and/or guidance in the Delphi study and its iterative rounds Focus on collective narratives and other qualitative data	Individual interviews Focus groups, group interviews Panel(s), subpanels
4. Conduct data collection and analysis based on the theoretical framework	Framing of research in established research stream(s)	Coding scheme for analyzing the data obtained through the Delphi rounds Choice of how to synthesize and present to panelists	Visual digital presentations, i.e. tables, figures, pictures and mind maps Written statements, reports, statistical data, etc.
5. Detail whether the market changes are perceived as important, likely and trigger dependent	Evaluation of identified elements and/or observations	Ensure reliability of study, verify the origin of the perceived market changes	Online survey tool for assessment of or comments to the projections (e.g. Qualtrics)
6. Analysis and explanation of the observations	Human experience as the basis for reality and truth (epistemological questions)	Aims at advancing theory	

see Table 1). Thus, the Delphi methodology is yet to prove its applicability in studying market change and to find the appropriate theoretical frameworks that induce knowledge of future change. As alternative frameworks to the market change index we suggest the market learning cycle (Storbacka and Nenonen, 2015), enablers and constraints for new market creation for breakthrough innovation (Colarelli O'Connor and Rice, 2013), market innovation practices (Mele and Russo-Spena, 2015) or actor roles in shaping markets (Mason *et al.,* 2017). The holistic method is particularly suitable for studying future market change but may also be useful in contexts where the trigger is known (e.g. technology and innovation). For instance, the holistic method could be used to study the evolution of ecosystems or platforms or business network dynamics with a future orientation.

6.3 Limitations and future research avenues

The method proposes a Delphi in which data is collected through online tools (here: e-mail and an online survey tool). To further develop the practical use of the method, it could be scaled by suggesting similar elements as in Sommarberg and Mäkinen's (2018) study: a custom-made application for data collection with inbuilt analysis algorithms. This would enable the use of methodology with various change triggers in several markets simultaneously. However, further research is needed to select the experts automatically, present additional questions, eliminate near duplications, consolidate similar themes and link the suggested changes with a holistic market framework. While there is probably a need for a human element in the exercise, further research on these themes would undoubtedly decrease the amount of manual labor needed in the process.

We deliberately asked the experts to elaborate on changes in the market. Nenonen *et al.* (2019a, p. 254) chose to use the word "industry" due to the challenges associated with the word "market." As a result, we may be limited by the experts' different interpretations of a market. We considered that we would not face such a problem with a Delphi method, as we would be able to ask clarifying questions during the different rounds. Further, we did not use a generic version of "our/their market." However, we opted to refer to a "media market," as the choice would guide the respondents to a somewhat similar understanding of what the market stands for. We consider that the similarities of the responses indicate that we were successful. Nevertheless, it is essential to acknowledge this pitfall, as terminology may limit the research findings if it is not well taken care of in the research design.

To keep the research process as light as possible to the panelists, we did not ask further questions about the market changes (e.g. how the changes will happen or why the changes depend on the emergence of 5G technology). These kinds of questions would add more insight. Future research designs could showcase a mixed method approach, if linked with, for instance, interviews, market visioning workshops or other alternative research methods to get deeper into the mechanisms of forecasted market changes. Data obtained in the Delphi study could be compared with text analysis of new and old media content to triangulate the results.

The method should be replicated in other contexts, i.e. other technology, market or country, to see how the method achieves its benefits in terms of covering the perceptions of envisioned market changes holistically and revealing the dependence of these changes on the trigger in question. We have given detailed information on each step of the study to enable replication of this method. While this enhances the rigor in the Delphi research (Hasson and Keeney, 2011), it hopefully encourages scholars to conduct similar studies in technologies and markets of their interest. The use of a theoretical framework conjointly with the Delphi technique could be compared with a traditional Delphi (not deploying a theoretical framework). Such a comparative study would be able to verify the impact and applicability of the suggested holistic method.

Following Sommarberg and Mäkinen (2018), in-depth interviews with informants possessing the same roles and positions in the value chain may provide additional depth to the analysis of the results. Such interviews would also provide insight into why informants judge the future impact or drivers in the way they do. Another suitable mixed methods approach would be to use big data, such as applying text mining to the professional discussions conducted by the same experts in seminars, trade media and other professional platforms.

Note

1 For details on the literature survey process, see Appendix 1.

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Appendix 1

Table A1 Literature survey process

Research phase	Content and process	No. of articles
1. Extract papers	Document type: peer-reviewed articles Timespan: 2000–2020 Language: English WoS category: Business AND Management Search terms: Market driv* AND forecast* AND predict* Market shap* AND forecast* AND predict* Market script* AND forecast* AND predict* Market vision* AND forecast* AND predict* Market innovation AND forecast* AND predict* Market change AND forecast* AND predict*	280
2. Extract detailed papers	Document type: peer-reviewed articles Timespan: 2000–2020 Language: English WoS category: Business AND Management Search terms: Market driv* AND Delphi Market shap* AND Delphi Market script* AND Delphi Market vision* AND Delphi Market innovation AND Delphi Market change AND Delphi	108
3. Evaluate relevance of articles	Eliminate duplicates Evaluate relevance by title, keywords and level of quality Read abstracts	22
4. Identify additional relevant articles	Manually track citations for additional relevant articles (snowballing method) Warth *et al.* (2013) (electric car industry) Winkler *et al.* (2015) (emerging markets) Jiang *et al.* (2017) (3D printing) Sommarberg and Mäkinen (2018) (emerging technologies) von Briel (2018) (omnichannel retail)	5
5. Final list of papers	Read full articles	27

Appendix 2

Table A2 Quotes from panelists on the most important and likely 5G-dependent changes in the media market

Market change	Excerpts from respondents
Wireless solutions are increasingly used in media production	"Outdoor production, for instance sports competitions, [their] cables are replaced with *5G* connections. For instance, when the focus is on outdoor production [carried out] in vehicles, the network is linked to [the vehicles]" (Development manager, media company A)
5G becomes a substitute technology for distributing TV and radio content	"[5G technology] will replace FM broadcasting technology [radio] and TV DVB-T2 [digital video broadcasting – second generation terrestrial]" (Development manager, media company A)
More AR and VR-based services	"In the future, 5G networks will enable many kinds of VR and AR applications, and consequently, a change in media use. The movie and sports event experience may change considerably, as movies or, for instance, soccer games are in the future followed through VR from your home coach. Or maybe in the pub on site, in the same ways as earlier" (Director, mobile operator A) "An authentic, real-time VR/AR experience offers considerable development opportunities and new revenue streams for media services: watching sports events, gaming, educational solutions (schools, self-study, different B2B solutions etc.), cultural experiences (art shows, music, theatre etc.) and entertainment more generally" (Director, solutions and software provider) "The birth of virtual media–if processing and image formation technologies develop in the current pace, I believe virtual media will develop during the 5G-era. By virtual media I mean virtual access to, for instance, the news action site. Put your VR glasses on and jump into the Syrian war or the cockpit of a Mars rocket. It can also be 360 streaming" (Business director, media company B)
Increased Quality of Service	"Increased connection speed offers a better media experience in terms of quality, 4K and 8K HD technology etc" (Director, solutions and software provider) "The rise of technical quality: more capacity, speed, less latency, better picture quality" (Development manager (media technology), media company A)
Easier and more flexible production and distribution	"Flexibility in production and distribution. There is no longer a need for dedicated [separately built] wireless production or distribution networks" (Development manager (media technology), media company A) "The production of media will be easer (technically). For instance, filming sports broadcast does not require a professional anymore" (Innovation manager, mobile operator B) "The production costs for media content may decrease, as live production can be done over the mobile network anywhere" (CEO, media company D)
Mobile as a communication channel strengthens	"5G technology strengthens mobility and the status of mobile as a communications channel but will not revolutionize it. As the concept of media consumption is still more [focused on] mobile, the impact may be surprising: media content has to be in such a format that it can easily be consumed anywhere, in your coach, in traffic, when walking in the street; in text, pictures, especially as sound. This means that, for instance, the significance of video or other immersive tools as means of conveying news (they require capacity) may even diminish" (CDO, media company C) "5G together with new packaging methods will also make high-quality mobile content available" (CEO, VR-technology startup) "In the best case, 5G may change the content production cycles. Video and voice recognition enable hybrid content, rather than written articles. The reporter may film the content, speak his/her text and artificial intelligence automatically creates a publishable article for all publication platforms" (Business director, media company B)
Media consumption with mobile devices continues to increase New video products and services	"Video will be consumed mostly on mobile devices–more than on other devices" (CTO, mobile operator C) "Media use will move to mobile devices all the more. Media use will increasingly be fragmented into micro moments, e.g. with TV in your pocket constantly" (CEO, media company D) "360-movies and iMAX are possible in devices remotely" (CTO, technology vendor A) "The increased use of video: 5G will not revolutionize, but absolutely bring more players to the video market. Specifically, content production will increase considerably, when for instance the production of live broadcasting is less dependent on the access link. Video is perhaps too broad a concept, and I believe it will crumble as the demand and supply become more fragmented. Already now, video narratives are video blogs, long video content (mainly TV narratives), short video (e.g., news) and social media videos. Alongside these, in the near future and as a result of 5G, there will be, e.g., live, video-messaging, and video-shopping" (Business director, media company B)