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ABSTRACT

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Abstract

In these times of crisis, it has been proposed that we need to consider wider more radical and even transformative innovation potentials to meet future challenges. Considering this, also futures scenarios should include more diverse interpretations within its work to aid in this endeavour. In this thesis, this challenge is explored by combining two innovation-rich arenas of the *Creative* and the *Transformative* that are represented by the Creative Economy and Green Growth, in order to widen the innovation potential. These constantly developing policy and rich discourse areas, are seen as a drivers and engines of growth. Combined these offer broader tools and perspectives in which to widen an understanding of future structural transformation. This type of transformed regime is explored through a proposed method *scenario adaptation,* that intertextually reads futures workshop and scenario results as text. that are read through innovation styles from creative economy and green growth literature (via a method of style matrix). Specifically, combined it is proposed that these flesh-out an alternative scene of a future sustainable system. This produces an adapted scenario in the form of a vignette. The results of the workshop, focused on one set scenario that was based on a future peer to peer energy setting. Beyond the successful renewable energy implications already expertly analysed in a wider Neo Carbon Energy research project. One specific chosen scenario in its own right gives a glimpse into a future preferable sustainable regime. The research results highlighted themes of crisis and recovery, and important role of knowledge spillovers. The traits and characteristics of transformative agency reveal changes in values required to achieve an advanced future system, but also the challenges and their essential support systems. The desire of this study is to propose and demonstrate the method of scenario adaptation, that can envisage alternative future transformations.

Key words	scenario adaptation, transformative innovation, creative economy, green growth
Further information	

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SCENARIO ADAPTATION FOR CREATIVE AND TRANSFORMATIVE INNOVATION

Master´s Thesis
Futures Studies

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1 INTRODUCTION

1.1 The Imperative to Transform

There is currently an imperative to change and transform to a better future that is driven by the acute complex challenges that we face on this planet. These range from the forces of climate change, population growth, loss of biodiversity, famine and poverty, requiring radical strategic solutions and innovations that engage all parts of the economy, society and culture (Barnosky et al. 2016; Matheson 2006; Steward 2012, 338-9). These efforts in essence are proposed to direct all resources and strategies toward a more sustainable low-carbon, high energy-efficiency growth economy, that has been identified as the greatest challenge of our times (Huberty & Zysman 2010).

The twenty-first century can be said to be characterised by rapid change, and it is clear we are also going through a period of rapid transformation (Wilbanks 2011; Cornish 2004). This has been described that the next hundred years could offer more prospects, challenges and threats than the past thousand years, and would radically change our lives (see Slaughter 1993; Romer 1990). To meet this challenge, it has been suggested that we require more radical approaches to innovation (Hargadon 2010; Wilbanks 2011; Schirrmeister & Warnke 2013). It would thus also be meaningful to apply that kind of thinking into futures research and its methods, to also broaden our range of innovations for the future, and to provide much more radical and inspiring scenarios (De Smedt et al. 2013). In this type of innovation regime setting, this approach would attempt to be simultaneously both creative and transformational (see Wilbanks 2011; Steward 2012; Tyszczuk & Smith, 2018).

Grand strategic projects are being planned and proposed at the highest level of government and are being set into place to transform the direction of the future, that engage new sources of renewable energy production and materials to directly combat climate change and bring the planet within safer limits (UNFCCC Paris Agreement 2015; Kruus & Hakala 2017). However, it has been criticised that these proposed innovations are often too limited and oversimplified in their conception to deal with complex problems (Steward 2010). A new role and function for innovation in this context can be seen as of crucial importance, where questions of how it is utilised and cultivated and further understood as a system will affect the success or failure of a transition to more

sustainable regime. Renewable energy through solar and wind energy capture for example, is the current focus of the dominant discourse on transformation to shift away from fossil-based energy to renewable alternatives. However, this is not a question of a simple substitution from dirty to clean. As this reformulation of innovation in the face of a fundamental need, rather this should be seen as a transformation of the whole system. Technology improvement no is not enough, rather this would suggest a move toward the emergence of a totally new structure than we have today. Similarly, the replacement and reinvention of all fossil-based materials and chemicals, like switching plastics to bioplastics, or petroleum switched to electric transportation for example, also require the same rigour of systematic replacement and renewal (Kruus & Hakala 2017).

Furthermore, thinking of the societal perspective, institutions themselves also require radical change, as Landry has posed that we might ask are schools and hospitals really meeting their full potential as places of learning and health? (Landry 2012) By re-considering these systems to implement meaningful change, a closer relationship between the meaning and system must be more fully explored.

To this end, widening, diversifying and opening up our understanding of innovation has been identified as crucially important for this challenge, moving beyond incremental change through innovation of step by step improvements, toward more radical and transformative solutions (Hargadon 2010; Wilbanks 2011; Schirrmeister & Warnke 2013; Steward 2010, 2012). Additionally, the role of emerging culture and creative sectors, as well as other softer sectors, have not been adequately examined with what they might contribute to a future transformation, including their role in tackling climate change (Tyszczuk & Smith 2018).

In this thesis I contribute to this challenge by re-examining the proposition of a scenario that depicts a successful future transformation. That is to say, a re-examination of a desirable future image. The Neo Carbon Energy scenarios represent an innovation rich regime, that propose a fully renewable energy system based on a much more open and non-hierarchical, peer-to-peer model of society and innovation production than we have today (Rouotsalianen et al. 2016). Created are all transformational scenarios (ibid.) I attempt to advance this model and contribute new understanding by moving beyond its' already rigorously explored energy setting, by widening its innovation spectrum to include two new compelling thematic sectors of innovation. That of the *creative* innovation as represented by the *creative economy* as a driver for growth, and the

transformative innovation that is represented by *green growth.* Both of these areas of creative and transformative assume a new form of entrepreneurship-driven-growth and often these sectors can be understood as overlapping, although equally often distinct in their own right (Lange 2012; Hall et al. 2010). In considering what is green and sustainable, the challenge then here is to see how to include the creative economy and its diverse entrepreneurial actors in the equation for innovation transformation and development for the future. As the creative sector has been seen as operating quite separately. By widening the potential of innovation to meet these future challenges, and to illustrate better the successful transformed innovation setting, we might then truly 'envisage structural transformation' (Schirrmeister & Warnke 2013). That is, we might form a clearer understanding of how a functioning future system would actually be, including its societal and cultural systems fully engaged.

1.2 Widening Concepts of Innovation

For this research perspective, defining innovation can be seen as challenging as it can be seen as a rather fluid and evolving concept, that is difficult to estimate how it will manifest for the future. As innovation can be seen as fulfilling certain roles and values within society depending on the current challenges of that time. If we think of different epoch or periods in time, specific innovations were representative and instrumental to those times. The contemporary innovation arenas of culture and creativity, and also green growth specifically all form the focus of this study. As these combined offer wider representation of the potential next epoch.

For some people innovation is akin with design, a solution, or a development of an idea in a new way. In a Schumpeterian school of thought, innovation can be seen as the commercial introduction of a new product or a new combination, from invention which belongs to science and technology (Perez 2009; Schumpeter 1911; 1926; 1961). This offers a wide and openly interpretable definition, whilst possibly at the same time somewhat limiting it in scope and social origin, that is bound in what can be subjectively understood as exclusively coming from ‘science and technology’. In contrast, current concepts for example include social innovation and open innovation, that encourage collaborative and inclusive approaches, that reveal another category that draw concepts and applications from diverse origins (Leminen, Nystro, & Westerlund 2015). Even

spaces for innovation themselves also become forms of innovation in their own right. Where for example innovation and creativity labs, or creative hubs or maker spaces etc., as Schmidt et al. have defined them, are:

> "[…] environments conducive to creating and testing innovative ideas, alternative business practices and business models, new economic practices or flexible cooperation forms" (Schmidt et al. 2014).

These become the innovation of sets of innovations, that are important precisely because of their combination and re-construction of different forms. These can be seen as systems of innovations, working together or being re-discovered in new contexts with one another, functioning as innovation platforms. These are interpreted as ecosystems of innovation, knowledge and practice.

A broad overview of the wide verities of innovation have been tackled by Patrick van der Duin, who noted that there are various approaches to define innovation in its different ways. He suggests that broadly innovation deals with *newness and change*, and have a *broad view of innovation* beyond physical or material, it is also importantly about *process* and its *implantation*, the *interconnectedness of innovations*, and finally it concerns aspects of *uncertainty and creativity* (van der Duin 2006, 48-51). Furthermore, he also links the importance of innovation with futures studies (and vice versa) in which both he sees are interconnected, having important roles to play, especially for considering technology futures, or in dealing with maturity and uncertainty (ibid. 35). Looking at innovation it is suggested here is akin with exploring a potential future.

Peter Drucker famously suggests that innovation is entangled with entrepreneurship as 'entrepreneurs innovate', where innovation is seen as *purposeful* in nature and as an *opportunity* emphasising human action. He suggests it can be defined simply "changing the value and satisfaction obtained from resources by customers" (Drucker 1985, 33) and that do not have to be physical 'things' (ibid., 31). This can be considered as openly defined toward the intangible products and services (digital or experience based) that we understand today. In another perspective Danny Jacobs proposed the importance of the 'culture side of innovation', where he emphasises seeing the 'cultural interpretation' and the 'culture *of* innovation' (Jacobs 2014). Whereby combined creativity and innovation aid in the forming of a broader understanding of the role of innovation (ibid.). In this

manner the systems of innovation are understood by considering their cultural meanings and structures, where the emergence of an innovation culture resides in the form of a process rather than a final designed physical object. Thus, seeking the characteristics of a future 'culture *of* innovation' might be more fruitful than to identify its innovated objects.

Of particular use for the perspective in this thesis, is to consider that innovation has been recognised as a critical dimension for the pursuit of future transformations and change, especially in times of crisis (Psarikidou 2015, 69). In light of this need, and for the perspective of this thesis is the proposition that we need more verities of innovation to meet these complex social, economic and environmental aspects of sustainable development challenges. Where in terms of development, innovation comes in many forms, of *incremental, radical*, *game-changing,* to *transformative* systemic innovation (Szekely & Strebel 2013; Steward 2010, 2012).

If we understand *incremental innovation* as the step-by-step development of important improvements, then r*adical innovation* can be seen as a new sudden shocking entry that disrupts and stands alone, creating new industries and markets around it (Szekely & Strebel, 2013). *Game changing* systemic innovation as Szekely & Strebel name it, changes people's behaviour and lifestyles, encouraging a new collaborative ecosystem of social entrepreneurship (ibid.). Game-changing transformation resides in social consciousness, as a crisis forming the collective understanding of a movement for change (Loorbach et al. 2016). Finally, the important concept of *Transformative Innovation* as introduced by Fred Steward, that is described as "broad in scope and radical in character", paradigm breaking with environmental sustainability at its core (Steward, 2010, 15). It embraces both technological and social change, with a long-range view of the future (Ibid. 16-17) and even with *radical re-innovation,* like for example the reintroduction of old technology like windmills to create a wind-farm (ibid.24). This transformative version is a total holistic re-evaluation of our understanding and application of innovation, for wider impacts in society. Perhaps exactly it is this concept of innovation and subsequently those earlier mentioned that can be considered as the most relevant for our times.

In some cases, innovation itself is not always by default the right solution. The very idea that there is the compulsory need for innovation on the other hand can also be seen as highly problematic. As identified in counter trends that follow the alternative reaction

toward a need for a slower innovation. This would be a move toward a less mechanistic and formulaic model, avoiding the unsurmountable pressure to innovate. This is highlighted through the foresight analysis conducted by Leitner, Warnake and Rhomberg (2016). They found through horizon scanning on the new and emerging innovation patterns, that it was dominated by the new emerging innovation trend of open and participatory innovation, that is strongly adopted. They also reveal in their study the other aspects surrounding the negative challenges associated with innovation for the future. These were located in the automated-information technologies that organise innovation, creating an enforced standardisation of innovation. And the contrasting reactionary trend of slow or even 'no innovation', where innovation is slowed down due to the risk of organisations who suffer from *Innovation fatigue* (Leitner et al., 2016, 225).

These negative aspects result from the increasing pressure in organisations to constantly produce innovation, with multiple parties involved, resulting in innovation fatigue and the overly excessive standardisation of creative processes. There is even the trend of technology using algorithms that take over the whole creative innovative process, actually resulting in a narrowing of the innovation potential. (ibid. 229) These critical concepts offer a counter trend to the idea of innovation as a default, standardised form, where innovation itself can be seen to hinder as well as help. Thus, all innovation is not inherently good (or bad).

Considering all of these and following van der Duin's example of focusing on newness and change, categorisation we can see a range of ways in which innovation can be understood and defined. From an entrepreneurial activity (Drucker), or as a process (van der Duin) to the idea of the culture of innovation being key to understanding the future (Jacobs 2014). Then the trajectory of innovation, as expressed in connection to change, can be seen as incremental (meaningful improvement or just improvement), radical (meaning disruptive, in stark contrast to other innovations), to transformative or game-changing that can be seen as change at the systemic level of innovation, a change that has very wide range effects. Then the final consideration surrounds innovation as also problematic with the risk of over innovation, innovation for the sake of innovation, and the possibility of alternative slower more considered approaches to innovation. All these categories aid in a wider understanding of future innovation.

1.3 The Creative Economy & Green Growth

The Creative Economy and Green Growth both claim to drive growth and offer novel as well as diverse interpretations of innovation. For this thesis the role of innovation can be then explored through these two current emerging and developing fields that I will introduce here.

The creative sector as a “central force propelling economic growth” has been the examination of Richard Florida's work, who introduced the theory of a 'creative class', – that importantly observes the beneficial activities of those professionals that by association create remarkable innovative environments (Mellander & Florida et al. 2014, 1; Florida 2001). The two fields of urban studies and business development are commonly the areas involved in the research of the Creative Industries (Florida 2001; Landry 2000) and the larger sector of the Creative Economy (Howkins 2002). These areas, industry and economy, offer two research activities that try to identify in different means the indicators of human capital, through creative professional activity and creative economic activity. What is actually monitored as the research subject are constantly changing and evolving, which I propose for a futures perspective makes this a very interesting field in terms of the issue of *emergence* and *transformation*, as the categories tend to change and evolve to redefine the system. The definition by the INTERREG IVC for example, define that:

> “Creative Industries cover, in particular, architecture, archives and libraries, artistic crafts, audio-visual (including film, television, video games and multimedia), cultural heritage, design (including fashion design), festivals, music, performing and visual arts, publishing and radio.” (INTERREG IVC report on creative industries, 2014).

In actuality the core areas of the industry named the *creative class* seems to be now more widespread that reposition to also accommodate scientists, technologists, innovators and entrepreneurs, knowledge-based professionals in business, education and healthcare (Mellander & Florida et al. 2014, 1; Florida 2001).

This creative field is especially characterised by small to medium sized entrepreneurs. One key perspective is to consider this field as being 'k*nowledge intensive'* (Interrig IVC report on creative industries, 2014) and the characteristics of the creative industries as being usually small (around 10 people) highly skilled self-employed, part time or with temporary contracts, highly networked with inter-firm linkages concentrated in major cities (Ibid., 10; Taylor 2015). Creative

entrepreneurship, represents the important role that small business actors play from within the creative industries, that has a clear impact upon the larger surrounding economy and society at large. As Richard Florida articulates the three key areas are:

> "[…] the rise of the Creative Economy is drawing the spheres of innovation (technological creativity), business (economic creativity) and culture (artistic and cultural creativity) into one another, in more intimate and more powerful combinations than ever." (Florida 2001, 201)

The UNESCO Creative Economy Report 2013 importantly re-defines these interconnected fields of the creative economy, as both a great *contributor* and *driver* for development (UNESCO 2013). What is understood as the creative economy offers growth from the creative sectors, an evolving concept that draws from the arts, culture, toward media and science which then function as "enablers and straighteners of value, as well as drivers of economic growth" (ibid; Taylor 2015).

The definitions of the creative sector can be seen to be fragmented and interwoven, evolving and expanding. It is this aspect of the creative economy that reveal its features of emergence and can be viewed as a rich resource for sense-making of emerging sectors for the future. The creative industries, which in part comprise of the *Culture Industries* containing for example the *Arts* and all aspects *cultural*, has an important role to play within the much larger creative economy (Howkins 2002). This engagement with the wider economy perspective, that includes not only the creative offering but also the channels in which it is emitted, and all its related industries represent the scope of the creative economy (ibid.). The creative industries can be said to have an increasingly important role to play in the overall economy, as a catalyst, that in turn further transforms the very nature of the changing economy itself. One can consider the role of film, music, media, and the internet for example, as an indicator of the character of change and at the same time having a role in effecting change.

There has been noted a resurgence of interest in the 'new economy' during the twenty-first century surrounding the subject of creativity and cities, notes theorist Terry Flew. Where he notes that "creativity has been seen the foundation of innovating, and innovation as the new primary driver of economic growth" (Flew 2010). The city or urban setting, is often the underlying context in which the creative economy and the creative industries have been explored, as mechanisms for urban development where the

importance of place and milieu are explored in relation to the close proximity of talent and the diversity of innovators and innovation activities (Flew 2010; Florida 2012; Landry 2000). The cities' ability to attract and cultivate from outside talent, the pioneering figure Richard Florida identified this as a strategy in which to identify and develop what he termed the creative class where the activities of this central core creative workers effect beneficially economic spillover effects over the rest of the economy (Florida 2012). In this light Silicon Valley can be seen as the assumed exemplary context for this type of growth where cities try to harness the same clustered intensity of innovation, or likewise Milan for fashion, and London for design, (Flew 2010; Florida & Mellander 2016) where the proximity to this rich central 'cultural' and 'innovative' activity attracted other service sectors.

The creative industries have for the past decade a substantial economic impact, in Europe in 2014 the cultural and creative industries have an annual revenue of about €535.9 billion and with more than 7 million workers that financially and employment speaking represent a substantial sector for innovation and growth (EY Ernst & Young report, 2014, 8; Taylor 2015).

Another new type of impact and representation to consider according to the UNESCO Creative Economy report (2013) is that the creative sector also contribute positively to global sustainable development. Through urban and rural development, where the culture and creative industries are acknowledged as key factors for improving life worldwide, as they functionally act as "*both drivers and enablers for growth"* (ibid.). Strategically speaking from a policy standpoint, the creative economy is an extremely established concept, in which to direct investment for innovation and support frameworks for society, and has been specifically used in the re-inventing of the economy agenda in Europe (Boccella & Salerno 2016). Especially as it now strategically combines such profitable fields as media, information technology and research and development, as well as the more familiar fields that are more clearly understood as culture, art and design (Garnham, 2005). Rich in innovation, it is the creative economy's claim to drive growth and sustainability that is one of the particularly interesting aspects for this research.

Toward this thesis's endeavour in widening innovation to be more associated with transformation, where innovation is directly linked to change, the concept of Green Growth can be seen to quintessentially tackle the global challenges we currently face. A

different kind of growth is defined, that decouples the economic activities from its environmental impact. This shifts away from the problem of economic growth in recent years, that is problematically tied directly and indirectly to environmental consequences. OECD defines that:

> "[g]reen growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities" (OECD 2011).

This type of approach is of course epitomised by the opportunities of renewable energy of wind and solar power, and sustainable, green and clean technologies, that represent the new ***'growth engines'*** for the economy (Mathews 2012, 762). Interpretations of this definition suggests an increased economic output while at the same time having a reduced environmental footprint (Stoknes & Rockström 2017). The role of innovation in this light is elevated as the essential tool in which to take advantage of the challenges that we face, where it has poignantly been characterised where "green growth interprets climate change not as cost, but as opportunity" (Mathews 2012, 762; Vazquez-Burst & Smith & Sarkis 2014). It is this underlying reframing of crisis to become an opportunity that encapsulates this movement to reimagine innovation to tackle coming problems, however daunting.

Sustainability then requires new radical thinking and new business models and organisational practice that challenge todays dominant business logic (Mitchell & Wlinga 2017). Where in practice this means that organisations are working in a much more collaborative manner in order to deal "with future uncertainties brought about by sustainability challenges" (Linnenluecke et al. 2017). Thus, the current challenges actually reframe the very nature of innovation itself and affect it in complex new combinations in the face of uncertainty.

Green Growth is a concept that has many potential dimensions, but can be defined as Eckehard Rosenbaum has in considering its two important roles. Where it is understood that:

> "[…] economic activities have detrimental effects on the environment, which need to be addressed as an integral part of economic policy and, second, the presumption that economic growth continues to be a *conditio sine qua non* not only for developing countries but also for the developed world." (Rosenbaum 2017)

In adjusting global growth and acknowledging this need for a new balance with the environment, that minimises pollution, environmental impacts and hazards. Green growth

understands that economic development can continue to be made, as the assumption that some growth would be necessary. But growth found only through being both green and sustainable, with continued economic growth action explicitly through active economic engagement with these critical areas of opportunities, that are in stark contrast to business-as-usual models (Huang & Quibria 2013). Often the opportunities are directed to and widely engaged by the developing world, that sees this as a means to gain much needed infrastructure as well as much needed sustainable growth. However implicit in this 'green new deal' is the need for monitoring environmental impact and monitoring growth itself. (ibid.)

This approach however, is not without criticism surrounding what actually constitutes the combination *'green'* and *'growth'*, which often becomes a blurry term and has potential to be manipulated, and even greenwashed (Rosenbaum 2017). Never-the-less it represents a fundamental change toward a new expansion of green sectors and a transformational greening of the economy (Vazquez-Brust et al. 2014). It is epitomised by the emerging areas of renewable energy, biotechnology and cleantech, but also through social policies and initiatives that actively confront and engage unsustainable practices. Green growth as a concept and practice can be seen to be itself evolving, manifesting in different ways to become *inclusive green growth* as the Dutch government has adopted to affect positively inclusion of a greater portion of populations of the globe (Inclusive Green Growth 2015). Or *critical green growth* where weaknesses are systematically scrutinised and strategies modified, and also toward the concept of a green growth state – where government models are themselves transformed to meet the roles of green growth (Vazquez-Brust et al. 2014).

Therefore, both of these empowered sectors, creative and green offer opportunities and can be understood as *engines of growth to transform innovation regimes*.

1.4 Innovation Regimes

Innovation regimes can be understood as the setting of innovation as a dominant regime. The meaning of presenting the concept of innovation regimes for this research is to try to specifically understand the future setting or landscape of the changed innovation system. Where a regime of specific accumulation and application surrounding certain

innovations further spawns' knowledge throughout society. It is within this setting that transformation occurs and the specific role that accumulated innovation has is underlined. There are many lines of theories surrounding this subject. Here I will present those that have emerged through the research process and that seem most appropriate, rather than to deviate into an extensive presentation of the whole field of innovation regimes.

Innovation regimes are as seminal economist Carlota Perez defined them, as *techno-economic paradigms* and even technological *revolutions* to reflect the change of regime. They can be seen as effective new best practices of new technologies within and beyond new industries, where revolutionary new industries become "engines for growth, for a long period where the techno-economic paradigm drives a vast reorganisation and widespread rise in productive activity across the economy."(Perez 1984; 2009, 9) Importantly these regimes become open spaces for innovation opportunities (ibid. 2009, 9-10).

Futurist Penti Malaska has described that the historical shifts of society can be seen as a transformation from *basic needs*, to *tangible needs*, and recently toward a *society of intangible needs* (Malaska 1999). These shifts can be seen similarly as a series of developments of long waves of cyclical economic development surrounding consecutive technological innovations, that is often attributed to Joseph Shumpeter (Shumpeter 1942; Perez 2009) amongst other economic theorists. Following the idea of technological innovation as a central force of capitalist growth, where the rise and fall follow a cyclical pattern, Schumpeter portrayed the process of 'creative destruction' where through competition in innovation, the stagnating products and services would be replaced with totally new products and services, that would additionally open up new markets, offering totally new jobs that did not exist previously (Garnham 2005, 21-22; Archibugi 2017a, 536). Importantly for this view of innovation is that it does not have economic impact in isolation, it happens through a wider transformation of original ideas and contexts across the board (Archibugi 2017a, 536).

Perez underlines that for the Shumpeter perspective on innovation, it is the combination of technical change and entrepreneurship that are at the root of economic growth (Perez 2009). However, Arachibugi observes that this kind of thinking about innovation has mostly been consumed with manufacturing, and only more recently attention to service and non-technological innovations, and now with a shift toward

innovation in all its forms (Archibugi, 2017b, 556). Correspondingly, engagement in innovation has been seen to have ignored various alternative economic organisations and practices and their potential to provide their own response to diverse socio-economic challenges (Psarikidou 2015, 69). Among various economists and political scientists, Joseph Schumpeter (1942) was one of the first to underline the central role of innovation as a key driver for change through economic growth (Psarikidou 2015, 69; Schumpeter 1942). Perter Drucker interprets this as *Entrepreneurial Growth* were growth is driven by the entrepreneur as the main actor of change and thus the relationship between innovation and entrepreneurship becomes the setting and regime in which these cycles and long waves of activity occur (Drucker 1985).

Fred Steward (2012) notices two different approaches within the socio-technological perspective, one that looks at the role of innovation in long-term epochal transformations that involve fundamental changes in economic and technological relationship configurations, and the other that focuses on the heterogeneous network of actors. This kind of framing Steward suggests, encourages a diverse-heterogeneous mix of both social and technological change, with an emphasis on identifying the end use consumption within the regime. (Steward 2012)

We might associate and acknowledge this understanding as connected to Geels' multilevel perspective (Geels 2002). His acclaimed MLP Multi-Level-Perspective model is of course important to note here, with its emphasis on lower meso-level changes that affect the whole system. It is a specific kind of modelling of the change mechanisms and especially highlighting their actors and their networks, that is especially associated with research on sustainability and transitions. However, at the same time it is important to keep in mind for this particular futures research, the other approaches that emphasise rather the long-term open forces of change as well as those key actors as has Steward has suggested. Even we must consider actors not foreseen or not understood as relevant. For this thesis, being open to complimentary new perspectives on innovation, growth and change, we might not just choose either for example Perez's view of long-term change, or Geels' model that identifies how transition from one socio-technological epoch to another occurred through actors. But rather to learn from both schools and especially note what useful discourses arise from these perspectives, from policy and beyond. This position is required as for example Green Growth literature often sites Geels MLP model,

but the creative sector seldom identifies it. Wider interpretations of regimes are then necessary for our task, while fully acknowledging the existing approaches.

To clarify this position, other studies have engaged in exploring the future innovation regimes in many unique contrasting and complimentary ways. Wilenius and Kurki for example have looked at how organisations could change in the context of the next coming regime, change called the Sixth Wave (Wilenius & Kurki 2017). Archibugi looked at science fiction film as a prototype to understand how progress in innovation could provide further growth at this future state (Archibugi, 2017a, 2017b). Rhisiart probed the changes of future arts and culture organisations (Rhisiart, 2013).

Another advanced perspective Schirrmeister and Warnke (2013; referring to Miller 2017) suggest that the future innovation landscape should be researched not as a change of direction, but as a *"change in kind"*. Likewise, in this research the aim is to better understand and illustrate an alternative future innovation regime, as a frame, and as a *change in kind,* considering the actors as well being open to long term change forces that define and give momentum to regimes. In the next section that frame of the regime is explored through the method of futures scenarios.

1.5 Futures Scenarios

In this section the concept of futures scenarios is both defined and explored, as contextually for futures research this study could be also read as a work of scenario analysis. After defining what future scenarios are, introduced is the selected scenario, out of the set of NeoCarbon Energy scenarios, that is explored in this thesis in order to answer the research questions.

Scenarios are perhaps the best-known futures method, often combining elements of other futures methods and are used in a verity of ways (Kosow & Gaßner 2008). A scenario can be commonly understood and defined as a description of a possible future situation (conceptual future), including paths of development which may lead to that future situation (ibid. 11). They can be seen as a logical sequence of images of the future (De Smedt et al., 2013). They can be acknowledged as positively contributing to companies' and organisations ability to explore the future and innovate, that can be used

for strategic visioning of new markets and to accelerate learning within an organisation (Rhisiart, 2013).

Exploring alternative futures can be understood as central to futures studies, and scenarios exemplify this by often producing multiple alternative scenarios. A great deal of futures research has engaged in producing futures visions that seek out preferable futures, and scenarios that depict several alternative states (Bell 1997; Niiniluoto 1987, 2017, 2009). Scenarios also can have an impact on inspiring and designing innovation (De Smedt et al., 2013). They are an established form of futures practice with a long history, from the seminal works like Limits to Growth, or the Shell scenarios and the work of Herman Kahn from the Rand corporation for example (Schwartz, 1998; Rowe et al. 2017). There are already commonly understood approaches on how to create a scenario or what constitutes a good scenario, and yet still there is wide room for interpretation and scenarios are used and created in many ways depending on their purpose (Rowe et al. 2017; Kees van der Heijden 2005; Godet 2000; Schwartz, 1998).

Scenarios also can be highly participatory in nature drawing from stakeholders, experts and informants, or as a central part of workshops or vies-versa where workshops are made to form and create scenarios (Dufva &Ahlqvist, 2014). It is this participatory nature of scenarios that represents an important continuation or content of the action-based part of the research, that utilises for example *futures workshops* (Jungk & Müllert 1987) or *futures cliniques* (Heinonen & Ruotsalainen, 2015).

For this study, we might consider that scenarios could be themselves the source for more radical approaches to innovation, through active participation and deliberation, where they could be diversified and adapted to seek more radical and transformative solutions to influence meaningful change. In a sense, scenarios could hold the key for transformative innovation.

Thomas Chermack gives a critical approach to scenario definition whereby there are "not yet defined any set of foundational theories that most would agree underpin the work we do" (2019). Yet there are a few scenario descriptions he generally agrees with, they are: "future oriented, about the external context, a narrative description, plausibly possible, a systematized set, and comparatively different". However, he criticises these limitations acknowledging that scenarios could also be art objects, exhibitions, that are

not necessarily narrative descriptions (ibid.). Thus, the field of scenarios can be seen as still open and evolving, defined in different ways to achieve bespoke challenges.

Following this line of thought, the wider perspectives and roles of areas like culture and the creative sectors could be more included and utilised in futures work. Criticising this issue about the absence of arts and humanities in (climate) scenario work, Tyszczuk and Smith importantly suggest that there is a need to utilise futures scenarios with multiple frames and contexts to find better narratives. Where arts and humanities could offer an important role in opening up climate science, where scenarios can act as testing ground for future impacts of climate change (Tyszczuk & Smith, 2018, 56-59). The value of the interactive use of scenarios as a testing ground has been noted by Gordon and Glenn, who see scenario work as an ongoing and continual process (Gordon & Glenn 2018).

German foresight researchers Erdmann and Schirrmeister (2016) criticise scenarios that only present snapshots of the future, but refrain from actually analysing the dynamics or the structural transformation of the research and innovation system that led to the scenario. In reaction they propose a two-step process with an *exploratory* stage and then a further *transformative* stage. The *transformative scenario* stage they define as "scenarios that anticipate the transformation of regimes" -- of course this resonates well with this thesis's perspective (ibid.). This stage can be seen as a *reframing* of the original, as Riel Miller approaches it, toward forcing more bold framings (Miller 2018, 98-105). Similarly, Martin Rhisiart adds a brief additional prototyping element to his scenario process, that he calls a *Vignette*, that is a "short thick continuation of the scenario" that succinctly express and prototypes certain contexts of change (Rhisiart 2013).

These few approaches I would suggest are transformations or *adaptations* of the original scenario that seek to gain extra insight into the dynamics of transformation. This I suggest can be understood similarly to *'adaptation'* as a literary form, where novels or film are made as adaptations of a previous work, developing its narrative intertextually, where content and style continue a dialogue in a new way. Adaptations can be seen as a 'transformative re-framing' of a scenario that more deeply explores new potentials for a regime with new information to provide more relevant interpretations. It is this characteristic of scenarios through the *adaptation scenario* work that is highly of interest in this thesis.

1.6 The Individual Chosen Scenario

It is the contention of this thesis that individual scenarios can also be of importance for exploration in their own right, beyond their original frame and context. Even though scenarios are often built is in sets of three, four or more, representing different distinct qualities or variables, one can think that each scenario has an individual characteristic of their own, as they should be distinctly different to be effective scenarios (Rowe et al. 2018). There is a danger in this interpretation, as normally it is the value of futures work to seek alternative views, not just one set linear perspective. However, I suggest a deeper reading of one singular scenario offers additional alternative interpretations that explore the transformative and structural regime that it depicts.

Existing, already made and formalised scenarios from the Neo Carbon Energy Project that anticipate a structural transformation are of importance for this study. They are particularly systematically well-crafted and tested examples. They depict the successful future transformation to a low-carbon high-efficiency growth regime, based on renewable energy. The scenarios are the essential foresight part, that were made within the larger project consortium funded by the TEKES Finnish Funding Agency for Technology and Innovation ending in 2017 (see Ruotsalainen et al. 2016; Breyer et al. 2017; Heinonen et al. 2017).

Of particular interest and in order to create a frame of this thesis-studies' challenge, specifically one of the scenarios has been chosen for closer examination and adaptation, provocatively named ***'Radical Start-ups'***.

This specific scenario was selected for a verity of reasons, firstly it suited an entrepreneurial and creative perspective, in which I could observe and engage in action in a futures Clinique. A Clinique is a large modified futures workshop of expert participants that was arranged to rigorously explore the ready built neo-carbon scenarios (in May 2015 at SITRA). For this practice part of this research, I also took the role of the moderator specifically for this *Radical Start-Ups* scenario, with the desire to gain further insight and offer new interpretations.

Secondly the scenario itself merits further elaboration in its own right, as for example one of the other scenarios on *New Consciousness* has already received thorough academic attention, exploring its future social and technological energy implications (Brayer et al.

2017). This scenario gained attention while the *Radical-Startups* scenario has been under-explored in its own right. An article exploring one of the other cases, the New Consciousness-scenario has extensively explored the transformed energy regime, speculating on how its systems function using networks of p2p person to person energy storage with solar and wind power, and how further societal values had changed.

The same level of exploration and re-examination have not been made for other scenarios, although several publications and reports have been made on the Cliniques, results and the scenarios that contribute to the larger picture (Vainikka et al. 2017; Heinonen et al. 2017). Still there is ample room for alternative interpretation. It is clear that the focus and role of the Neo-carbon project has been concentrated on exploring science and technology aspects and their societal implications in this respect, specifically connected to the energy regime. The project in practice as a participation between different research institutions in Finland formulated and experimented with real energy storage networks, real technologies for carbon capture, solar and wind energy (ibid.).

For this introductory stage, it would be important here to introduce the chosen scenario briefly. The scenario is built upon a peer-to-peer entrepreneurial, non-hierarchical model of a future society that assumes there will be a fully renewable energy system by 2050:

> "[This Radical Start-ups scenario has already achieved successful transformation to a 100% renewable energy system] based on distributed solar and wind energy storage[...], while production is organised as peer-to-peer models, as communities instead of hierarchical command structures.
>
> [The] economy is driven by networks of start-up enterprises which are tightly interwoven in the surrounding society. Most of these companies have evolved organically from pre-existing non-commercial communities. For those who work at the startups, the lines between work and leisure are blurred inseparably. The walls between different start-ups are porous, and open collaboration prevails throughout society. Still, many are left out of the start-up economy and have be-come marginalised. Those who do not feel themselves comfortable with the commercialised social and cultural sphere, find it hard to find their place in society." (Ruotsalainen et al. 2016, 2)

The characteristics of this *Radical Start-Ups* scenario it is notable that it fits very well with a neo-Schumpeterian view of entrepreneurial driven innovation, a regime of its own, where individuals construct their own dynamic relationships and where concepts of work and pleasure are blended. This portrayal of society is furthermore within the constraints

of a highly ecological perspective, in which the economy is based on ecological solutions, akin with a maturing concept of green growth.

In the coming chapters of this study by further examining this case of a successful transformative futures scenario and its connected explorative participatory workshop, I suggest that this situation offers an opportunity to attempt to actually see or *'envisage structural transformation'* (Schirrmeister & Warnke 2013). This term is particularly evocative of the role of this thesis. That is, by revaluating the scenario intertextually to further understand the dynamics of the possible future innovation regime, and while drawing from the critical literary traditional forms of *'adaptation'* and intertextuality through the frame of scenario analysis. I propose that a re-reading through *creative* and *transformative* (or *green*) viewpoints offers new benefit and better understanding of the future transformed innovation regime in scenario form. In the next section I will formally introduce these presented ideas as research questions.

1.7 Research Question & Aims

The aim of this research is to further explore the future successful innovation regime by widening the approach to innovation. This is done by revisiting the transformative scenario exploring its other potential characteristics, by applying thinking from the models and approaches of creative and green growth theories and their sectors of innovation. Furthermore, it is my hypothesis that by applying these to an existing and well-constructed scenario we might then bring flesh-to-the-bones and gain further understanding of the model of a successful future innovation regime. This thesis essentially proposes and demonstrates the scenario adaptation method. Thus, the research questions deriving from the above introduced theories and hypothesis as follows.

The main question considers - How can *intertextually reading* and *adapting* a futures scenario offer alternative perspectives, that represent both crative and transfriomative innovation?

The sub questions below specifically aid in this task.

1. When *adapting* and *intertextually reading* of a futures scenario, beyond its original frame, how does it help to better understand and illustrate the characteristics of a future transformed innovation regime?
2. How do applying creative and green discourses and theories combined widen and change the innovation potential?

These questions function as a way in which to seek out the drivers of change that may have impacts on the future, as Rhisiart (2013) has made in his foresight work, similarly I seek to further understand the implications and structures at play in emergence and change. Revealed through this study I suggest that through widening the innovation potential, concepts like *future spillovers* and the role of individual *agency*, that are similarly identified in creative and green sectors, become of importance for this line of research.

1.8 Structure of the Thesis

Here I would like to outline the structure of the thesis. In the previous introductory chapter, the research setting and definitions have been introduced where the creative economy and green growth have been briefly presented in the context that they support the imperative to transform, that address the global challenges and threats facing humanity. Furthermore, this is presented to acknowledge the wider important role that creative approaches have, alongside emerging green-transformative. The futures scenario *Radical Start-Ups* as a case in point has also been briefly introduced that reveals for this study a narrative in which to further explore as a functioning innovation model for the future. In this respect, this research revolves around the role and analysis of the futures scenario.

In the next chapter two, the theoretical framework for this study covers the relevance of this research in the futures studies context, the *creative economy as a driver for growth* and *green growth and transformative innovation*, that offer umbrella perspectives on innovation, where both these areas also offer novel sources for methods, models and theories for understanding emergence and the role of *agency*. The theoretical framework

concludes with the concept of *Spillovers* that is additionally introduced as a significant concept in which to understand and model the innovation process.

Then follows chapter three, that introduces the methodology and materials that are used in this research, which includes a brief literary review that outlines the breadth of literature from the study, as well as the key selected texts and similar complimentary research cases. The methodological use of the *scenario* and *futures clinique* are explored in the context of the wider Neo-carbon project, and the introduction of the adaptation scenario stage. Additional emerging trends for the creative industries are included as an external input in which to widen the innovation potential, contrasting the futures clinique material and to balance out the results. Then the methodological tool of the *style matrix* is introduced as a kind of reframing tool.

In chapter four the results of the *futures Clinique* are presented and all textual data from scenario, Clinique and trends are combined in a *style matrix*. This produces the *futures vignette* that is presented at this stage.

Chapter five deals with the discussion, where the theory, literature and outcomes of the research are reflected upon and discussed, reflecting on the *futures vignette*. A brief fictional prototyped scene in which to explore the transformational workings of the original scenario.

Finally, the conclusion in chapter six addresses the hypothesis and research questions and the potential for further study.

2 THE THEORETICAL FRAMEWORK

This chapter deals with the theoretical framework that supports this research. First a few theoretical literary concepts are introduced that underpin the theoretical process, then moving on to where the futures studies context of this study is reaffirmed. The forthcoming sections introduce the theory surrounding the dynamic claims of the Creative Economy as *'a driver for growth'*, and the Transformative Innovation as a mechanism within Green Growth. These areas I suggest offer key theoretical concepts and models in which to understand futures approaches to the process of emergence and sense-making. Finally, the concept of Spillovers further offers a useful theory in which to understand the complex and emerging processes involved.

The established concept of *Intertextuality* that is usually contributed to Julia Kristeva is an approach in literature, that analytically reads texts in combination or that are built upon other texts, where the meanings are found as dialogue, or as Kristeva explains "as an intersection of textual surfaces rather than a point (a fixed meaning), as a dialogue among several writings" (Kristeva 1980, 66). For this research this intertextual reading of texts about the future transformation and its discourses, through participatory action, form a framework in which to engage the complex materials.

The process suggests that language and texts are intrinsically built upon others, a constant dialogue between reader and texts (ibid.). Futurist Jennifer Gidley has adopted this embodied philosophical methodology where she interprets it as a reflexive participatory relationship with the object of research, in which to seek the "interconnection of ideas where previously none existed" (Gidley 2008; 153-4, 161; quoting Orr 2003; 24). This approach acknowledges the origins and heritage of ideas as well as the multiple interconnections, toward an interwoven reflexive inquiry (ibid. 153). In practice my interpretation of intertextuality, like Gidley's use of Kristeva's formulation, weaves a new narrative between the complimentary bodies of research (*creative* and green -*transformative*) at the same time aware of my own subjective and participatory role within the process. The key thinking here is that novel re-reading of text brings forth ideas that were not evident before.

Within the field of literature intertextuality is already an established form, and likewise the second established concept I would like to present from literature is *adaptation*. In

modern media saturated culture, the term adaptation is perhaps so ingrained and familiar that we might not notice it as a phenomenon in its own right. Think for example about the adaptation of a novel to film, where the core narrative and essence are reinterpreted and presented as a new form in a new medium, changed and yet still maintaining a reference and dialogue with the original narrative, characters and genre. It is this adaptive process that I would like to foster for scenario analysis, to take the literary form of adaptation and use it to extend, reframe and accentuate the original scenario. Already in previous sections I have proposed how scenarios can be used to transform, inspire and be a continuation of the process (De Smedt et al. 2013). For this research process I place emphasis not on scenario building, but on the scenario continuation, transformation and adaptation.

2.1 A Futures Approach in the Context of this Thesis

Change and transformation can be understood as the underlying pursuit of futures studies. Futurist Wendell Bell offered that futures studies itself is a transformational science (Bell 2002) as certainly it involves not just anticipating, but also instigating change, where action is part of the change. Futurist Thomas Lombardo has philosophically studied modern era's approaches to transformation (Lombardo 2008, 191-242), as has Edward Cornish from a business perspective in his coined characterisation of the era as the 'great transformation' (Cornish 2004).

Thus, futures studies can be understood in many ways, to be trying to both understand and implement positive transformative change. Futurist Sohail Inayatullah utilises *Transformation* as one of his main pillars of futures process that seeks to narrow to the desired future (Inayatullah 2008). Futures studies is also becoming increasingly important for thinking about climate change. Jennifer Gidley has made a critical dialogue between climate change researchers and futures studies approaches, suggesting that futures approaches themselves are more participatory, and are geared toward action, as well as being deeply informed about complexity compared to standard climate research. (Gidley 2017) Her suggestion is that that climate scientists can learn from futures studies' approaches to climate change, and they should be combined in their efforts, meaning that this requires a multidisciplinary approach to the imperative to change where futures studies have a meaningful role.

Thus, the meaning of this thesis in a futures studies context is formed around a very relevant theory base, as well as a practice base in which futures methodologies are well represented. Utilised is a very multidisciplinary approach, that also compliments and is typical of futures research.

Toward this aim of utilising creativity more to explore the future, we might take the guidance from theorist Charles Landry who stresses:

> "[t]he greatest impact of creativity comes when it finds a way of solving wicked problems." (Landry 2011, 526)

He ponders that wicked problems cannot be tackled by traditional approaches and importantly the "need for creativity should be seen in light of new complex problems, such as greening and sustainability, [that we] will need to reshape how we think and behave." (Landry 2011, 526) These complex problems are interconnected and interwoven political economic social questions, and this we might understand as a departure from the assumption in which the creative sector is separated from the goals of transformation, and that in addressing wicked problems in futures studies it would be wise to learn from, utilise and support creativity.

2.2 Creative Economy as a Driver of Growth

For this study, the creative economy is not only understood as a legitimate economic force within the overall economy, it is primarily applied in this research due to the fact that it has been profoundly acknowledged as a *driver for growth* (UNESCO Creative Economy Report 2013). This places its importance and role alongside current urgent development goals, is far removed from its historical beginnings where the cultural industries were perceived as a negative mass commodification, or elitist social side-distraction by the critical view of Theodor W. Adorno 1903–1969 and Max Horkheimer 1895–1973, (see Moore 2014).

If Stewart Cunningham has posed that the creative industries in its *'teenage years would be rambunctious'* (high-spirited), then growing-up beyond its teenage years into the creative economy it can be seen to be maturing and as it matures it takes on new responsibilities (Cunningham 2011). Nicholas Garnham observes that the late nineties

saw the creative industries arrival in policymaking driven by its potential future growth value, that was generated around the assumption:

> "[…] that the creative industries are the key new growth sector of the economy, both nationally and globally, and thus, against a background of manufacturing sector decline, they are the key source of future employment growth and export earnings." (Garnham 2015)

This observation seems to be reflected in every formulation of creative policy since, where the potential of this 'new economy' to replace fading industries of decline with more growth oriented derived from intangible products and services. In fact it has in many ways become intertwined within conceptions of innovation, as Terry Flew identifies "[c]reativity was seen as the foundation of innovation, and innovation was seen as the new primary driver of economic growth." (Flew 2010) Becoming the very embodiment of innovation, human creativity and knowledge were at the source of this momentum (Florida 2002; Flew 2010).

In rethinking the *enabling factors* of innovation, Flew proposes that the creative industries and creative economy address key issues concerning post-industrial economies, in which both sides of the equation are more fully included and engaged: arts and humanities alongside science and technology (Flew 2010). Both arts and sciences are established industries in their own right, but have been combined in new ways to create new industries, as Florida observes (Florida 2002, 44).

Of course this widening of the creative core of arts and culture to include such hot areas as media, computer programming and research and development for example, have caused a kind of identity crisis within the creative sector, blurring its definitions, and have been in many ways seen as a strategic ploy by policymakers in which to place the creative sector as a new growth engine. As Garnham and Flew have critiqued, as it includes the media and information technologies sectors not normally associated with culture or arts (Garnham 2015; Flew 2010). Of course, interestingly this debate constantly contests our understanding of what *is* and *will be* arts and culture, and what *is* and *will be* science and technology (defined by whom?). Thus, through the emergence of this evolving sector the two sides of advancement therefore constantly redefine the relationship. And here I would reiterate that it is this portrayal of emergence in these arenas that is of high relevance for futures research.

The strategic modelling of the creative economy and cultural-creative industries is of particular interest from a futures research perspective. There is much work hidden in its development. If we continue to think about these creative innovation regimes presented earlier, they reveal the evolution and emergence of the new economy and perhaps the seeds of the following future economy.

Going through phases from the core creative to supportive industries and further interconnected industries. At the core are the traditional art and design-based industries, these have been the first stage that identified occupations and practice that was cultural or arts based. Then the secondary ring holds industries that while similar are more market oriented like media and fashion, film and cinema, then the following outer ring are those that are supporting manufacture industries as well as the research and development, games manufacture etc. The outer ring encapsulating them all and represents the whole creative economy, that can be defined by Howkins as 'all goods and financial exchanges derived from creative output'. (Howkins 2001)

Looking at the development of this sector, what is interesting is that this modelled conceptualisation is changing, that the core contributing sectors are merging and evolving with time, and at the same time the creative economy is hard to quantify and place limitations.

For an illustrative example, the inclusion of craft was at one point controversially due to be cut from the UK list of creative industries, until it was revealed by researchers the full financial impact it had of generating £3.4 billion to the wider creative economy (Dezeen magazine, Anna Winston 13/1/2015). This reveals from a futures perspective that values and identity of occupations and professional practice are not static, they change context to meet the current or future social-professional environment. Craft for a moment did not fit the IT growth driven creative economy model, until it was perceived as an important part of design. Likewise, the process of evolution of the creative economy reflects these changes as well as the socio-political climate where the identification, stock taking, sense-making and strategizing are all part of the growth discourse.

Cunningham expresses that rather than a *Trojan Horse*, where various economic growth sectors like media and communications are snuck in, he says it resembles more of a *Rorschach ink-blot*, where one perceives and accentuates what factors in policy discourse are desired (Cunningham 2011, 52, 59). He critiques that there is 'category confusion' which means it is near impossible to gain accurate and timely data about the

sectors, which leaves only unfocused analysis and implementation (ibid. 53). However, as Cunningham observes that for the emergence of the creative economy in linking growth economy sectors with those of culture and creative - there is no going back, *"the toothpaste cannot be squeezed back into the tube"* (ibid. 57). The message here is that the creative industries and creative economy are growing in ways that are not clear, not only as an economy but as it increasingly accumulates and engages related sectors, and they will not vanish, but are open to interpretation and adoption.

Perhaps it is the city as an *'innovation engine'* that as a system embodies and visualises the complex phenomenon of merging diverse occupations, cultures and technologies. The richness of the urban environment of the city has been proposed as a complex innovation machine, where both of these art-cultural and science-technology arenas reside. A dynamic setting where:

> "innovation and entrepreneurship power economic growth that also place the city and the urban region itself is an important factor in the growth equation." (Florida, Adler & Mellander 2017)

This urban and entrepreneurial driver can be seen as the other aspect of the growth discourse that characterises the creative sector, where the clustering, attracting and close proximity generate economic wealth and progress. Richard Florida has called this special group the *Creative Class*, where collecting and attracting talent can be seen as the measure of urban renewal and growth (2002). Following Florida's hypothesis specific core-creative occupations have benefits that *spillover* into other sectors, generating and attracting wealth. Or as Charles Landry has simply explained about creative cities, that the phenomenon of migratory movements of creative workers meaning is centred around the new importance of location, where previously, educated choose a company because of the job, now they choose a city (Landry 2011, 535).

In the book *The Creative Class goes global*, Charlotta Malender and Richard Florida and other urban academics engage in a vigorous test of the viability of the creative class concept, especially in regard to the theory framework of their *3T's tolerance, technology, and talent* (Melander et al. 2014; Florida, Mellander, & Stolarick. 2008). These combinations are suggested as the key to development and I would like to highlight have

fascinating potential as a model for expressing the optimal growth environment for innovation, and even as a model for a future regime. See Figure 1.

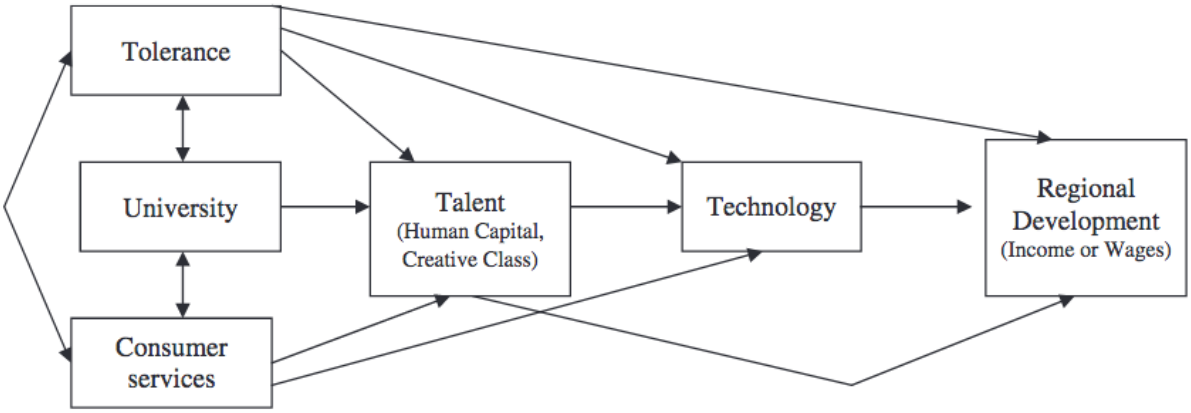


Figure 1. Adapted from Florida, Mallander & Stolarik Path model of regional development system. (Florida, Mellander, & Stolarick. 2008)

The model in the book is adapted and tested in different global regions, with different results that engage the complexity of the issue well and lets the creative class theory still be a valid and useful indicator of the modelling of the regional creative economy. The assumption is that the creative class migrating talented workforce move to attractive places where there are solid levels of services offered, from commercial to social, education, health etc. The global study of the representation of the creative class then can be seen is a reaffirmation of the model and concept's importance and legitimacy, even after some criticism.

In light of Florida's recent work and in response to his critics, he reinvestigates his position on the creative class, acknowledging that the issue is much more complex than originally thought and that the application of the creative class is compounded by the growing urban divisions caused by gentrification, an unforeseen symptom of the creative class (Florida 2017). A much more inclusive and balanced approach to urban innovation and growth he sees is necessary (ibid.). Looking again at the potential of modelling the *talent, tolerance, and technology - the 3T's*, we can see already that they are adaptable for new tasks and should not be overlooked. The obvious issue here has been that the creative class does indeed add value, but as Florida asserts now it needs to add value for all, not just some (ibid.).

We can acknowledge again that this is a case for the need for a widening of theories and concepts of innovation, to include a fuller and more inclusive understanding of the spatial and environmental contexts, as well as specific innovative and creative activity. For a futures perspective even though these models are discussing specific numerical indicators from a set time in the past to present, the model reveals most importantly what underlying key relationships support future creativity, innovation and growth. It uncovers the valuable relevant growth formula, that Mallander and Florida outline in their work that they call: *inside the black box of regional development*.

This thinking we might carry forward later in our re-reading of the Radical-Startups scenario, combining other elements that might also be added to broaden the innovation model. At the very least, irrespective of the empirical data on cities as valid grounds for the future competitiveness of specific cities or regions. More importantly I suggest to acknowledge the work already made in actually attempting to model the successful innovation rich society, that in structure and relationship has meaning and validity.

The sensitive and novel nature of the creative sector is shown in Michael Indegaard's research of the impacts of economic crisis on the creative industries, *Creative New York in boom, bust and the long run* (2013). He suggests creative industries in high growth *'boom'* periods have had the most growth, with an "explosive rise" especially for those linked to "mechanisms of speculation", but also "suffer the most dramatic falls during bust" and downturn (Indegaard 2013). The creative industries can be said then to be particularly sensitive to the market movements, especially when developing something new, but also offer the greatest rewards. In response to the suggestion by Pratt and Florida, that the creative industries potentially are "replacing finance as economic drivers in major cities" (ibid. 43), he sees it as a much more complex issue. That in crisis, creative industries are actually vulnerable and importantly often need support from state to survive, and are no match at present for the finance sector generation of tax and income revenue (ibid. 49). The kinds of flexible working, 'incubator' support Indegaard illustrates, "New York has offered a Fashion Industry strategy that aims to strengthen the city's position as a '*hub of innovation for emerging designers'* and attract a new generation of *'design management and merchant talent'" (*ibid. 49). This in a way illustrates the role of support for the creative industries, in order to enable entrepreneurial growth. This portrayal I find especially relevant for the Radical Starup scenario to consider later.

2.3 Cultural Entrepreneurship

The concept of Cultural entrepreneurship represents an interesting model of agency for the creative economy. According to Bastian Lange *'Culturepreneur'* is a combination of 'culture' and 'entrepreneur' embodying various forms of capital, able to mediate between and interpret areas of culture and service provision (Lange 2011, 260). A creative entrepreneur translates between business services and the creative scene and is someone who runs clubs, record shops, fashion shops, galleries bridging the new evolving urban social landscapes (ibid).

Berlin for example, Lange suggests in the early 2000's, has found most rapid growth from design, fashion and music industry that represent the urban fabric of the city. A growth in design: fashion, web, print and media come without the direct support of the city administration, revealing that these emerging sub sectors they have their own mechanisms of support (Lange 2011, 260). In fact, it is this point that is key, that these sectors have become through sheer-necessity, self-organising and self-governing. (Lange et al. 2008) They operate in **new undefined areas of the emerging economy**, through the convergence of different economies that are navigated and utilised by individual entrepreneurs and groups with agency, to make things happen.

The cultural entrepreneur I suggest is an interesting model for **autonomy, agency and transformation for the future**, perhaps often overlooked and misunderstood sector as it has been beyond standard categorisation, **often on the vanguard or cutting edge**. Frequently in this sector, growth and economy are beyond direct financial exchange, and beyond conventual monitoring. The creative industries innovation setting of *creative innovation labs* and *Hubs* also carries forward this theme of self-organising models for growth (Leminen et al. 2015). This focus on the dynamic creative and cultural, multisector actor working in new undefined areas, offers an important area to consider later in the thesis.

2.4 Green Growth as Transformative Innovation

In this section green growth is explored as a specific application of transformative innovation. If sustainable development represents the maintaining of life for future generations, then Green Growth can be understood as representing the wider

opportunities that arise when discovering economic continuation without breaking the limits of the environment. In this context, it is the strategic role of innovation, to be transformative, to be mission oriented toward facilitating that transformation is particularly of interest here in this research. W.T. Wilbanks (2014) importantly calls for transformational change rather than incremental change – in considering technology innovation. He visualises the task ahead, where the distribution of change needs to be more widespread and impactful, especially in the context of energy transformation from fossil based to renewable, as incremental change by step by step improvements do not generate the overall systemic change that is needed (ibid.). However, the issue is not exclusively a technological approach.

Francisco Szekely and Heidi Strebel have identified the typologies of *Incremental, radical and game changing innovations* (Szekely & Strebel, 2013) that portray the wider range of innovation spectrum required for the challenges we face. Then yet another perspective by Fred Steward suggests an additional level of theory in the form of *Transformative Innovation*. Presented through the think tank Nesta, the global innovation foundation (UK) as a radical policy proposition the concept, that I would suggest is perhaps not as well-known as it should be. In fact, it may well be that in 2008 it was not yet fully understood as it preceded the global shift to tackle climate change. This work can be seen as a call to arms and a source of theory and policy change. My aim here is to reintroduce its' ground breaking concepts as an important contribution to be used in futures research, as well as a tool that encapsulates frames of green innovation.

As a theory transformative innovation is seen as being broad in scope and radical in character, as it is about radical change, or even epoch change, with long term visions and short-term action, it is an innovation that embraces both technological and social change (Steward 2008, 15-16). Steward points out that transformative innovation needs different policies to those shaped by the traditional technological agenda, whether incremental or radical (Sterward 2012, 341). The challenges for the innovation policy arena are now to be seen as broad societal problems with no straightforward technological solution. They are quite different from the mission oriented grandiose prestige technology projects of the era of Concorde and Apollo. The solutions would require a diversity of technology and social change, and crossed the production and consumption divide. (ibid., 336) Radical change he suggests is unlikely through only a single focus, as it should incorporate a

mixture of technical and social elements, not innovation in isolation but by purposefully engaging in end consumption and social practice, otherwise the future vision will be too narrow (Steward 2008, 17). Thus, Steward rephrases the concept as t*ransformative sociotechnical innovation*, where the merged terms serve better than either technology or social innovation, incorporating several innovations, where this type of innovation approach requires new innovation actors and new types of knowledge, based more on learning by doing (ibid., 337-8).

Considering this idea above, there is a question of how to approach supporting and construction of this transformative innovation, be it from the role of venture or governance. According to Huberty & Zysman (2010) as they see it, there is a venture capitalist problematic challenge in financing innovation for a large-scale platform, they say this is because for all Silicon Valley's success, it did not *build* the Internet – that came from government led policy implementations, specifically:

> "[t]he venture capitalists' genius lay in capitalizing on this new platform for innovation, not in the design and construction of the platform itself. And it is the platform that, at this stage, presents the major barrier to the transformative energy systems change required for effective climate policy." (Huberty & Zysman 2010)

Similarly, more recent work by economist Mariana Mazzucato suggests that a *mission-oriented* system involves state led initiatives and innovation settings, and that these are the new ambitious and urgent roles for governments to lead, that cannot be left to the market and entrepreneurship to solve alone (Mazzucato 2014). The question we might think about for exploring future regimes are what are these new platforms (like the internet, or social funding schemes) that spur future industries?

Steward identifies the differences in these interpretations of solutions and the role they must play, where:

> "[…] often to meet the challenges of climate change (British) governmental strategies are traditionally narrow industry led interpretations of technological innovation, that do not engage locally based low-carbon socio-technical system innovations that offer diverse hybrid public/private experiments and test beds." (Steward 2012, 338-9)

In this way government strategies are dominated by industry solutions, narrowing innovation potential that not engage wider softer systems. The very nature of

experimentation, that can be understood as essential for innovating, is missing from this view.

Steward says some entrepreneurs are expected to fail, and governments are too wary of failures, while paradoxically at the same time they *"applaud entrepreneurs but do nothing to influence whether they them sink or swim"* (Steward 2008, 21). In effect there is little-to-no support of the emerging sectors that are crucially able to realise sustainability oriented transformative innovation (ibid.). In the old paradigm governments were **'picking winners'** of specific innovation projects and solutions, now the innovation paradigm needs to move to rather **'picking portfolios'** that offer diverse ranges of innovation portfolios, likewise involving wide ranges of actors. (Steward 2012, 339) Futures research and more specifically futures scenarios that would engage these points would possibly gain insight into new arenas to apply solutions, widening the innovation offering and at the same time finding new systems of governance that reach society. This point seems key.

To summarise the above, transformative innovation is a shift toward a more holistic approach, as a solution within green growth. This includes engaging agendas of sustainability, governance and also *'transformative agency'* where individuals are empowered in the transformation process. That could be described where change occurs in a complex and adaptive system, with continuous change, that are characterised by holistic change, breakthroughs, that also represent a catalyst for change. Being truly collaborative and social, understood as a systemic change at all levels, with positive change articulators made by systemic-innovation actors. (Bruckmeier 2016, 365; Steward 2012, 339) In this manner green growth utilises change through transformative innovation and transformative innovation happens through transformative agency, where individuals are empowered as actors to engage in a systemic manner, inducing more radical change.

Perhaps, in seeking transformative agency what we are talking about is also entrepreneurial agency, as Tuomas Kuhmonen explains that:

> "[…] 'new' is always small and local when it emerges, rather than extensive, large or universal. A small firm is an ideal tool of the entrepreneurial agency to probe into novelty, to explore a niche or a competitive advantage." (Kuhmonen, 2010, 95)

Beyond economic terms, Kuhmonen suggests that the entrepreneurs' own aspirations also define opportunity not met by others (ibid.). This type of entrepreneurial agency then is a dynamic at work that is driven by exploring both uncertainty and aspiration, enterprise

and individual. This is much more of a bold approach than traditional business led incremental innovation improvements, seeking slightly greener products and processes (Steward 2012, 333). Through agency, as Kuhmonen has above stated, individual's active engagement and identity dictate alternative business models that need to be both agile and local to meet an adaptive changing environment.

Hall, Daneke & Lenox (2010) cautiously engage this issue of entrepreneurial agency that are part of the forces of "large-scale economic and societal transformation through innovation". In this situation, the entrepreneur is elevated to 'save the day', that they re-name as the *Panacea Hypothesis,* that is:

> "[t]he unstated assumption is that green, clean, and low-carbon entrepreneurs will somehow cure most of what ails ageing industrial economies." (Hall et al. 2010, 441).

The core idea is that green entrepreneurial action would stimulate economic growth and offer high growth potential for employment, while still remaining sustainable (ibid), offering sustainable products and processes (ibid. 440). This common discourse follows the assumption that "entrepreneurs are better equipped to detect (even spearhead) subtle shifts in societal values and much more able to ignore precedence and pursue innovations" (ibid. 444). However, Hall et al. are cautious and critically suggest this sometimes is overly optimistic and that there are still many hard questions to be answered, as to what extent sustainability driven entrepreneurs are different from other entrepreneurs or incumbent businesses? (ibid. 445) And "under what conditions can entrepreneurship simultaneously generate growth while advancing social and environmental objectives?" (ibid. 445). They suggest that there are some growing literature and theory supporting this area, but there is work to be done to actually understand it and there is 'uncertainty' about its future role (ibid. 439). The crucial question is "will entrepreneurs rise to this challenge?" (ibid. 446) as there is great uncertainty about how this will actually play out, much of which is dependent on the individual and collective agency and its support systems.

The *Panacea Hypothesis* then is of critical relevance and importance here to articulate the imperative to transform within the context of green growth where entrepreneurship especially engaging the 'novel or new' can be understood as the facilitator of transformative innovation. But also, that effective research into this area also tries to answer these crucial hard questions by examining the areas of uncertainty. One of the

benefits of futures research and scenarios is that they are an effective tool to probe uncertainty (Derbyshire & Wright 2017; Bell 2012). The scenario presented later in this thesis offers further inquiry and opportunity to fully explore the landscape of this type of eco-entrepreneurship.

2.5 Spillovers

Spillovers are the concept of indirect effects from actions. For this research the concept of spillovers have become a recurrent theme and theory in the literature, that illustrates the conceptualisation of extended impacts and the further reach of the innovation system. Perhaps this can be seen as crucially important in order to observe and effect possible creative and transformative future actions. Spillovers can be defined simply as unintended impacts or exchanges of an activity, often in the form as knowledge spillovers, that is the unintended exchanges of knowledge (Gråsjö 2006, 12). A wide variety of other potential types of spillovers also should be noted, depending on the subject or context i.e. network, financial, technology, innovation, cultural and so forth.

In order to narrow this approach specifically for the context of this thesis, we might just generally consider the areas and approach of knowledge, innovation, and also creative spillovers as these also encapsulate many other forms of the phenomena within them. Researcher Urban Gråsjö simply describes the knowledge spillover, where: “knowledge is a phenomenon that has a potential to spill over or flow between agents in an economic system” (Gråsjö 2006, 12).

If our task here is to consider scenarios that are modelling a system involving growth and development, I suggest spillovers can then be acknowledged as relevant to this pursuit and for futures studies in general. As Gråsjö observes, that “the importance of knowledge spillovers is well established and their existence is fundamental to the theory of endogenous growth” (Gråsjö 2006, 20). In many ways all spillovers can be seen to have a knowledge or information focus. We might think about spillovers from mission-oriented government led innovation investments where for example, the NASA space programme put a man on the moon, that consequently resulted in many unintended technological spillovers that broadly benefited society (Mazzocato 2014). The infrastructure of the

internet might be another good example to consider, where instigated through government investment there are direct and indirect and unintended impacts and forces that go far beyond the initial conception of the role of that technology. The internet clearly provides a good illustration of the countless unexpected spillovers to society at large. (ibid.)

2.5.1 Creative Spillovers

Creative Spillovers, that focus on the flow of creative aspects of this phenomenon, on the other hand are another expression. Where it is not technology or knowledge per-say that is central, but the causal and indirect effects of culture and creativity – be they art and design, architecture, music or other expression, that can even be experimental creativity found in research and development.

Reinforcing the importance of creative spillovers approach in this study, is the discovered recent 'Invitation to Tender' for 'Cultural and Creative Spillovers in Europe' (2016), that followed the publication of the 2015 'Cultural and creative Spillovers in Europe' 2015 report. It calls for innovative methods to evaluate these spillovers, case studies, in response to the need for demonstrating more clearly causality in spillovers. It represents the very real actionable need, for approaches to explore the creative sector by specifically looking at the spillovers. This represents the state-of-the-art methodology for the creative economy in which to better understand the causality of creative spillover (Invitation to Tender 2016). This represents an emerging field that is as yet uncharted, and it is a call for spillover methodological approaches, measurements and future potential methodologies. This invitation reinforces this thesis's relevance and timing, where the spillovers concept offers material and supportive theory for scenario and futures research, and that is yet uncertain.

In an examination of spillovers for the creative industries, or technically similarly named NE *Network Extremities* as they are also referred to in certain disciplines, Hoo Bea and Yoo (2015) importantly link together spillover, innovation and creative industries in their exploration of the economic modelling of innovation in the creative industries. They identify the connections to other industries and their implications. They suggest that there has been little modelling for the creative industries as an economic sector, as there are problems faced with identifying the correct indicators and approach

(ibid). They find that creative industries are interconnected with innovation, and also supporting innovation in other industries, with “critical elements to generate innovation spillover to other sectors” (ibid). The problem creative industries face, is that for start-ups their ability to acquire business loans from banks is difficult, as they are often working in new uncharted areas that are hard for banks to put value on (ibid). By utilising this financing issue in their model Hoo Bea and Yoo were able to identify and link the relationship between Network Externalities (spillovers) and new business entry and also the relationship between banks' profit and creative industries' profit. They show that entry costs for the creative entrepreneur rise when there is a less degree of spillover occurrence and likewise costs decrease when spillovers are highly established. In this model they have identified flows of spillover innovation and enterprise by looking at business bank loan data. (Bang Hoo & Yoo 2015, 108.)

It can be thus claimed by this approach to spillovers, that the more intense and closely located proximity the higher the ease to establish a business through startup business loans. By looking at the spillovers they identify the model of a functioning or not functioning regime. This can be interpreted as a useful approach for understanding future spillover effects and systems. We might ask does scenario of a future regime have a supportive structure to ease entry to market? That is not the quest of this study, however it illustrates the compelling need to explore spillovers to understand uncertainty.

2.5.2 Knowledge spillovers

In another key study by Noailly and Shestalova (2017) “innovations contributing to knowledge spillovers in the context of climate change mitigation […] show that knowledge from renewable energy technological fields generate important knowledge spillovers. These knowledge spillovers were detected through looking at patents, identifying 'radical-innovations', 'intra-technology spillovers' between renewable energy, and external spillovers (ibid.) They are able to draw attention to policy fields through these spillovers, clearly identifying the knowledge spillover flows. There is an understanding here that at least directional flows of innovation can be identified. The emerging renewable energy sector then is especially rich and accommodating for knowledge spillovers, and we can imagine it finding suitable partnership with the creative economy who likewise are highly adaptive and technology oriented with spillovers implicit in the exchange of knowledge and culture. Perhaps it is beyond this thesis to

implement this concept fully, but keeping this type of considerations aids in knowing that intra-technology spillovers are key areas to include.

Spillovers has been suggested, to be especially important for organisational change, especially organisations transforming themselves to orient toward new markets. Ko and Liu (2015) explore how the third sector or Social Enterprises “acquire knowledge to transform themselves into more market-driven, business like social enterprises”. Business knowledge in the *Third Sector* (e.g. Non-Government-Organisations or NGO's) is hard to contain as organisations may actually willingly share with one another to achieve the greater good (Ko & Liu 2015). Implying that this kind of knowledge will further foster knowledge spillover flow. This type of study, they say, offers great potential for transformation. They argue that in this exchange more emphasis is given to the knowledge receiver than the knowledge giver (ibid.). The flow of the knowledge spillover cannot be easily controlled, as no formal collaborative arrangement exists between sender and receiver. This is specifically 'entrepreneurial knowledge' that exploits business opportunities as well as technical knowhow, they discover more innovative ways to create social value for a sustainable venture (Ibid.).

2.5.3 Spillover Effects structures of emerging regime

Looking back over this last chapter, there are a numerous variety of examples how spillovers can be observed as a function of structural change, growth or stability. Organisational spillovers, or 'intra-technology spillovers', and knowledge spillover and knowledge spillover flows, innovation spillovers etc. We might understand these all under the framework of ***Spillover effects***. These can be largely understood to function conceptually as a growth - development framework, to bridge them to the rest of the society and the economy at large. This formalized concept has been described in the Framework by EU OMC working group on CCS (EU OMC Policy handbook 2012). They define, three important stages of innovation and maturity of the regime are depicted.

> 1. Creating preconditions (i.e formign of favourable environment, identifying what is considered part of this innovation regime);
> 2. Strengthening (or strategic positioning) and;
> 3. Spillover effects (bridging effects upon society at large). (EU OMC Policy Handbook 2012)

In this way it is possible to categorise the key stages, functions and relationships of these actions with one another, and especially in a novel way underlying the role of spillovers as the third important stage that has the widest effect on society. This forms a clear framework for development that identifies the stages of development for the creative industries. But could quite easily be applied more generally to other regime sectors like Green Growth for example. For futures studies, spillovers have as yet not been fully utilised.

3 METHODOLOGY AND MATERIALS

3.1 Literature Review

To a great extent this study has been based on compiling a review of relevant, diverse and novel combinations of literature that opens up and underlines discourse and theory on this tentative subject. The role of the literature review as a method, can also attempt to revise an understanding of an established field and explore certain characteristics of the literature to expose underlying visions or evolution of the field (Iden et al. 2017; Bugge, Hansen & Klitkou 2015). To this end the discovered literature follows a process of finding new meanings, dominant discourses and emerging developments. As ‘innovation’ itself is an obscurely defined subject, then it requires reinterpretation to discover meanings and contexts.

To conduct a review of the expansive body of literature required for this research, the thematic bodies of theory have been divided into two general areas, to represent the two complimentary positions. As described in the previous chapters they were green growth and creative economy (creative industries, cultural industries, arts and design) featuring transformational innovation and the creative economy as a driver of growth. Furthermore, in exploring these literatures further, the discovered themes of 'spillovers' and 'agency' that were identified. That are clearly connected to the need for modelling and transforming. These interconnected or complimentary themes were of interest. Academic search tools were utilised with keywords, as well as reports and white-papers explored through internet search engines (like Google).

The beginning of the research process found that the UNESCOs creative economy report (2013) offered a profound claim of creative driven growth. This claim offered a way in which the transformational scenarios produced for the futures clinique, could be explored in a new way. The hypothesis was that a creative, culturally rich innovation approach could contribute new perspectives to the futures research project, as often cultural or social aspects are not considered in large technology-oriented projects.

Critical observations about the emergence of the creative economy and industries’ importance has been described by Garnham, Flew and Cunningham. Literature by

Howkins, Landry and Florida have offered the foundation theories for the new economy and creative practice. However, it was Florida and Mellander's approach of modelling the 'creative class' that offered and understanding of how highly creative innovation rich settings could be explored for the future. These connected interrelated issues, in order to identify preconditions for a desirable innovation rich system leading to growth. A deeper search into the policy reports and documents of mainly European creative industries, revealed the strategic nature of these policies to deal with monitoring and conceptualising the illusive and emerging economy, that was understood as a phenomenal area of growth and importance for society. The modelling work was especially important to notice in this literature search considering the context of future transformation and idealised creative driven innovation regimes.

Considering other dominant theme of transformation, in which renewable energy and green growth approaches are strongly represented, there is a need for alternative literature to give new understanding and perspectives for it, that go beyond the approach used for the scenario building and the Neo-Carbon Energy project. As the project's scenarios were based on Rifkin's *Third Industrial Revolution* and Bowens theory of *peer to peer society*, it was important to find other avenues to contribute to this research discussion. Methodologically speaking the scenario is treated as ‘conjecture’, a proposition that one accepts whole, including its theoretical foundations, themes and literature (i.e. peer to peer, high ecological solutions based on entrepreneurial growth etc.). The purpose of the literature search becomes much more about sense-making of this claim, as it is about both understanding and categorising the different disciplines involved.

From this methodological perspective one could say this was akin with a grounded theoretical approach, to discover what methods and theories openly and naturally should be applied in the discovery process. However, in actuality, as futures research is naturally inter- and multi-disciplinary, this exploration of suitable information that enables us to talk about the future already naturally considers this wider prospecting process. It is thus natural for futures research to engage in diverse literature, to step out of normal discipline boundaries. As such, the literature search did not try to document the entire body of academic research on the main themes of: creativity, creative economy, culture industries etc. or green growth, sustainability, renewable energy etc. Even if these terms were at one point specifically searched for. As each of these thematic areas produce huge amounts of articles beyond the scope of this research. In practice it was more important to find texts

that were representative of both of these emerging practices or covered the key themes and concepts.

The grounded and multidisciplinary nature of futures research can be seen to nicely follow the intertextual approach. That informs this methodology, where texts-upon-texts are collected. Where one set of research uncovers and leads to another area, that in contrast requires similar examination of the parallels of creative and green themes.

In practice search keywords of creative*, transformation*, transformative*, green growth*, creative economy* for example guided the search, looking at academic journals and key reports and a few specific books (especially concerning the creative economy). The sectors were sought for representative literature to define them and then especially from futures studies and foresight related articles were sought also on these themes. Notably Martin Rhisiart's (2015) article emerged from an early search, with a futures perspective, became influential as a methodology base starting-point, as it dealt in similar culture creative based themes and methods like scenario building and futures workshops. The literature structures can be seen below, that also form key concepts to add to the Style Matrix.

Table 2 Key Literature dimensions

Main Themes	Key Literature sources	dimensions promoted
Creative Economy as driver for growth	UNESCOs creative economy report 2013; Florida 2002; Mellander et al.; Garnham 2015; Flew 2010	
Green Growth as an engine for growth	W.T. Wilbanks (2014) importantly calls for transformational change rather than incremental change.	Green Growth as an engine for growth
Entrepreneural Agency	Hall, Daneke & Lenox (2010), Lange (2004)	
Transformative innovation	Steward, Fred. 2008. Breaking the Boundaries: Transformative Innovation for the Global Good. Steward, Fred 2012. Transformative innovation policy to meet the challenge of climate change: sociotechnical networks aligned with consumption and end-use as new transition arenas for a low-carbon society or green economy,	

Typologies of innovation	Szekely & Strebel, 2013; Steward 2012, 2008.	Transformational, Radical, game changing and Incremental innovation
Knowledge spillovers	Noailly and Shestalova (2017) renewable energy innovation positive knowledge spillovers.	Spillovers as linked to the dynamics of growth
Creative Spillovers	Eg. 'Invitation to Tender' for 'cultural and creative spillovers in Europe' (2016). OMC handbook.	Spillovers as linked to the dynamics of growth

3.2 The Futures Clinique

As part of the participatory empirical research, the special workshop (futures clinique) that is central to this research is presented here. The Clinique with the title Creating the Third Industrial Revolution organised by the Neo Carbon Energy Project (Finland Futures Research Centre) on 6th of May 2015, was held at the Finnish Innovation Fund SITRA building in Helsinki for 70 expert participants from various institutions, organisations and companies. The task was to explore four futures scenarios of transformative energy future in the year 2050. These scenarios based on data already collected for the project that had been divided to compose the four separate scenarios:

1) *Radical Start-ups,*
2) *Value-Driven "Techemoths"*
3) *Green DIY Engineers &*
4) *New Consciousness*.

These are established, consistent, tested and well-crafted scenarios that have been used in different ways throughout the Neo-Carbon Energy Project.

The *Futures Clinique* method is a modified futures workshop that can be characterised as an intense highly participatory and exploratory futures method to gain insight and to create radical futures (Heinonen & Ruotsalainen, 2013). It differs from a futures workshop that is founded on resolving certain specific problems, with rather a scope for finding preferred, alternative and surprising futures, all in a short-organised time frame, usually for half a day. The original Futures workshops developed by Robert Jungk (Jungk

& Müllert 1987) are highly participatory, multi-stage workshops that attempt to resolve disputes by exploring alternative futures with stakeholders in order to come together to identify a new future collectively, often over a longer time frame of days or weeks. The Clinique is designed to collect expert participants for an intense period, strategically to utilise their knowledge around a certain theme. Material is prepared beforehand to prepare the participants and moderators for the Clinique session, in which often different scenarios are prepared to explore in groups. It is interesting to notice that the futures scenarios are an interwoven part of the Clinique, where the Clinique is an exploration and continuation itself of the scenario. It becomes a testing space for scenarios (Gordon & Glenn, 2018).

This point I would like to underline here, as much as my adaption approach deals with the scenario, it equally draws importance from its participatory interpretation and exploration in the Clinique as a textual source. The action-based aspect in this research has been important to find new relevance and push assumptions and be highly collaborate in the process. The Clinique itself also has another important function, as an educative showcase of futures thinking, futures literacy and futures methods (Heinonen & Ruotsalainen, 2013). Thus, the function of the specific chosen mixture of showcased futures methods also adds value in representing and developing the futures studies field. It is perhaps this reason that methods are often re-interpreted for the task at hand, as they should contribute in new ways to the field. The Clinique in this manner is an excellent method to utilise in multidisciplinary and participatory research. But also, one that especially demands closer examination, as each Clinique may methodologically function quite differently.

The tight structured schedule of the clinique using the many futures methods – that ran during this occasion is designed as follows, based on the clinique report (Heinonen et.al 2016) and from personal observation. In practice the Clinique follows a structured process of a series of stages of active participatory futures thinking. Firstly, along with the pre-given material depicting the projects focus, background theory and the four transformative scenarios, there the presentation of a futures provocation. The provocation is in the form of a presentation, a talk to inspire future consciousness and ending with a visual inspiring image slide show, called a futures window (Heinonen & Hiltonen 2012).

Then Clinique groups are separated to their designated table to begin their participatory foresight group-work. After a brief group self-introduction, a reminder of the scenario

premise is stated by the moderator and a few minutes are taken for participants to write down their initial ideas about the scenario and to draw ideas from to the provocation they had just seen. All ideas were written and presented on sticky post-it notes and placed into the centre of a *futures wheel*, a method which has been developed by Jerome Glenn (2009), whereby ideas are presented and clustered in a central circle on a large sheet paper. Important themes to develop are then taken to the outer ring where answers to questions of what do these ideas mean in practice? What would be the resulting services or products? This forms a semi-structures space for ideation and development through a process of continual discussion, that the futures wheel is especially good at beginning the ideation process. After this hour process moving on to the next stage the chosen main ideas from the wheel are now considered and transported to a PESTEC table, based on the *futures table*, a structured method by Yrjo Seppälä (1984).

The PESTEC separates issues and themes onto a table where the *Political, Economic, Social, Technological, Environmental, and Cultural* elements form rows. Participants deliberate what should go into each specific section while considering the context of what kind of society is there in Finland in 2050 according to the scenario. Once all sections were full the most important and developed ideas were chosen and circled, then connecting all circles together. The top of the table then was given an inspiring title or short narrative to convey the ideas. The visionary ideas were developed a little further to consider what are the energy implications for their scenario, and if still able given the time, they were asked to make a short manifesto from their vision. As a final stage for this group-work process groups were asked to think of a surprising *black swan* that could come in the context of this visionary work and scenario. A *black swan* is the concept of considering a surprising sudden event that could be very impactful ether expediting or compromising the vision (Taleb 2007). After a quick presentation of all the groups final resulting statements, manifestos and black swans, a discussion where themes were compared and commented on in a cross fertilisation of ideas concluded the clinique event. All Clinique material is collected, transcribed and sent to participants for commentary before the results are analysed and finally published in the Neo-Carbon Energy project in a report. The moderators also gave feedback and make a commentary statement of the proceedings and observations.

3.3 The *Radical Start-Ups* Scenario

Here below is the introduction of scenario description background material, called a scenario sketch (Sirkka Heinonen, Joni Karjalainen & Juho Ruotsalainen 2015b), that was used in the Futures Clinique 6.5.2015. This description was the source of the Clinique and subsequently one of the key textual sources for my research. As it also elaborates on the earlier simplified definition. The larger Neo Carbon project itself developed for different events and reports the scenario descriptions in different ways, but this can be considered for this case the influential interpretation in terms of the Clinique.

Scenario sketch 1: Radical start-ups (Corporate peer-to-peer & Deep ecology)

"In the 2010's, innovation and economic growth began to stem significantly from startup enterprises.

Startups offer new products and services for niche markets. Their goal is exponential growth instead of linear. Startups market value are based on their productivity rather than on expectations for future profits.

They aim to "disrupt" society and its practices, as "disruption" opens up new possibilities for revenue and future profits. Startups being a major driving force, society has become unstable and constantly changing. Precarity has become the new normal. However, the ease of establishing a business makes the instability more bearable.

Society is organized as horizontal peer-to-peer networks. This reorganization has taken place in numerous small and medium-sized startups known for their radical values and approaches. These companies are not akin to the "traditional" companies still predominant in the 2010's but are more community - or cooperative-like. Startups collectives have leveraged the Silicon Valley ethos of individual emancipation, creativity, communalism and networked practices as society's mainstream.

Working in start-ups is often leisure-like, as workers bring their hobbies and free-time interests to work. The line between work and leisure has become often non-existent. Startups can be seen as "communities of interests" where people can often express themselves best and do things that are meaningful to them. Hierarchies are extremely flat. Establishing an enterprise is easy. This mitigates inequalities, but still citizens can be divided into those who work at "elite" startups and those who are employed by "lesser" businesses.

As it merged work with hobbies (free-time), the new corporate culture began to evaporate the division between companies and the rest of society. Consumers demand moral, aesthetic and value-related integrity from companies, just as they expected these virtues from each other.

Authenticity has become the leading value for the new breed of start-ups. These new companies firmly stand behind what they believed in, instead of trying to please as many customers as possible.

Startups are drivers of new, ecologically oriented lifestyles, and many of them have adopted the philosophy of deep ecology – partly to build an "authentic" brand with "street-credibility".

Environmental problems are solved first and foremost commercially. Many startups specialize in environmental issues, energy technologies and environmental services. However, due to the vast number of different startups, the production structure is highly diverse.

> ICTs are everywhere (imbedded in everything) and society is “smart”. Smart technologies, applications and services emphasize the active role of individuals – they enable more than automatize (meaning connect-ability rather than AI). Still, the energy and resource consumption of ICTs is an issue to be solved.” (Heinonen et al. 2015b, 7-8)

In summary this scenario paints a progressive picture of transformation, where society and innovation work hand in hand to solve global environmental problems. These can be seen to be opportunities. On the other hand, the potential radical impacts are formed around the rapid exponential growth and constant creative disruption that leaves in its wake expendable throwaway services and products. Society can be seen as a race, competitive while enjoyable, shocking for our perspective but natural in the future setting. Taking part in the race is essential. The scenario sketch also offers energy implications where solar and wind are dominant renewable energy forms, fundamentally established and stable, and other renewable forms are unfavourable, such as energy taken from forest biomass (clean burning or gasification), as forests are untouched in this deep ecology context. This suggests an understanding of the balance of nature, an attempt to allow nature to be, while in contrast through constant creative destruction of startup activities result in a changeable and diverse landscape of human activity.

3.4 Emerging Trends for the Creative Industries

In order to add textually to advances made in the Clinique, there was a need to add additional trends that generally can be attributing to the creative industries perspectives, that had been collected at a similar time parallel to following the Neo-Carbon Energy project.

These emerging trends are under the context of the Creative industries. I was initially invited collect emerging trends for the CreBiz project (to make a report), that offered an international business development study module targeted for undergraduate and graduate students (CreBiz project; Taylor 2015). The *CreBiz Emerging Trends for the Creative Industries Report* was a collection of trends to be applied in the CreBiz creative business education programme, especially for Open Innovation Labs. These laboratory events were intense short sessions in different European locations. The project involving

three schools throughout Europe, University of Turku, Spain and Portugal engaging creative entrepreneurship in a minor study module at university level education.

The commissioned trends I were presented to the organising group at the event 'Open Innovation Living Lab', in Bristol, UK. The trends were then tested and engaged by students for the programme, with online discemination and in separate laboratory events in the different partner countries.

For the purpose of this study out of all 21 trends, 9 trend clusters are of obvious use for reflection in this case. The trends were collected following a horizon scanning process for weak signals and emerging trends, collecting online cases that would stimulate students into thinking in new ways about creative business models. Searching for weak signals is a method in which to look for signals of change that may become more dominant, with emerging trends being a more established form of trend that is more common and perhaps easier to engage (Hiltunen 2008). In practice the trends were collected along the lines of work done by Futurist Osmo Kuusi et al. in identifying radical technologies for the future, for the Finnish government, and these emerging trends can be seen to follow a similar format (Kuusi et al. 2014).

1) The trend of ***crowd funding*** – and ***angel investors***. . peer to peer funding that is exemplary of some of the aspects of the emerging trend of the *sharing economy* (peer2 peer) that of course is directly on theme. “Finding investors upon mass, known as crowdfunding, offers fast and agile approaches to setting up timely offerings that would never have been accepted in the traditional funding paradigm of banks and angel investment. These are scalable offerings, sometime even not-for-profit initiatives of services that meet a need. Mesenaatti.me is one such crowdfunding platform that specifically offers Finnish creative business opportunities to realise their new business concepts. Some are serious hard thought businesses and others are more conceptual and playful like art performance music offerings. This lets the public support an idea to invest a little and make concepts into reality, some little - others large.” (Taylor 2015)
2) ***Authentic branding*** – communicating authenticity and pedigree of a product, often to be sustainable has high added value. “Authenticity' as a trend is directly linked to the added value of a product and brand by emphasising its sustainable or local genuineness. These products reveal the entire chain of production as being unique, environmentally or ethically good. The identity of the product is linked directly to

the process how it is made, in this way the creative and ethical fingerprint makes these products distinguishable from the opposite mass-produced item. Story telling of the product and brand play a key factor in creating value." (ibid.)

3) ***Coding with objects***, Interactive learning, IoT Internet of Things, makers and interactive tools, wellbeing apps, wearables, new interactive materials. "Coding tools are becoming easier and more accessible connecting code with objects. For children the ability to learn to code is seen as an important aspect of their education and many new tools are being offered in which to seamlessly engage them. ATOMS is one such tool that linking of object to code, linking anything to anything, is part of the larger trend of the Internet of Things an aspect in which products and services are linked together" (ibid.)
4) ***Gamification of Education and Gamification of Sustainability***- also known as serious gaming. A new shift in which creativity can be applied to serious problems, thus 'serious gaming' – where the engagement with a problem is solved in the game like manner. From education to poverty, participation in solving complex genetic codes that utilise the latest developments in game technology expanding the meaning of the game beyond entertainment. UNESCO and the XPRIZE have recently offered competitions in which to encourage expanding gaming to solve real problems." (ibid.)
5) ***"Agile and small SME's*** moving directly to where they know their customers will be, adapting to a changing environment and an evolving business is the advantage of this kind of light weight and mobile businesses on wheels. Adapting bicycles into cafes barista stands, restaurant carts etc. requires imagination and an understanding of creating new experiences in the city. Ecological, green and smart, these are like a development from pop-up-stores that utilise unused spaces and transform them into culturally rich consumer spectacles, even for just a few hours before moving on to the next peak event. If there is something big happening in the city – these mobile businesses are where-it-is-happening. These can be seasonal, occasional or consistently maneuvering the appetite of the city. There are virtually little barriers to this kind of creative entrepreneurship, only imagination"
6) ***Collaborative strategic competition of SME's***, are seen as disrupters. Utilising technology (apps) in a network community that strengthen independent businesses to disrupt larger dominant players. Directly challenging their business with eclectic, personalised and local offerings. Case: "CityShelf — a co-operative

platform comprised of eight indie bookstores, which, collectively, aim to give Amazon and Barnes and Noble a run for their money. ... It enables customers to browse the full catalogues of eight independent New York bookstores using a combined search tool." (http://www.springwise.com/indie-bookstores-team-compete-major-chains/; ibid)

7) ***Old industrial buildings developed as cultural centres*** or hubs. These also are connected with the trend of *coworking spaces*. Sometimes temporary former factory buildings are fast becoming attractive spaces for cultural industries.
8) ***Bio hacking – near Impossible products***. "Science and technology normally associated with corporate laboratories are becoming more accessible for creatives who see bio hacking or gene hacking as ways in which to improve existing products, but also creative near impossible new biological products." Case: Glowing Plants with no electricity (https://www.kickstarter.com/projects/antonyevans/glowing-plants-natural-lighting-with-no-electricity)
9) ***Sustainable design, art & technology***, Case: Energy wall, green and creative energy use. "Giant media walls filling the surfaces of the city seems rather extravagant and energy wasteful until we understand that they can be powered by their own renewable energy (in this case solar). These green creative energy use in the hands of artists, designers and event producers offer a guilt free luxury, where the extravagance of light displays is rather a celebration of the sustainable technologies innovations. Energy is no longer the soul realm of engineers anymore, but for creatives to experiment and express in new ways. Think of city spaces as green interactive spaces, producing power in a playful and experience driven way." (Taylor 2015; See http://www.arup.com/projects/greenpix zero energy media wall.aspx)

3.5 The Style Matrix

The *style matrix* is not considered a futures method; however, it is presented here into the futures methodology-mix as it can be seen to deal with reframing trends. The style matrix, is proposed, as a useful sensemaking tool in which to organise and understand the

interlinking and compatible attributes. They can be seen as similar or complimentary in kind to the futures table (as used in the Clinique). The difference being that the style matrix allows for trends to be seen as 'stylistic actions' in order to in a way curate futures. In a sense it blindly clusters similar stylistic attributes of trends beyond their historical or original contexts.

My approach is built on the method of seminal art theorist Arthur C Danto, who examined the post-historic situation of art history. That is, what happens when you think beyond the linear official bound narrative of the history of art, and how to approach the entire body of the history of art anew. He suggested looking at the qualities of the art itself and codifying them to produce new collections that were representative of a certain style, to find new alternative collections. In his original context he looked at the entire body of the history of art to identify art that had for example 'minimalist' qualities – and present them as a curated contemporary art collection, irrespective of their place in history, while having the understanding of their origins. Thus, for example minimalist paintings from 15th century could be exhibited in the same wall and context as modern or avant-garde art, all having similar attributes (all perhaps painted in similarly, or using similar geometric proportions). This can be seen as a post-normal view of trends (Sardar 1999), or post-history view that seeks a new alternative interpretation irrespective of their origin. In understanding the value of this *Style Matrix*, Frank Boarman suggests:

> "[…] the integrated matrix provides a limited but valuable model of the close relationship between intentionality, history, interpretation, and style. Using the integrated interpretation of the matrix, we can place an artwork in a narrative of expanding available styles—which is just what the 'history of art' means from a certain perspective—and preclude ahistorical and anachronistic interpretations." (Boarman, 2015)

Boarman offers his interpretation of the style matrix, allowing it to be opened up for use, which might be suggesting a futures perspective where the historic past, present and future interpretations are expressed and he identifies the problematics with the matrix but also its potential. Specifically, for scenarios these might be important factors to consider: intentionality, history, interpretation, and style**.** Danto's original formulation can be seen in the context of identifying artistic styles as they transform from period to period, that are often difficult to distinguish, say between modern, postmodern and contemporary - except by looking at the philosophical internal characteristics (or meanings). Although we are not considering historic artworks here, this method can be very helpful to utilize as a rich way of thinking that can be applied to trends (and even weak signals). As it is

very useful to think in this way of types-of '*trends' as 'styles',* to be applied to new situations and contexts to offer up multiple alternatives to conceivably 'paint the future'. And in doing this, I utilise a fresh but also established method in which to re-read trends intertextually.

Danto's original style matrix coding follows this structure looking at styles of art (Danto 1991):

Mannerist, Baroque, Rococo. ,.
1.+ + +
2.+ + –
3.+ – + etc

In this manner, a work of art may have characteristics that fit into one, two or three (or more) stylistic categories; where it could be seen as Mannerist+++, or Mannerist and also Baroque ++– , or Mannerist and Rococo + – + etc..

In order to translate this method into the future innovation regime research-context, I have captured the main thematic issues in this thesis that express different thematic aspects of innovation. These essentially supplement the artistic style codes, expressing rather new innovation styles that can fit into a new "narrative of expanding available styles" (Boarman 2015). These new stylistic formulations to be considered are issues drawn from the theoretical framework on the scale of innovation: *Incremental, Radical, and Transformative innovation*. Addtionally further themes associated with the creative economy and green growth also need to be specifically categorised. And finally the dynamic emerging concept of spillovers is also called for. These key areas are sought for in the texts, where an intertextual reading pulls together narrative qualities as well as systemic qualities. Thus, exploring this in terms of styles allows for nuanced readings.

Chosing a description for each of the styles that reflects the core ideas discovered from the texts. The clinique then forms the main material for analysis, with complimentary trends added where appropriate, as the clinique is most related to the radical startups scenario. The challenge is to fill all the categories in order to express the broadening of innovation style activity. The key themes of for example Green Growth, Creative Economy, Transformative Innovation, and Agency, etc. are addressed.

To aid in this task, the three stages of creating preconditions, strengthening, and spillover effects allow for an understanding of a more complete model of the developing function of the regime. These in a sense offer a narrative structure in which to talk about

the whole. From this material the styles can then dictate what themes the scenario vignette should characterise, and why.

The original style matrix did not offer this dynamic, but as an analytical tool in order to interpret this into a new adapted scenario, or vignette, that specifically addresses diverse innovations in the context of growth and transformation. Thus, the earlier key literature both green and creative, and additional emerging trends, are all intertextually read in in conjunction with the Clinique iterations. The Clinique in this manner represents the new exploration of the scenario. The matrix role is to codify, facilitate and organise these stylistic elements.

4 RESULTS

4.1 Futures Clinique Results

In brief, the Clinique event had around 70 participants attending in Helsinki, divided into groups each exploring one of the four scenarios. Here below specifically are the results of the Radical Start-ups (group 1), that also have been documented along with other groups that are also referenced in the Clinique report by Heinonen, Karjalainen & Ruotsalainen (2015a).

The raw results, found in the futures wheel (see Figure 2) and futures table (see Table 2) and statement from the futures Clinique, offer a view of the system function and thinking within the radical startup scenario. As instructed the participants went around the table introducing themselves and then writing down their first impressions and ideas about the scenario and any ideas that came from the images from futures window. Very quickly the requirements for a more *dynamic and agile startup* scene was discussed, and that at least from a Finnish perspective, that the barriers identified both were social and psychologically oriented. Moreover, the challenge and ability to learn new things was clearly central to the discussion. Confident in the already developed potential of renewable energy through solar and wind, it was suggested that the renewable energy 'solutions' and technologies 'are already here' and just need to be applied broadly. So, the real potential could be seen to be found beyond these technologies.

Startups, or small organisations, were seen to have the potential to be at the forefront to implement, experiment, and find design solutions. They would drive policy and culture through 'passion trends', branding them ecologically, empowered with forms of social media, actively geared toward creative destruction. Established larger companies would be followers in the wake of these radical startups. Startups are emboldened by a *'yes we can!'* attitude, they are *brave* (if not fearless) co-creating between services and culture, driven by new customer demand, experimenting with development. A dialogue between the dynamic challenges of the startups of the developing world and the developed world offer new sources for inspiration and cross-application. These new startups require speedy dynamic agile education solutions to suit their demand for business skills and new knowledge. This education element seemed a crucial binding facilitator of these 'brave values' and momentum to push change.

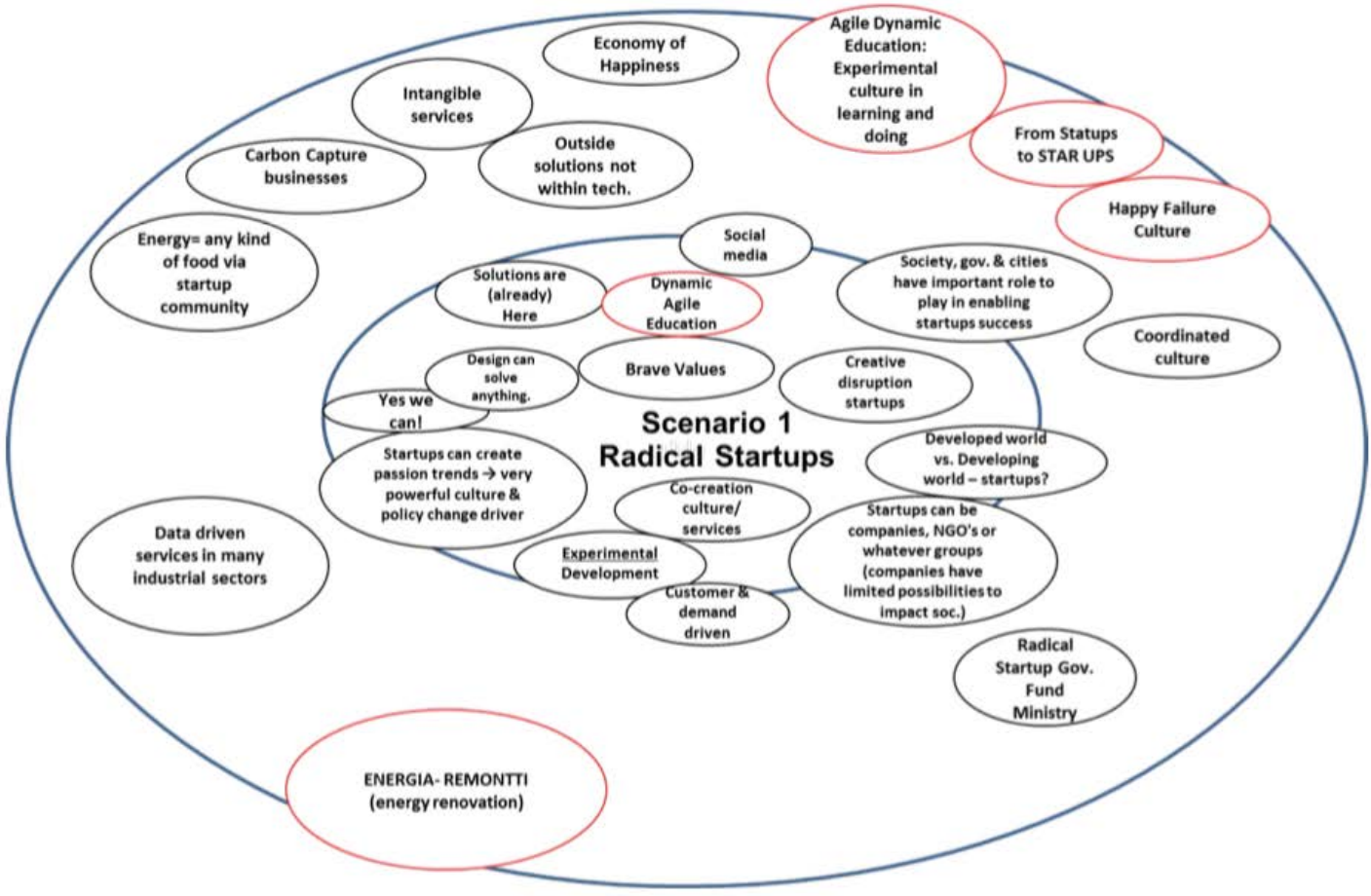


Fig. 2 Futures Wheel, Radical Startups 6.5.2015 Heinonen, Karjalainen & Ruotsalainen (2015a)

These core ideas were developed upon for the second outer ring. Society, urban cities and government are seen as having an important role in which to situate and enable success for startups. Culture is coordinated toward this facilitation of new activities. Beyond economic growth, an economy of happiness is sought. The activities and experimentation, trying out new ideas, is represented in their *'happy failure culture'*, where falling down is seen positively as there is an expectation to return and try again.

> "In order to renovate energy through a culture of startups an agile and dynamic education system was identified as a crucial enabler. Behind this supportive education is a lean bureaucracy, a system where legislation is modified so that it enables startups to grow creating and facilitating a market platform limiting the barriers. Fluid collaboration between education, government and the business environment allow a constant 'bubbling' of entrepreneur innovations, many of which are based around new uses of energy. (Heinonen et al. 2015a, 30-1)

The whole process as an entrepreneurial experimentation with development, toward mitigating climate change. The industrial activities are automated offering broad data driven services. Intangible services, that is conceptual services where the value is created around ideas rather than physical products, are infinite in possibility. New ideas for innovative solutions are not found from within technology, but are sought from outside, offering strange pairings of ideas and applications. One panellist an expert in *carbon capture* explained the very real potential to actively collect carbon from the atmosphere and this would have positive business offerings fitting with this scenario. Discussion of water shortage as a future threat could produce through abundant renewable energy the potential to grow any food found on the globe synthetically and locally, for start-up communities working together.

> "New types of business surrounding energy, like directly collecting and harnessing carbon from the air, was one example drawing from the personal expertise of the group who suggested that this experimental production would become more affordable (as it is too expensive right now to be put into practice). It would become a highly profitable business. Of course, new wind and solar technologies have matured and offer verities of strategic local applications to larger ventures. '*Any food you can imagine'* – the group suggested, can be produced using the water and energy resources in new innovative circular ways, mindful and aware of the environmental footprint, fearlessly bold in its aspirations." (Heinonen et al. 2015a, 30-1)

The theme of experimentation in learning and doing, reveals the education imperative based on directly linking practice-based education, in the field, where learning by doing becomes an entrepreneurial expression. Education in this manner is linked to supporting solutions for challenges in the marketplace. Again, this education format is changeable, agile, adapted.

The mentality change sees a move from *'start-ups'* to *'Star-ups'*, for a positive attitude and celebrity appeal of this movement. *'Star-ups'* reflects a *moonshot* attitude, to try to go as high as possible with an idea while everybody watches. Actors are reassured and comfortable in potential failure (a '*happy failure culture'*) and the ability and support to begin again. This is a mechanism for growth in this scenario. A government body dedicated to funding and supporting these sporadic radical start-up actions is maintained through a national platform.

In the final stage of the futures wheel, most interesting items were circled as ideas to develop further. Chosen themes were *Dynamic Agile Education* from the centre section, then continuing with that theme *Agile Dynamic Education*: *Experimental Culture in Learning and Doing*; *From Start-ups to STAR-UPS*; & *Happy Failure Culture*.

> "Education is an essential part of the coordinated culture effort that supports the radical startup culture, where academic studies directly approach the emerging problems, with less and less fossil fuel business cooperation with universities. Politicians and educators look to create new markets and new kinds of growth based on happiness and wellbeing." (Heinonen et al. 2015a; 30-1)

The team cumulated their ideas in the statement *'Energia-remontti'*, or energy renovation in English, that reflects the current 2015 quest to shift to renewable energy to mitigate climate change, and it was felt that by 2030s through 2050 these challenges had been achieved and upon reflection society was thankful for this positive period of 'energia-remontti' in Finland.

These ideas then were developed further in the PESTEC table to reflect the political, economic, societal, technological, and cultural aspects of the discoveries. From the table the most important from each were again chosen, with the table baring the name "ENERGIA-REMONTTI (energy renovation): From startup to STAR UP". For the political statement 'Legislation is modified so that it enables startups to grow, creating & facilitating market platform.'. For the economic perspective *'Making money with the*

environment' identified clearly the green growth ideology. For the social category an '*Agile – Dynamic education experimental culture, learning & doing*' was expressed.

PESTEC	ENERGIA-REMONTTI (energy renovation): **From startup to STAR UP**				Scenario 1 Radical Startups (Moderator Amos Taylor)
Political	Legislation is modified so that it enables startups to grow, creating & facilitating market platform.	Long term goals are fixed to reach zero-carbon society by 2050	Business development & funding system modified to take more risks & support service. Infrastructure & tech innovations.	Lean Bureaucracy	
Economic	Academic research is strongly linked to business development, policy & government	Making money with the environment			
Social	Agile – Dynamic education experimental culture, learning & doing	Social Security rewarding startups (after failure)	Climate change & other problems will unite people & institutions in more closer cooperation.	Language not a barrier, technology translates	
Technological	Dispersed technological landscape instead of one-fits-all solutions	Authentic Eco tech Clean tech	Eliminate Fossil Fuel Utilization studies/ research		
Environ-mental	Internalisation of external costs	Be aware of carbon footprint	Making fossil fuels expensive would create business opportunities for sustainable startups to make STAR Ups grow		
Cultural Citizen Customer	Failure OK in our culture. Start again!	Be Brave, Try First.... Born entrepreneur.	Positive Psychology	Team Spirit Cooperation 'very local'.	From Internal competition & envy towards boosting together successful teams.

Table 2. Futures Table: Radical Startups Heinonen, Karjalainen & Ruotsalainen (2015a)

In the technological row, *'Dispersed technological landscape instead of one-fits-all solutions'* reflects the creative destruction potential, where standards are constantly questioned and technology offerings are broad, personalised, and diverse. For the environmental row the concept of *'Internalisation of external costs'* reflected the way that nature should be protected from waste and energy through products, services and actions should include in their value the environmental cost of the whole lifecycle, so that the conception to the abandoned end of cycle waste product is also already paid for and taken into account. A concept central to the circular economy, this would pull stress away from the environment. For the cultural (citizen, customer) final row the two phrases of '*Failure*

OK in our Culture. Start again!' and '*From internal competition & envy toward boosting together successful teams'* – suggests that a collective entrepreneurial brave spirit is a key attitude for success in this culture and engaged citizenship.

During the presentation stage in the final 'cross fertilization of ideas', the main points of the PESTEC and the 'energy manifesto' which was titled to be "Lean Brave Agile", were presented. The *manifesto* reads:

> "Be Brave and Committed to → A Clear Timeline For Phasing Out Fossil/Peat (2025!) (2035)
> - *With a positive can-do attitude formed around a commitment to tackling climate change these aims can be truly achieved in a prosperous way.*
> - *In the future we would look back and thank the previous generation for this commitment." (Heinonen, et al. 2015,* 32a)

We can briefly state here that there is a slight disconnect between the final presentation text and the themes found in the table and wheel. This was due I believe to the shortness of time and becoming tired, and reverting back to predetermined personal themes. This is why iteration of *Phasing out Fossil/peat* appeared suddenly in the final statement and not in other material, envisioning those goals achieved by 2025-35. Which one can think is what underlines their idea of a 'can do attitude' to mitigate climate change, and that this would certainly be a historically important point. Overall in the presentation the statement however did not reflect the full potential of the discoveries, and the energy manifesto itself reverts to current determinism of *'energia remontti'* that the experts obviously deal with on a day to day basis, rather than further exploring the 'new agile and dynamic' aspects found."

4.2 Style Matrix Results

The style matrix reveals the many complementary combinations of trends and new perspectives they offer, with for example the themes of education, agency and experimentation offering new attitudes and values that may represent the scenario differently. These trends read intertextually through the literature themes, categorised through the innovation themes to reveal a stylised structure of the future regime. The aim is to provide and identify the material for the adapted scenario – vignette.

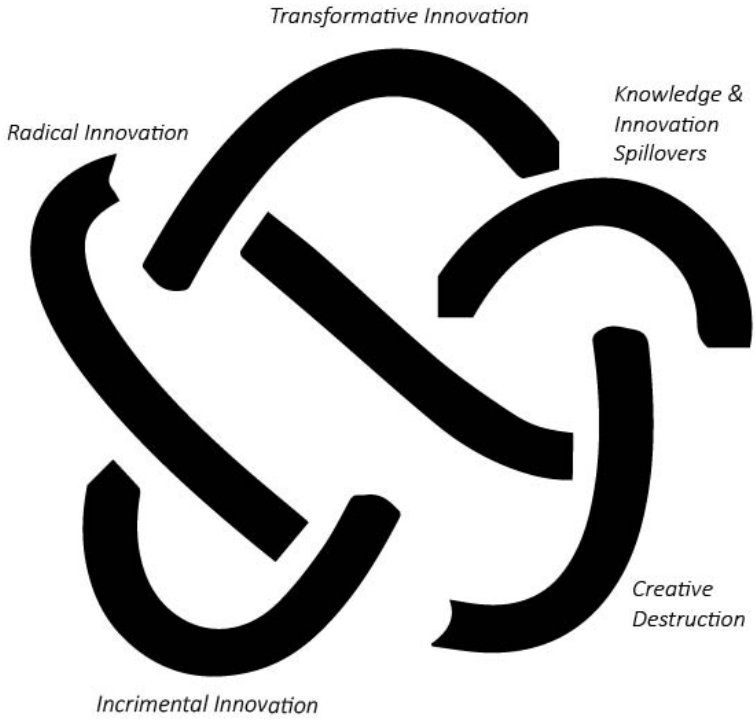
In practice as ++ or – were used directly in reading and coding the texts, in a sense these acted as a research shorthand in which to codify for styles. As a researcher, the concept of these different styles then aided in coding in a different way. Textual statements in the end represented these styles, in order to form and merge the intertextual nature of the process and ultimately to give clarity. Initially ++ - - type codes were enough to identify the major issues, but these each considered became overwhelming. Ultimately it was clear that each style category needed just one clear representation as is similarly normal in a futures table, or has been used in innovation typology. The vignette then took these styles into narrative form in order to communicate this specific depiction of the future.

Table 3. The style matrix

	Style Matrix
Styles	Description of linked text (trend, literature) are characterised as:
Creative Economy as driver for growth	As an enabler for growth, through settings that adds value, and as a driver for growth in its ability to create new tangible and intangible goods and services.
Green Growth as an engine for growth	Crisis is seen as opportunity. The challenges create new greener markets to replace dirty established ones. "*transformational change rather than incremental change"* W.T. Wilbanks 2014
Incremental Innovation	Step by step improvements, slow to progress, but as meaningful incremental improvements and those that establish a new norm. Only incremental innovation is seen as too slow to reach the challenges we currently face, but are also nessacery for establishing a regime.
Radical Innovation	Disruptive sudden shocks to the system, a radical innovation stands on its own, distinctly different from others, that can disappear or be followed by other innovations that follow suit.
Transformative Innovation	"broad in scope and radical in character", paradigm breaking with environmental sustainability at its core (Steward, 2010, 15)
Agency, Transformative or entrepreneural	"Being truly collaborative and social, understood as a systemic change at all levels, with positive change articulators made by systemic-innovation actors." (Bruckmeier 2016, 365; Steward 2012, 339) "A small firm is an ideal tool of the entrepreneurial agency to probe into novelty, to explore a niche or a competitive advantage." (Kuhmonen, 2010, 95)

Culture of Innovation	'culture side of innovation', where he emphasises seeing the 'cultural interpretation' and the 'culture *of* innovation' (Jacobs 2014).
Innovation fatigue/ no Slow innovation	slow or even 'no innovation', where innovation is slowed down due to the risk of organisations who suffer from *Innovation fatigue* (Leitner et al., 2016, 225).
Spillovers	(Noailly & Shestalova 2017) "innovations contributing to knowledge spillovers in the context of climate change mitigation […] show that knowledge from renewable energy technological fields generate important knowledge spillovers." "knowledge is a phenomenon that has a potential to spill over or flow between agents in an economic system" (Gråsjö 2006, 12). Using knowledge spillovers for "organisations transform-ing themselves to orient toward new markets." Ko and Liu (2015)

Another way to explain the above main styles can be seen in the illustration below. Where different stylistic aspects of the whole are elevated with intention that these are interrelated parts of the whole. They are different expressions of the innovation regime.



For this research the complexity of the intertextual relationships is more understandable and managable when interpreted as styles. The creative industry trends themselves were

useful to attach to identify new potential from within clinique results and then to the literature themes. The plus + code act as markers for styles, as simplified below.

The intertextual-reading of these styles for example might look like this: the emerging trend of *Biohacking* - *Impossible products* – style stands out on its own as a **radical+** and disruptive trend that tests the advancement of technology and the legal and ethical systems involved. It offers ecological sustainable solutions but only by breaking the limits of what is currently understood and accepted. **Spillovers** + from these would evoke experimentation and knowledge transfer with both positive and negative effects. The example of 'genetically altered glowing trees' for example might offer solutions to new forms of emission-free street lighting but with unknown ecological implications, or societal issues. In a sense this trend is also proposed as simply a maker movement of groups of individuals in which high level science can be reproduced at home, or in shared spaces by hobbyists. They do this in order to share modify and pass on. This is clearly part of the *peer-to-peer* movement in its initial business application, but also requires a totally new change in attitudes. These require *very 'brave'- 'we can do it'* - attitudes for a startup mentality. These we can identify as **transformative agency** +, that require systems within **transformative innovation** + to support these actions. The *Environment based ecological business* (i.e. green growth), we might link to *Authentic Branding* as a way to **incrementally** + improve the system to new standards and the trend of *collaborative advantage* leads to a challenge the norm that can be interpreted as**+ radical** or **game changing + innovation**. The trend of *Lean legislation platform for startups*, we can link with systems of *crowdfunding or angel investing* from individuals, through collective workspaces that can be applied like hubs that also affect agency+. And if we think back to our framework the creative industries offer remarkable abilities to self-organise and self-govern that would facilitate stylistic characteristics of **transformative innovation** +. *Gamification of sustainability development* can further be linked with *Agile education* or interpreted as gamification of education that when combined would offer a systemic change, combining ecological opportunities and educational needs that would function as **transformative innovations** + as well as having **spillovers+** to other sectors.

The above examples of intertextually-reading styles identify the areas and can be then summarised and joined with other similar elements that fill out and contribute to representing the wider potential.

Next the vignette that incorporates these main factors in the style matrix is presented.

4.3 Futures Vignette

Gemini's New Breed

As a new angel investor in 2053, Gemini was excited to meet her newest potential startup, as this would be the first time meeting them in person at the *Energy Wall* festival. In previous years she had herself been one of the experimenters of the festival with several successful startups behind her, as well as a few bold failures that she learned so much from. Now she had naturally made the shift from being a serial entrepreneur toward investment in new radical ventures.

The aging energy wall situated in a former commercial industrial area, had become a symbol of new eco-experimentation attracting crowds every few months to witness the newest spectacles in eco-experiences. These fusied eco-innovations with experiences was a valuable combination. The wall originally was built as a giant building-sized advertising screen, that was self-sufficiently run by clean solar energy to power a spectacular light-show display, rather like a cinema screen.

In recent years, a thriving diverse culture of entrepreneurs have adopted the aging wall and surrounding industrial area to incorporate carbon and pollution capture technologies with an array of vivid cultural experiences. Energy was the easy part, what to do with it was the fun challenge. The aging wall itself was merely the central point of the festival, in a constant state of being rebuilt with new elements added. morning haze crowds were gathering.

In the morning haze the crowds gathered, Gemini had arranged to meet a bunch of interesting candidates to add to her growing portfolio of change-makers. The most interesting of them was *Octavia Grow*, a couple of guys from Amsterdam who make *impossible vertical gardens*, that grow exotic flowers, fruit and vegetables reintroduced from crops considered at the edge of extinction. These were farmed in elongated hanging tubular tunnels that hang like balconies from buildings, overflowing with blooms of green. These were more than just innovative vertical farms; they were radiantly beautiful environments that captured the imagination.

She knew that one of the guys had been previously working in construction specialising in crafted ornamental balconies and the other had been a former school teacher with a passion for botany, who both became interested in taking over a struggling government supported landscape-garden business. The brief experience in landscape business itself was a flop, but the knowledge and networks gained led to a great new idea – to make modular automated systems that promote optimal life promoting environments. In fact, it was not only rare food and plants that thrived, it seemed people benefited also.

But Gemini was interested in more than Octavia's garden core business; her interest was piqued by its new growing following of fearless experimental agitators. They had been inspired in learning from Octavia's systematic agile approach to create other radically sustainable environments that were also fun, lush, educational and very disruptive. These had spillover impacts across the city, and their hype was growing. She knew that getting in contact with these would have the greatest potential to make her dreams true to affect positive change. They would be new profitable partnerships that she knew her other portfolio of clients desperately sought to support.

But how to gain their trust? Strictly speaking these new breeds were working outside the bounds of the law, self-governing, at misunderstood by city officials. They seemed not to be interested in money at all, rather finding value in exchanges of knowledge and spending what profits they made directly on the next radical social experiments. Already the secretive group of followers became known for orchestrating a takeover of public buildings and even a metro station, turning them into wild tropical gardens overnight. And recently they had made their mark by starting a crowd-networking of gardens across the city to challenge the imported food industry. The public seem to love these spaces, many choosing to work, learn and just be in these haphazard blooms of flowers and fruit jungles, taking over the corners of the city.

Moving closer to the wall through the crowds, Gemini could already smell the perfume of the Octavia technology growing the wall in technicolour. She could see the Octavia guys noticing her and waving. This would be a great investment, a gateway platform to gain access to this new breed. Who knows where this could lead?

5 DISCUSSION

The previous section has offered the key results of from both the Clinique and the style matrix, and while keeping in mind the theoretical framework, with two sets of complimentary literature and methodology. The vignette *Gemini's New Breed* combined the key issues to communicate how the system was in the state of transformation.

In order to address the original questions of this thesis first a discussion is required as to what has been discovered in this experiment.

To reiterate the premise, the role of the adaptation scenario is to engage existing established scenario research work, and to change its frame, as one would with the adaptation of a book or film to another genre. This adds to the relevance of the issues. It seen as being different from the process of scenario building; that is to build, test and evaluate. The aim has been to widen of the potential innovation to meet future challenges, that illustrates structural transformation as other studies have made (Schirrmeister & Warnke 2013). Through the process of adaptation, the original pre-determined context of the scenario is reconsidered, while maintaining its core essential idea. In this case of the Radical Startups scenario, the intertextual reading of this scenario requires external additional material. Some of the external material is added as the result of futures Clinique group work, that follows the original premise designed by the Neo-Carbon energy project.

It could be speculated, as could be said of all workshops, that much of what happens in the workshop discussions and materials does not all directly contribute to that project's final synthesis. And some aspects of the discovery could have other qualities to be explored in a new context. In this way, one could consider scenario work that has been conducted and re-examine it under new contexts. In this case, adding two innovation regime perspectives of *green-transformative* and *creative*, offered new tangible structures and perspectives to the bones of the radical startups scenario. This could then offer a better understanding of the functioning regime and its change, given that these two areas of green growth and creative economy are by now established and studied. Rather than depicting mere green or creative examples of technologies or artefacts, it has been the mission here to rather express and identify the supporting systems that relate to the *emergence* of those fields that is of importance. While it has been challenging to clearly establish one clear model of a future sustainable growth regime, it has become clear that there are multiple sources from the literature that do express provocative contenders to

research further. In this sense this research has been a first step in identifying promising candidates that represent diverse aspects of emerging fields to utilise to think about the future in these ways.

Drawing from an example of prototyping mentioned earlier in the introduction, Archibugi in his prototyping of the future science fiction world of the film *Blade Runner*, he explored how that functioning regime came to be and how coming out of economic downturn could be rectified. Finding for example that certain shifts in biotechnology would have been needed to developed, as well as certain markets to radically change and open up. This he used as an example to explore the then current economic recession, to understand evolving structures and to foresee where growth could be speculated to emerge. (Archibugi 2017a; 2017b)

In a similar manner our case of the *radical startup* has certain propositions that have needed to be explored. As the scenario is proposed to have a peer to peer (individual to individual networked) and highly ecological mindset (fully circular and green) as its axis of core scenario characteristics; the literature of both these attributes offer guidance about how this type of regime would evolve, and what kind of growth characteristics it could have. From a policy standpoint, literature from the creative sector has insights that suggest a high level of autonomy and strategic advantage, in self-governance, enabling development and sustainability, identifying spillovers and also highlighting its vulnerabilities in crisis times and need for formal support frameworks.

The vignette *Gemini's New Breed*, sets the scene in which there is occuring a transformation, and emerging is a new unpredictable and disruptive economy based on experience and ecology. The main character, an angel investor symbolises the change mechanisms whereby through her eyes one can witness the ways in which agency is being utilised toward personal and system change. Past failures, learning, experimentations are all part of the expectations of these experimentors. Solutions are found through portfolios of investment, through platforms, and with the expectaion of the unknown spillovers. The innovative startup of *Octavia gardens* represents this novel technology as a platform, business and with its spillovers into society. However in this vignette there is something beyond something is changing, in the form of a new breed of entrepreneurs who are yet undefined, working in new experimental ways. These are future culturpenerus maybe, bridging the gap between disciplines, representing a fundemental change in values, one

that is more radically ecologically motivated. The vignette suggests that if these could become supported by mainstream society it could be a remarkable change. The setting of the festival scene and the *Energy Wall*, that represents old factory spaces as alternative cultural spaces for innovation, business, and experimentation. Renewable energy is already old in this 2053 world, so what comes next when energy is abundant? The scenario poses this element alongside the spirit of transformative agency.

Scenario expert Kees van der Heijden has said that, once you "have gained sight of the structure and predetermined elements of the situation, yes, it is possible to 'see' the future, and your own unique position in it" (Van der Heijden 2005; 346). We might then consider this aspect more carefully, as certainly in the presented literature it offers actual models and structures in which to identify or conceptualise ideal conditions and their relationships for a regime. For example, Florida and Melander's *black box* model, or the observations of spillovers all suggest a better understanding of novel emerging regimes (Mellander et al. 2014). The very nature of the futures concept of 'emergence' is also very present in the discussions of the formulation of the creative sector as a driver of growth, as well as the green - transformative sector that identifies what is necessary for a giant leap in radical and transformative innovation progress. The literature for green-transformative half has useful insight on the specific need for changes in consumption and end use, finding excellence in its discovery of opportunities in the face of climate change. To name but a few characteristics. I offer that these two areas combined offer structural changes if employed at scale in the future. Thus, for our vignette these aspects are prototyped to elevate the functional engagement with innovation, specifically with the aim of understanding a transformative oriented system.

5.1 Creative and Transformative Agency

One of the outcomes of this research could be best interpreted through the transformative role of agency. Or specifically combining the main themes to provide *Creative and Transformative Agency*, merging the best qualities of the two worlds and blending the boarders between them. This is a concept and term I presented at the poster session at Brussels' European Commission FTA Future Technology Assessment conference (June 2018), specifically to underline the aspects of agency as the outcome

from this research. As clearly the key themes picked up concerning agency suggested distinct changes for the scenario in education and learning, values embracing experimentation, failure and renewal. In the context of the FTA futures conference these seemed to compliment the current state of futures thinking.

Agency in the regime context resembles a fluid combination of skillsets and attitudes where solutions are engaged with ease, where transformation is implicit and failure understood as part of the creative process. This reminds of Maldonato in his research of the mental state of creative consciousness, that he described as "flow", that is an "almost automatic awareness, […] highly-focused but at the same time with effortless concentration" (Maldonato et al. 2016, 323). Perhaps it is this aspect that makes the vignette distinct from the original scenario as it describes the very nature of the change of agency in this regime, rather than its direction in technological innovation. Subsequently the system reflects this change, and varieties of support and mechanisms are given to enable it. Through considering agency it can be possible to identify structures that facilitate transformation. Not just any change, but specific transformation determined by agency. This aspect seems clear.

From literature cited earlier in this thesis supporting ideas can be found in the form of entrepreneurial agency, culturprenuer (Lange 2011, Lange et al. 2008), and transformative agency (Steward 2010; 2012). All of which encapsulate a learning-by-doing active engagement with the system. With a high level of self-governance, due to their necessity to work in novel-vanguard emerging areas (Lange et al. 2008). We also know from Richard Florida (2002; Mellander et al. 2014) that diversity, tolerance and talent are a key formula, where spillovers of knowledge, innovation, and creativity are optimised in more dense urban concentrated areas. In this way urban or urban-like areas have the potential to become growth machines. These can be important settings for any scenario, and utilising the old industrial spaces as cultural innovative spaces in the vignette, suggests a specific grounded setting.

As Leminen, Nyström, & Westerlund (2015) have similarly explored this theme through innovation roles in living labs, that are collective social working spaces for collectively and openly developing innovation practice. They focus on the *roles* in which the actors play that they consider of deep importance. The setting of the living labs, for example, offers a suitable basis for how different types of innovation experimentation play out in everyday life. Specifically, this portrays a certain change-making attitude that

drives and transforms the very nature and role of innovation. It is perhaps this point that is clearly underlined in the Clinique and thus further expressed in the vignette.

5.2 Toward Transformative Future Spillovers

Another way to view this research results can be to acknowledge the role that spillovers have. Admittedly this is perhaps the most challenging task as this field is still fairly undefined. It is for this reason that it is also fascinating and novel way to think about the future. As this too is identified as an emerging field of study. Ko & Liu have noted for example "[l]ittle attention has been paid to the factors that may speed up the process of knowledge spillovers" (Ko & Liu 2015). This gives us the sense that with further research of spillovers, there could be factors learned that speed up or support indirect positive or negative spillovers. In the original radical scenario, spillovers could be potentially found that would further promote positive impacts well beyond the initial renewable peer to peer energy contexts. In the vignette this has been expressed in the form of the *new breed* who create surprising *cultrepreneural* activities that stimulate culture and society in new unintended ways. These are spillover effects that would be essential to understand for the future.

5.3 Challenges and benefits of the research

This research in essence has had two connected aspects, the theoretical and the action-based participative research. One of the challenges in this research has been to keep up with the ongoing Neo Carbon research project that regularly produced new reports, that extensively addressed the major aspects of this subject. Initially little room was seemingly left to discover new insights from outside of the process, as there was already a broad range of research being conducted that was not as techno-centrically oriented as I had assumed.

The other challenge was in managing and processing the broad potential literature surrounding these two large fields of innovation and then in filtering what actually was useful for my particular research context. There was a learning curve in engaging these

simultaneously. However, the literature reveals itself to be of high importance for the research questions. There are similarities and learning that can be only found in reading literature from both fields, both are highly creative in their own right, and both have the greatest potential for contributing to transformation.

There were also weighty expectations on the findings from the Clinique – that were directly designed by and tied to the Neo Carbon project. However, the results were not initially clear how these would be relevant and could help in further understanding the potential of the sustainable regime. Even I had the conviction that a wider view including a cultural creative perspective could be achieved. One could ask is it possible to look at a renewable energy project and also consider its creative potential? This was not initially clear. All of these issues necessarily took extensive time to find solutions to address this need. Exact similar studies were not clearly available within the futures field.

My role as a moderator for the futures Clinique was to facilitate one of the groups, based around the *Radical Start-ups* scenario. There were many other groups that each took one of the scenarios to concentrate on, each with different outcomes. The moderator's role is to guide the process, maintain the time and sequence of stages, and facilitate the dialogue in a balanced and objective way. However, I was also had my own clandestine role as a researcher during the process, observing the whole process, very aware ethically that as a moderator it can be possible to guide the discussion to sway or dominate opinion toward my own agenda, which I did not want to do. I was waiting for the opportunity when overt themes of culture and creativity would arise, that I could then be especially attentive to those, but they did not materialise. My initial research methodology was based on merely identifying culture and creative aspects from the Clinique and then to elaborate those to contribute to the Neo Carbon project as a whole. However, those themes were not clearly evident in the renewable energy discussions, and the demanding role of a moderator in practice meant at that it side-lined any other personal agendas I might have had. Which in itself is interesting to think of individuals own agenda and role in a futures workshop setting, as well as facilitators role of which Dufva and Ahlqvist (2016) have researched. This left me to question my own initial assumptions. That actually to understand the preconditions for creative and renewable growth should rather be sought. And in this lies the need for a stage of scenario adaptation.

It is the hope of this study that engaging in other established scenarios could be revisited and adapted to offer new interpretations and with new understanding to become

more relevant. This adaptation would also mean an opening up of alternative methods to approach scenarios as has been called for in research (De Smedt et al., 2013). This would not necessarily require following the same approach as this study, although the fundamental elements that I have identified would warrant deeper exploration and are open enough to aid in facilitating diverse approaches. Any new approach could consider looking at contrasting literature to identify useful frameworks (in this case innovation related). It could scrutinise and develop on overlooked workshop material, in a way to bring to life in new contexts the often rigid (admittedly necessary) constraints of scenarios.

6 CONCLUSIONS

In this thesis, innovation that is both creative and transformative has been explored, combining the two arenas of creativity (culture, arts, creative industries and economy etc.) and transformative (renewable energy, green growth etc.) to further offer insight through an entrepreneurial led imperative to instigate total transformational change for a more sustainable paradigm.

In answering the main research questions for this thesis the literature and research experimentation have shown in different ways how alternatives can be sought. The overarching question simply asks:

> How can *intertextually reading* and *adapting* a futures scenario offer alternative perspectives, that represent both crative and transfriomative innovation?

Put simply, the answer is that intertextually reading gives a rich dialogue between diverse textual elements; from participatory discussion and deliberation in a workshop, to crafted scenarios, as well as different fields of research literature like on creative economy and green growth. These elements offer alternative ways of sense making, or alternative practices, policies, structures that can be considered for the future. An adapted scenario that considers these points, and of course the process leading up to that adaption, reveals a broader view of innovation, that is based on new insights. Innovation thus has been reconsidered in light of this.

Of course adding new textual elements can automatically make changes, but it is suggested here that the combination of intertetually reading and adapting a scenario would change the frame as well beyond the sum of its content. Thus the sub questions aid us in getting to the issue of this thesis more directly.

1. When *adapting* and *intertextually reading* of a futures scenario, beyond its original frame, how does it help to better understand and illustrate the characteristics of a future transformed innovation regime?

This first sub question deals with the use of adapting and intertextually-reading a future scenario. Presented is the method of utilizing an *adaptive scenario,* that while experimental, clearly has revealed itself as a valuable way in which to open up and

communicate new ways of exploring future innovative settings. At the very least it functions as a way to reframe, rethink and reconceptualise a problem. The benefit of this study has been to articulate and find the various relevant theoretical frames in which to discuss transformation, that has only here been tentatively explored. And yet this perhaps has the most promise for further research and utilisation, in finding complimentary sources of texts. The mixture of external added new information, or new sources of ideas that link participatory workshop material with formally crafted scenario material and theory or policy literature represents an opportunity to re-discover alternative futures. In a sense this is exactly the role an adaptive scenario should take, to make space for opportunities for new voices and perspectives of formal scenario work. This means that scenarios are not final, there are also valid spaces for experimentation and transformation of ideas. One could revisit more formally created sceanrios for example, like the Limits to Growth, or more recent scenarios concerning climate change and adapt them into new contexts.

1. How do applying creative and green discourses and theories combined, widen and change the innovation potential?

The second question deals with how has widening innovation emerged in this research? Firstly, the literature combination contributes greatly to widening the understanding of how innovation can be approached, revealing a robust study in of its self. In this way the wider spectrum of innovation-approaches has been portrayed as innovation *styles*. It has been highlighted in this research that the constantly developing policy and discourse-rich areas of both Green Growth and the Creative Economy as a *driver of growth* can be said to have found a level of maturity. In which much can be critically learned from to be applied for the future, including from its weaknesses, crisis and attempts of modelling. If Green Growth - sees opportunity in tackling the challenges of climate change, then the Creative Economy offers new innovation that forms resilience enablers. Combined these offer broader tools and perspectives in which to approach structural transformation, specifically combined these flesh-out a more complete scene in which actors engage in transformative agency, in actions, beyond regional development, strategically toward a much-changed sustainable system.

Seconondly the potential of the changed innovation can be seen. Themes of crisis and recovery, knowledge and innovation spillovers, and creative destruction have been expressed in this research. And the need for new forms of inclusive learning mechanisms and understanding of the nature of spillovers has been further highlighted. The traits and characteristics of transformative agents reveal the changes in values required to achieve an advanced future system. But also they reveal the challenges these face and their essential support systems are identified. In this way the innovation potential is much more dynamic and it becomes clear that innovation can be tackled upon many fronts.

The results of the futures Clinique-workshop have focused in this case on one set scenario that was based on a future *peer-to-peer energy* setting, that produced results that most interestingly engaged in the empowerment of entrepreneurs and their ability to encounter continuous change. Beyond the successful renewable energy implications that have been expertly analysed in the wider parent research project (Breyer, Heinonen & Ruotsalainen 2017), the chosen radical startups scenario and Clinique combined rather can be seen to represent a glimpse into a future of a preferable functioning socio-technological regime. This I have suggested can be intertextually read through both creative and green growth texts. That's key elements are expressed in a vignette – a short scenario adaptation.

The desire of this study is that an adaptive reading of futures scenarios drawing on the creative and green sectors can better inform, identify, include and empower individual actors. And also supporting policy to enable the transformations needed to reach our future goals. This introdyced type of scenario can be seen as adaptive and seeks to widen the potential innovation regime, through re-evaluation of the specific scenario. The original scenario has already an established robustness, having being explored in different contexts, settings alongside the larger project. I suggest that in futures studies by adding more layers from different fields of study, being multidisciplinary, aids in discovering a deeper understanding. In this case, of the nature of the original scenario, to deepen and reframe it. This we can then understand in the context of a exploring a successful model of a transformation to a low carbon, low emissions, renewable energy scenario, as the NeoCarbon scenarios depict.

This thesis essentially proposes and demonstrates the scenario adaptation method. It can offer a way to reinterpret scenario material beyond its original scope. Even to offer wider innovation perspectives, where incremental, radical and transformative innovation are explored and identified. In approaching the *imperative to transform*, as I have phrased it in this thesis combining the complex current and impeding crises'. There would be a deep need in futures studies to re-evaluate existing foresight research. This I propose would mean scenarios that have been *shelved,* could be re-purposed and put under examination in new contexts. Choosing just one scenario to adapt and broaden has been a inforced constraint to focus and to foster experimentation. This has been done in order to better understand the structure, as has been reflected in the widened literature offering. Further research could again return this analysis to the bigger scenario logics, that is the sets of multiple scenarios in their relational contexts. However, this methodological process also finds that focusing on a singular scenario, and adapting it intertextually potentially offers new understanding.

Finally, Peter Hall (2000, 4) has identified a research gap where an:

> "operational conceptualization of creativity infrastructure and superstructure has as yet not been developed [and there is growing] interest in the dynamics enhancing impact of creative activities."

As creativity is being constantly understood in new ways, engaging and influencing new sectors we might consider that the research made here is a step toward understanding, and imagining of the supporting creative structures of past, present and future.

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