EMERGENCE OF CROSS-INNOVATION SYSTEMS

Audiovisual Industries Co-innovating with Education, Health Care and Tourism

EDITED BY
INDREK IBRUS

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Chapter 1

The Study, Its Design and Its Social Pre-conditions

Indrek Ibrus

Abstract

This chapter presents the many premises of this book. It first discusses the book's central questions and lays out the design of the large multi-national and multi-method study, carried out across Northern Europe. It also places the book at the interdisciplinary space between contemporary innovation economics and cultural and social theory. It then discusses the complex set of social processes that have conditioned the phenomena that the book studies – how and why are the contemporary audiovisual media industries co-innovating and converging with other sectors including education, tourism and health care? Within this framework, it discusses the effects of the broader individualisation and mediatisation processes, of media convergence, of the emergence of cross-media or transmedia strategies, of the evolution of the service and experience economies and of the emergence of creative industries policy frameworks.

Keywords: Cross-innovation; mediatisation; media convergence; cross-media; audiovisual media industries; creative industries

> *Nicholas Negroponte (1995): 'Early in the next millennium your right and left cuff links or earrings may communicate with each other by low orbiting satellites and have more computer power than your present PC'.*
>
> *Roger Silverstone (1999): 'What will they say to each other, my cuff links?'*

Indeed, what are the cuff links saying, now that the new millennium is well underway? Our newest technologies, even if they are not exactly what was imagined a quarter of a century ago, are very capable, of course. So, what are Siri, Alexa and others saying? It matters, since it is about communication and meanings, in the end. That is, it should be about what are we – everybody – doing with the new media technologies as they reach us? But it is also about what are all the others, those who have made the gadgets, those who have delivered them, those who may still own them and those who continue interacting with them – fetching data and injecting new algorithms, guidelines and questions – how do they all shape these gadgets, and via this, our communication, media usage and cultural practices? This book is about such questions. It is about dialogues between all those that shape, and what, then, are the cuff links, activity trackers, mobile phones, augmented reality glasses or any other new medium or communication device used for? Are they made to collect and interpret data on our health and wellbeing? Are they used to show and teach us new knowledge? Are they made to guide us through new surroundings, explain spaces to us and provide us with new experiences?

Under what circumstances would the distinct industries, say, tourism and media, decide to cooperate to provide us with these experiences and such uses of new technologies? What would make them co-innovate and what would hold them back? And how would the new medium then work – what will gadgets say and what will they show? These, again, are the questions that this book, broadly, asks. Yet, perhaps unusually, it does this, relying mostly on various forms of innovation theory and studies, especially those within the evolutionary and institutional economics that have addressed the nature of 'innovation systems'. It is because we want to understand these systems as they produce novelties in our lives. Relatedly, this book continues the work of those colleagues who have integrated economic innovation studies with cultural and social theory – especially Jason Potts (2011), John Hartley (Hartley & Potts, 2014), Stuart Cunningham (2014) and several others.

Yet, it needs to be emphasised, the protagonists – the case studies of this book – are the audiovisual (AV) media industries. We see that it is the AV media and their related industries that, paradoxically, are becoming both more dominant in contemporary culture and, as well as dissolving in it, they are both converging and diverging into an immensely heterogeneous pool of forms, practices and institutions. AV is increasingly used for learning, for personal communication and for modelling all relations. It is, in effect, the screenic, visual and AV forms of media that could be seen to mediatise the everyday textures of our lives (Silverstone, 1999). In this book, we are, therefore, interested in the specific ensembles where AV industries start co-innovating with three other sectors – health care, education and tourism – using available new technologies and other resources.

For this purpose, we have carried out an extensive empirical study consisting of 144 interviews and encompassing seven countries in Northern Europe – Denmark, Sweden, Finland, Estonia, Latvia, Lithuania and (Northern) Germany. All these countries are part of the Baltic Sea Region within the European Union

(EU) and our study was part of the Cross Motion research and development project,[1] part-funded from the EU Interreg programme. Regarding each cross-innovation area, we carried out two alternative sub-studies – a meso-level study and a micro-level study. The meso-level studies focused on comparative views on how the two industries were cooperating, co-innovating and converging in two select different countries: AV + education in Sweden and Finland (Chapter 5); AV + health care in Estonia and Denmark (Chapter 9) and AV + tourism in Latvia and Germany/Hamburg (Chapter 13). We interviewed a wide range of experts representing stakeholders in all our chosen four sectors – entrepreneurs, professionals, managers and policy makers.

The micro-level studies focused on the endeavours of specific start-up companies in different Northern European countries that were innovating at the same cross-sections between industries. As Cross Motion also financed the production of innovative prototypes by start-ups from around the Baltic Sea, we chose to observe more closely the struggles of a small subset of those start-ups. That is, we carried out longer-term observations on two start-ups in Estonia and Lithuania and their struggles to innovate in the education sector using augmented reality and virtual reality solutions (see Chapter 7); we also studied a start-up in Germany and another in Finland who innovated using AV solutions in the health care sector (Chapter 10); lastly, we observed the actions of small companies in Germany and Sweden that were innovating at the cross-sections between AV media and tourism (Chapter 14).

The multi-method studies of selected cross-innovation areas are divided into three larger sections in the book that all include introductions to the prevalent forms of cooperation and co-innovation between AV media and the other three sectors (Chapters 4, 8 and 12) and conclusions on the main findings in each section (Chapters 7, 11 and 15).

The subsequent pages present our conceptual assumptions before we embarked on our study. We discuss the broad social forces that could be understood to have conditioned these industries to cooperate and innovate together. In Chapter 2, we discuss the central concepts – *innovation systems* and *cross-innovation* among others – that we see as establishing the grounding for the intellectual work in this book.

Media Convergence

The idea of media convergence is more than 30 years old. Predicted by Ithiel de Sola Pool in 1983, the 'convergence of modes' as he put it, has been blurring the lines between different media since. The digitisation of all media as well as communications channels and protocols has allowed new combinations of formerly distinct media. Different combinations of television and point-to-point telephony have provided us, for instance, with Skype's video-calls and VOD-platforms

[1]See further: http://www.crossmotion.org/

such as YouTube. Combinations of all possible personal communications modes and recording devices (and more) have brought us contemporary mobile phones. Combinations of documentary film and tabloid press have enabled new multimodal forms of digital journalism such as Vice.com.

It needs to be recognised, however, that convergence is a concept with many implications. The term has been used generally as a flexible rhetorical device denoting the complexities of the modern media evolution (Fagerjord & Storsul, 2007). What this suggests is that convergence processes have been multidirectional and co-evolutionary. It has been a point of discussion whether the convergence of digital networks has been facilitating the convergence of forms of content, of industries, markets and policy frameworks, or if any of the latter has motivated the others. We posit that these have all been mutually conditioning. That is, they are co-evolutionary. Technical convergence of networks motivate visions of greater market scale, motivating in return investments in further network integration as well as in new cross-network or cross-media services. These developments may call for new domain-crossing regulations, but when these are enforced they facilitate again further convergence in networks, services, markets, etc.

The multi-directionality of media convergence refers to the paradox that much of convergence may in fact result in divergence (Jenkins, 2001) or emergence of new forms of media (Ibrus, 2016). This is because the new combinations may have entirely new properties and use values. Users may find the specific combinations more meaningful and relevant in their everyday lives. Also, the enterprises that produce these specific combinatory media are motivated to provide unique value to their customers and capitalise on at least temporary monopolies that this uniqueness enables for them.

This suggests that, effectively, media convergence refers to the emergence of new combinations of media that may, if adopted and diffused, eventually diverge, that is, emancipate, develop their own codified distinctions, markets, institutions, norms of transactions, professional identities, etc. As an example, we could think here of the rapid contemporary emergence of virtual reality (VR) as a combination of forms of videogaming, 3D modelling, film, social media, etc. This emergence has been facilitated by the rapid development of its own institutions, content and service markets, educational platforms, etc. It can be argued that the VR domain has started to operate 'auto-communicatively' (Ibrus, 2015; Ojamaa & Torop, 2015) re-affirming its existence with an assortment of self-codifying practices and self-addressed communications.

What this suggests is that the process of media evolution is constituted by constant dis- and re-assembling of media into new formations and sub-systems. The re-assembling is based on wider societal needs as well as on dialogic practices and knowledge exchanges between different media sub-systems or other knowledge domains. The further divergence and diffusion of new media formations is based on the success of their self-codification and institutionalisation.

Media convergence can also be multi-layered. While all new media are combinations (or remediations in terms of Bolter and Grusin (1999)) of earlier media, then these new formations may be connected and integrated either more

or less strongly. Digitisation has enabled the rapid dispersion of media content across different channels and platforms. Content, its fragments or elements, can be moved from one media to another, creating meaningful connections between them, forcing cooperation and coordination upon them. The economies of scope logic have motivated media enterprises to develop various cross- or transmedia strategies that constitute another layer of media convergence. It is a 'higher' layer as it has the potential to integrate other singular, already convergent forms of media. The cross- and transmedia strategies were first recognised in academic literature in the 1990s and early 2000s (Jenkins, 2006; Kinder, 1991) and studies of these processes have formed a distinct academic domain of its own (Freeman & Proctor, 2018; Freeman & Rampazzo Gambarato, 2019).

When cross-media strategies are conceptualised as another 'layer' of convergence processes, we need to note that these layers may overlap with the ownership structures of media industries – consolidation of media enterprises and horizontal concentration of media markets has been a trend also associated with the digitisation and convergence processes. Yet, cross-media strategies may also function as market (or innovation system) coordination mechanisms, facilitating transactions and cooperation between different kinds of enterprises (of different media and of different sizes) and the related development and growth in some of these sub-domains. As evidenced by Bennett, Strange, Kerr, and Medrado (2012), the cooperation of the UK's public service broadcasters (BBC and Channel 4) with what were initially small independent digital content companies in the UK facilitated the development and growth of the latter. Working with large national broadcasters on their cross-media strategies and online output gave them the skills and experience to achieve international visibility and develop, eventually, new international strategies and presence. That kind of coordination and co-innovation processes; 'interactive learning' (Lundvall, 2010) of each other's knowledge domains and practices, can facilitate the emergence of new (convergent) industry formations.

The empirical and conceptual work on cross-media strategies form a basis for the work on cross-innovation in this book. Not only have several of our authors worked in this area before (Ibrus & Ojamaa, 2014; Ibrus & Scolari, 2012; Nanì & Pruulmann-Vengerfeldt, 2017), but the cross-media strategies could be understood as the Phase 1 of the processes and phenomena investigated in this book. This book looks at the contemporary co-innovation and systemic convergence processes between AV media and other sectors – education, health care and tourism. We argue that while the media industry has always cooperated with these sectors in various ways, their systemic convergence is new and at its contemporary scale, further promise is unprecedented. As such the convergence processes between different media constitute useful examples and provide potential insights on the further dynamics when the media industry starts to converge with other industries.

This is especially the case as in much of the media convergence processes the second or third party has anyway been a sector other than media – the information and communication technology sector (ICT), including telecommunications. The studies into how, for instance, formerly only desktop-optimised world

wide web converged with mobile telecommunications industries to produce cross-platform web and also cross-platform or mobile-only content industries (Ibrus, 2013a, 2013b) have provided insights into the specifics of cross-industry co-innovation and convergence dynamics.

In the early 2000s, the telecommunications industries aimed to standardise and design the mobile web so that it would become a new networked content domain parallel to the world wide web (Ibrus, 2013a, 2013b). That scenario would have meant the evolution of two parallel hypertextually organised, but device-specific content and service domains: one limited to desktop devices and the other for mobile devices. Yet, as the engineering communities developed a dialogue across the industry boundaries, and new ways were developed to enable mobile devices to access web content, a very small number of mobile operators saw an opportunity for a unique selling proposition. They chose to offer access to the 'real web'. In parallel, the methods to adapt content for different access devices (what we now know as the 'responsive web') were also developed by a grassroots content developer community against the will of the major handset and software vendors, who preferred at the time not to openly reveal their handset characteristics and trusted their browsers to do the adaptation work. Content and service providers wanted to stay in control of the designs of their services on all devices. The eventual solution that resulted from the many power struggles between the converging industries was the technically converged cross-platform web while content and service developers became able to distinguish their output for different kinds of access devices enabling divergence in content forms. What this case study suggests is that convergence starts often from dialogues and knowledge exchange across existing industry boundaries, especially between relatively powerless grassroots communities. But the eventual direction of further convergence depends on the power of the converging sub-systems to retain their operational models, on how can these be matched, or on the perceived benefits of convergence for all the parties (for instance, market expansion).

Mediatisation

What the case study above also indicated is that when media and other sectors converge, the new combinatory formation needs to also accommodate 'media logics' (Altheide & Snow, 1979) of various kinds. Online content and service providers wanted to fully control how content is targeted to, and adapted for, different devices and user groups. It was important as direct contact with their audiences was central to their operational model. While technical convergence generally presumes universal standardisation to achieve maximum compatibility, media industries look to address the differences in cultural and social contexts where content is received and used. Meaningful life assumes meaningful distinctions and this understanding is among other things what media industries tend to bring to all cross-innovation and inter-industry convergence processes. We, therefore, suggest that the broad social process, recently labelled as

'mediatisation' (Hjarvard, 2013; Lundby, 2009), is central to understanding the contemporary convergence of media with other sectors.

There are many versions of mediatisation theory; it is mostly seen as another societal meta-process, part of general modernisation and equal to parallel trends such as globalisation, urbanisation or individualisation. The broad idea linking different approaches to mediatisation is that all social processes are increasingly mediated by media technologies, media institutions or media's representative conventions. All the social processes are enabled and coordinated by communications and as media 'modifies' communications (Krotz & Hepp, 2013) it shapes all social processes. To understand the ways this shaping happens is the focus of much of mediatisation studies. For the present purposes, however, we want to deploy an earlier and narrower approach to mediatisation – a tradition started with Altheide and Snow's (1979) work on 'media logic' that was later continued by Schulz (2004) and Mazzoleni (2008) and their conceptualisation of mediatisation.

The focus of the media logic concept has been on the principles and guidelines that media institutions apply when transmitting information and that are understood to inform social interactions. That is, the explicit focus of the concept is on the institutionalised media. The institutional approach to mediatisation has been further developed by Hjarvard (2008, 2013). In this book, we are similarly concerned with institutions and the meso-level of analysis – we look at how media industries co-innovate and converge with other sectors. Addressing how 'media logic' diffuses to shape operational modes in those other industries is one of the objectives of this book. Yet, we need to be precise here; media are complex, there are many media, different technologies and modalities, also institutions with very different kinds of rationales operating in different cultures and working with different talents and audiences. So, there must be many kinds of media logics, as pointed out by Couldry (2008, p. 378). In our analysis in the subsequent chapters, we are careful to note how the affordances of different media and rationales of different institutions express themselves in processes that could be understood as mediatisation. Yet, as analytical concepts we see as handy the system of four alternative ways in which media could affect social dynamics, designated by Schulz (2004).

First of these is *extension* – media just improves existing communication capabilities, advancing either transmission or decoding capabilities. Second is *substitution* – media substitutes for some social institutions or social activities. For instance, in case of hypothetical situation where VR replaces physical travel, or in much less hypothetical instances where online banking replaces high street branches. The third alternative is *amalgamation* – where media use is woven into existing social practices in ways that the media's definition of reality merges with the realities of that practice, creating an entirely new amalgamation. For example, in case of contemporary fitness trackers that encourage new modes of exercise and physical activity behaviour. Finally, *accommodation* – media is itself an influential economic and social actor that other sectors need to transact with and, therefore, accommodate.

Schultz's four modes of mediatisation are not mutually exclusive, but rather constitute analytically distinguishable components of the complex process. In this book, we will use these as tools to interpret ways convergence with media affects the conducts of other sectors.

Service Economy

One broader trend since the 1970s has been the steady rise of the service economy – seen often as an economic sidekick to the broader evolution of the information society. The broad argument since Bell (1973) has been that the driving force in capitalist economy is increasingly not physical resources and capital, also not material labour, but the processing of information, accumulation of knowledge and the resulting human abilities to learn and reach new ideas and discoveries. Processing knowledge means provision of knowledge-related services. And all of the four sectors, discussed in this book – AV media, education, tourism and health care – are evidenced (Gallouj, Weber, Stare, & Rubalcaba, 2015) to constitute some of the central forces in this general trend of the evolving service economy. All four sectors, for somewhat different reasons, but also as carried by the general trend, have been in the growth mode in recent decades. Education and health care are complex mixed-economy sectors where public subsidies are central, especially in Europe – therefore statistics on their economic contribution are scarce. But the statistics below by Eurostat and the World Travel and Tourism Council indicate the stable growth of the tourism and broader services sector in comparison to the general economy (Figures 1.1 and 1.2).

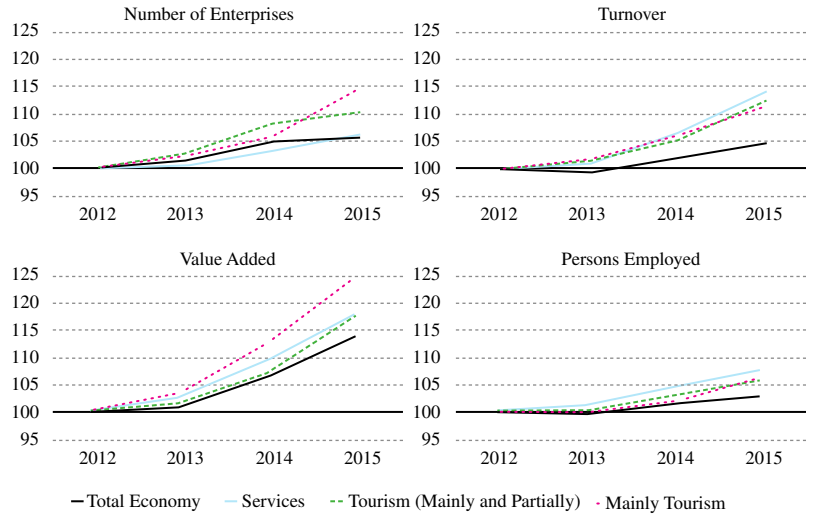

Figure 1.1. Growth of the European Union (28) Services and Tourism Sectors in Relation to the Total Economy, 2012–2015. *Source*: Eurostat.

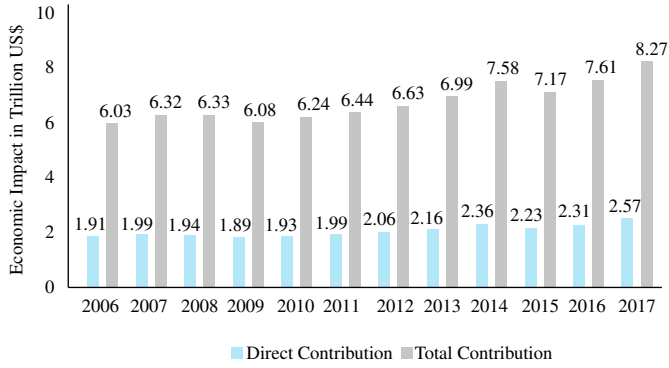

Figure 1.2. Direct and Total Contribution of Travel and Tourism to the Global Economy, 2006–2017 (US$). *Source*: World Travel and Tourism Council.

The growing importance of two of these four sectors – media and tourism – can be related to another concept – *the experience economy*. The argument here being that consumers are not only seeking out services that provide them distinct new information and knowledge, but also different new experiences. An 'experience' as such is often an alternative, entertaining form of acquiring knowledge and awareness. There is a related rationale to 'gamify' some of the services provided in more formal settings, such as health care or education. Videogame industries especially have developed new lines of business to gamify the services provided in these sectors. It has been projected that the revenues of the 'learning games' industries will more than double to US$8.1 billion by 2022, up from the US$3.2 billion reached in 2017 (Adkins, 2017). The more broadly defined global gamification market was valued at US$2.17 billion in 2017 and is expected to reach US$19.39 billion by 2023 (Mordor Intelligence, 2018). Therefore, these trends, the rise of the interrelated phenomena labelled as the information economy, service economy or experience economy, could be seen as facilitating the further convergence of the screen media sector with the other three sectors.

Individualisation

Also, the broader trend of individualisation could be seen to shape the convergence processes. As highlighted by Beck and Beck-Gernsheim (2002), individualisation associates with late modernism and inherently differentiated and complex societies – where information is processed to produce new spheres of knowledge, new meanings, experiences and identities. Here the cultural and media industries have a central role. Networked media and communications technologies and platforms, while facilitating new kinds of socialities, have enabled relative independence of workers in the economy and enabled more control for networked users regarding their communications and media choices. These same technologies have also enabled new forms of surveillance – used to

collect data on users for service adaptation and personalisation. The latter – personalisation of services – has formed one of the core rationales for media innovation in the contemporary era. Media services are increasingly personalised and this presents a question: What does it bring about for co-innovation and convergence processes with other sectors? While health care services have been relatively personalised through all eras, education and tourism rarely have. Mediatisation of education and tourism is therefore disruptive not only in terms of services becoming mediated, occasionally public and on other occasions gamified or entertaining, but also in terms of becoming increasingly personalised, supporting further individualisation in society and culture.

Creative Industries Policies

Lastly, the convergence and co-innovation processes between media and other sectors have been further facilitated by a significant policy push – especially in Europe, but also in many other corners of the world. The 'creative industries' policy agenda emerged in late 1990s in Australia but gained high visibility with New Labour policies in the UK. While its emergence in the UK was perhaps circumstantial, relating to 'third way' rationales of the New Labour government, its rapid international diffusion indicates its fitness and match to the global *zeitgeist* in the late 1990s and after. The emergence and diffusion of this policy set has been related to the evolving information society and service economy, already covered above. Additionally, it has been associated with the parallel emergence of the 'Californian ideology' (Barbrook & Cameron, 1996; Bridges, 2018; O'Connor, 2016) – a system of beliefs that built on the entrepreneurialism of the ICT industries and on the view of its start-up scene that the information economy provides not only new freedom and disruption of former power-systems, but enables scalable growth and extreme productivity for innovative solutions in information services sectors. It has been suggested (Garnham, 2005) that one of the rationales of the New Labour government was to build on that dynamic and growth potential, linking the cultural and creative sector firmly to the ICT industries, marketise much of it and bring the Schumpeterian entrepreneurialism and innovation orientation to its heart.

What has followed in terms of the actualisation of real term policies is an assortment of instruments in European countries and at the EU level that support small- and medium-sized enterprises in the cultural and creative sectors in innovating and in development of scalable business models. We could think here about different business accelerators and incubators, public funding measures for developing innovative prototypes and business models, etc. Another closely related policy imperative has been support for export, especially relevant for small countries in Europe without a sustainable domestic market for niche cultural services or content products. What all this suggests, however, is that the policy-driven need to innovate in order to reach international markets of scale has come to constitute the focal point in creative industries policies. Furthermore, as was already indicated in the early EU creative industries studies

and policy documents (European Commission, 2010; KEA European Affairs, 2006), the creative industries' potential to spill-over into other industries and induce dynamics and growth in them, has been another core policy objective. As it has been perceived, the most natural partner has been the ICT industries – it has been understood that rich provision of digital cultural services would provoke new demand and innovation also in ICT (European Commission, 2010). It has been also evidenced that the majority of the creative workforce works not in the core cultural industries, but is in fact 'embedded' in those other industries (as advertisers, marketers, designers, etc. – see Higgs, Cunningham, & Bakhshi, 2008). This could be understood as creating opportunities for cooperation and co-innovation as the embedded experts are generally also those commissioning specialised work or initiating cooperation processes.

It needs to be recognised that the study that the subsequent chapters of this book will discuss was funded by another of the EU funding measures aimed at supporting innovation in 'non-technological' sectors. The Interreg programme of the European Commission is designed to improve regional cooperation and competitiveness. Our project, Cross Motion, was co-funded from the Interreg Baltic Sea programme and promised to bring together the AV media industries with health care, tourism and education sectors, facilitate their co-innovation processes and learn from this. The fact that space was created for the project like this indicates the policy priority to facilitate such co-innovation processes and spill-over opportunities. Altogether, much of co-innovation processes between AV media and other sectors are driven by policy. What these policies are, and their exact effects is discussed in subsequent chapters.

Conclusion

There is a complex mesh of broad social forces that have conditioned the emergence of the phenomena that this book will study and discuss. The evolving trend of AV media co-innovating with other sectors results from digitisation, convergence, mediatisation, emergence of service economy and creative industries policy frameworks. These forces are not only interrelated and mutually conditioning, but also create distinctions and add complexity as all have their own increasingly codified purposes and evolutionary logics. Yet, what the chapter above suggests,is that what all this complexity seems to introduce is that many of the service industries have been on the course of convergence, and the question that has taken centre stage is how to facilitate their co-innovation processes in mutually beneficial as well as socially valuable ways. To answer this question, we build on the innovation systems theory introduced in Chapter 2.

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Chapter 2

From Innovation Systems to Cross-innovations

Indrek Ibrus

Abstract

This chapter establishes the conceptual and analytic framework for the book. It relates not only to much of the existing work in *evolutionary and institutional economics*, but also to work in *cultural science* and *cultural semiotics* domains as well as in media convergence and transmedia studies. The central concept it first deploys is 'innovation systems' as applied in national, regional, international and sectoral contexts. It then builds on the *general theory of economic evolution* by Kurt Dopfer and Jason Potts and reviews the tools this theory provides to carry out a meso-level analysis of industries co-innovating and converging. It then proposes a new concept – 'cross-innovation' – to refer to the emergence of new structures and 'rules' at the boundaries of existing industries.

Keywords: Cross-innovation; innovation systems; evolutionary economics; interactive learning; media innovation; media industries

Beginnings of Innovation Systems Research

Before we start discussing what to think of 'innovation systems', let us first settle how we understand 'innovation', the central term in this book. As the main topic here is the convergence of audiovisual (AV) media with other sectors, let us, perhaps unusually, start with a cultural definition – one by Russian-Estonian semiotician Juri Lotman:

> Innovation […] can be seen when the texts of one genre invade the space of another genre. Innovation comes about when the principles of one genre are restructured according to the laws of another, and this 'other' genre organically enters the new structure and at the same time preserves a memory of its other system of encoding. (Lotman, 1990, p. 137)

That is, innovation in terms of the forms of media and culture is equated with transmissions of texts, new combinations of textual elements and conventions and the resulting emergence of new forms and meanings. Let us take here, as a comparison, another classic, the most original of innovation definitions by the economist Joseph Schumpeter:

> Recalling that production in the economic sense is nothing but combining productive services, we may express the same thing by saying that innovation combines factors in a new way, or that it consists in carrying out New Combinations. (Schumpeter, 1939, pp. 87–88).

What we need to recognise is that newness, both as a new cultural form and as a new product to be brought to markets, is always an original combination of what existed before, of representative conventions, of ideas or bodies of knowledge, of institutional settings or of resources. Innovation emerges out of the old, but the combination is new – it may appear as new, may get codified as new, may eventually emancipate as an entirely autonomous system, but it still stays connected with the previous combinations in complex ways, more at the beginning, less after emancipation. Yet, what also needs to be realised is that innovation is not a bounded entity; it is a process of combining. What, therefore, needs to be looked at is how and why the combination happens. As much innovation in contemporary societies is arrived at in different kinds of organisations, we rely here on the articulation by Chaminade, Lundvall, and Haneef (2018, p. 1) that innovation is an interactive process where different kinds of knowledge are combined through communication within and across organisational borders.

And here we arrive at 'innovation systems'. It stands to reason that if innovation is an interactive process involving multi-directional flows of knowledge, it needs a system of institutions constituting this process. Innovation systems theory looks at how to make these interactions between institutions work such that it facilitates growth of knowledge and productivity, which in most instances is a national system of economic production. Hence the common research focus on 'national innovation systems'.

While innovation systems theory is relatively young, its roots are firmly in the nineteenth century. The conceptualisation started with Friedrich List, founder of what is now known as the historical school of economics. He posited in *The National System of Political Economy* (1856 [1841]) that 'the present state of the nations' is a result of the accumulation of all discoveries, improvements,

perfections and exertions of previous generations and that the further productivity of national economies depends on how contemporary generations can build on the existing knowledge. In that, he criticised the classical economists for neglecting the role of science, technology and skills in their theories of the wealth of nations.

The modern concept of national innovation systems emerged in the late 1980s as part of the quick emergence of evolutionary economics – now the prevalent approach to understanding innovation in economy and society. The concept was mentioned first in a paper by Freeman (1982) and soon after by Lundvall (1985), Nelson (1988) and others. On a broad scale, their realisations were not that different from those of List. What all models of national innovation systems share is, first, that the growth and development of economic systems is conditioned by accumulation and growth of knowledge and, second, that growth of knowledge results from interactions between different kinds of institutions and their systems. Chaminade et al. (2018) have, however, divided the approaches into two – the narrow and the broad.

Narrower models (Freeman, 1988; Nelson, 1993) focus in the first place on the interactions between research institutions and firms. The sequence of knowledge investments that in this tradition would bring growth has basic science first, then technical engineering and then markets. In opposition, what could be understood as broader models (Lundvall, 1992, 2010b; Potts, 2011) focus on all kinds of interactions that involve and result in cross-boundary learning and emergence of new constellations. The more recent evolution of these holistic approaches has been notably interdisciplinary, building on the work in structuralist long-term growth theory, institutional and evolutionary economics, behavioural economics, interactionist social psychology, media and culture studies, semiotics and the geography of knowledge and learning.

Holistic Approaches to Innovation Systems

The underlying idea that connects what can be termed as various 'holistic' approaches to innovation systems is that new ideas and innovations are also born outside the formal R&D systems, that production of knowledge is a nonlinear social process involving not only interactions between institutions, but also interactions between humans both within as well as across institutional boundaries (Chaminade et al., 2018, p. 8). In this context, the approach developed originally by Lundvall emphasises the concept of learning – that is, knowledge exchange and learning between people with diverse expertise or skills; learning between producers and users and learning by interacting, by using and by doing (Johnson, 2010; Lundvall, 1992). Factoring in learning in this way means, first, that analytic focus becomes divided between large-scale institutional settings and people's individual interpretative or cognitive capacities. As posited by Dopfer and Potts (2008, p. 8), economic evolution is the co-evolution of general social rules and specific rules of individuals. The analytic framework, then, needs to encompass both – by also including scholarly approaches and methods such as anthropology and cognitive psychology. But, second, including learning in the analysis also

means that educational systems that affect learning capacities are crucial for the evolution of the system; therefore, all organised forms of training need to be included in the analysis, too (Chaminade et al., 2018, p. 8).

Further, what the scholars who have been part of the 'interactive learning' approach have also been notably emphasising is the role of culture. Building on Commons' (1931) articulation of culture as 'collective control of individual action' and Veblen's (1919) writing on 'habits of use and wont' and 'habits of thought', it has been seen that economic behaviour is shaped by enculturation, that is, that culture conditions all human actions (Johnson, 2010, p. 25). It needs to be recognised, however, that Lundvall, Johnson and others working within this tradition are concerned, in the first place, with national systems of innovation and, therefore, address the challenges producers face owing to differences in national cultures. As Johnson puts it:

> Culture makes nations with the same kind of economic system, for example Denmark, Sweden and Germany, different from each other, and cultural systems are governed by the rules and rules about rules, including rules for breaking and changing rules. Many of these rules apply to economic production. Who can decide what? What remunerations are to be expected for different kinds of work? What efforts and what kinds of communications and cooperation will be expected in different situations? Such questions would be impossible to answer and uncertainties would take inhibiting proportions, if production was not heavily supported by different kinds of formal and informal rules. Many of the rules supporting production differ between countries and since communication within common culture is easier than between different cultures, we should expect the differences between national cultures to have considerable staying power. (Johnson, 2010, pp. 40–41)

When reading this passage, we need to recognise that while the likes of Johnson and Lundvall operate with broad categories such as national cultures, for them, 'culture' effectively means behavioural codes and norms structuring production processes of all kinds. They do not include into their calculus the role of finer forms of culture – various kinds of more or less temporal subcultures or other systems of meaning. And they also ignore the role of cultural or creative industries or non-market production and the use of arts as an important constituent of national innovation systems. This ignores, effectively, the trends described in the previous chapter – the evolution of the service economy, the substantial part of creative industries in this, the related emergence of what is known as the 'experience economy' and the mediatisation of all economy. Analyses of these trends have generally suggested not only that the creative industries are contributing usefully to national GDPs and are in a constant process of generating novelties (that is, innovations), but also that these innovations

are shaping and driving much of the technical innovation that scholars of innovation systems and economic growth have generally been focused on to this day. Our suggestion, in other words, is that including the creative and especially media industries is necessary if we are to move towards what is suggested as a holistic approach to innovation systems (Edquist, 2011, p. 17).

This inclusion would mean putting a firm focus on the 'demand-side of innovation' (Potts, 2011, p. 107). The argument is that much of growth theory has focused on the supply of innovative physical technologies as drivers of economic evolution. Yet, the role of the media and creative industries is to facilitate wider exchange on 'possible worlds', to enable multiplicities of perspectives and of imaginations. As Umberto Eco (1979, pp. 86–87) put it, there are two ways of arriving at new information: through 'factual judgements' (scientific discoveries) and through novel metaphors that open up new ways to interpret realities. Arts and creative industries facilitate the emergence of new tropes and, therefore, not only contribute significantly to the growth of knowledge, but also facilitate its pace. By facilitating societal dialogues, they not only enable the meetings of different ideas and motivate their combinations to form entirely new ones, that is, innovative ideas, but as such they also facilitate social and cultural coherence and stability because dialogues carry the potential to bring about understanding and compromises. Improved understanding of others relates to the general growth of knowledge. This was highlighted by Potts and Cunningham (2008) when they argued that the contemporary rapid growth of creative industries may not be owing solely to wealth effects (people having resources to consume cultural services) or the benefits of information and communication technology and globalisation, but may reflect the deeper order in which the creative industries facilitate the emergence of ideas that drive economic evolution. In Potts' terms (2011, p. 107), they facilitate demand for all kinds of new products and services that the rest of the economy can then provide. Within the framework provided by Mansell (2012), we can also suggest that they have the potential to shape the dominant social imaginaries that then shape the evolution of the broader information society.

This view of the arts and creative industries shaping the rest of the economy in terms of creating demand and facilitating the emergence of innovative ideas and social imaginaries could be, in effect, called an endogenous approach to social and economic change. It is based on an understanding that change does not happen exogenously, through technologies that just arrive as 'manna from heaven' to disrupt the markets and shape society. Instead, the endogenous view is that all social and cultural processes need to be included in the analysis, and that technologies and governing systems are conditioned by complex interactions between systems of meaning making and communication. The need for this kind of endogenous view becomes more immediate in the case of creative industries cooperating and converging with other sectors. In the following, we will discuss how to apply innovation systems theory as an endogenous approach to understand the changes on the meso-level of economy – that is, in the case of industries reorganising, converging or developing new 'rules' around which to organise themselves. Mediatisation of formerly distinct industries could be exactly the kind of rule change that reorganises all industry structures and operations.

Sectoral Innovation Systems and Their Convergence

When we discuss the co-innovation opportunities and convergence between distinct industries, we should first ask if it is possible to talk about sectoral innovation systems. Breschi and Malerba (1997) thought it is and defined sectoral innovation systems as systems of firms that are active in developing and making the sector's products and in generating and utilising the sector's technologies. Their focus only on firms and not, for instance, on educational or research institutions may be too limiting, especially as their definition emphasises the importance of competition among firms and their role in the selection of technology designs and sectoral rules. Yet, they added that interaction and cooperation in technology development are also of importance in system evolution. Regarding cooperation, while they focused mainly on geographically concentrated sectors, their conclusion was that when it comes to knowledge transmission, the boundaries of sectoral innovation systems are endogenous – they are auto-communicatively created. That is, an industry creates itself and, as McKelvey (1997, p. 205) also proposes, a (sectoral) innovation system emerges when institutions share common characteristics relevant for innovative activities.

Against this backdrop, we want to build further on the work of Dopfer and Potts (2008) and Potts (2011). The 'general theory of economy evolution' of Dopfer and Potts is effectively a generalised and as such abstracted approach to economic evolution. Yet, their articulation of social and economic evolution as a change in generic rules allows them to systematically address the circumstances when rules do change – as when industries converge and establish new combinatory rules. Furthermore, their division of analytic 'levels' into micro, meso and macro is useful for our purposes. Our focus is on the processes of different sectors and their industries starting to co-innovate and converge and this asks for a specific toolset designed for meso-level analysis – to understand how the rules shared by specific auto-communicatively functioning industries may change.

The central element of Dopfer and Potts' theory is the 'rule'. In their terms, a rule is an idea that organises actions or resources into operations. 'Rules' can be languages, discourses, conventions, habits, belief systems, scientific discoveries, standards, laws, agreements, network protocols, computer codes, technologies and so on. As such, rules are the starting points and hotspots for economic evolution in the knowledge economy. Broader economic evolution is a change in socially generated rules that Dopfer and Potts call generic rules (2008, p. 6). These generic rules, then, are divided into subject rules and object rules. The first are the rules for individuals – that they learn, mislearn, modify or generate for guiding their operations. Object rules, on the other hand, are rules organising individual agents as 'rule carriers' into social organisations such as firms, their networks, markets, clusters, civil movements and so on.

The specialty of Dopfer and Potts' approach for our purposes in this book, however, is its proposal for 'evolutionary mesoeconomics'. In neoclassical economics, there is effectively only one rule – the representative rationality of an individual agent – and this is not supposed to change. Compared to this, 'evolutionary microeconomics' recognises that there is a heterogeneity of agents with different

rationalities, sometimes also without rationalities, and that there is, therefore, also plurality of rules that do change. Evolutionary mesoeconomics addresses the rule in relation to its carrier population – the 'industry', in our case. For instance, in the videogames industry, the rules relate to the forms of games, or to the ideas or ideologies behind the games, as well as to the production processes and business conducts constituting the industry. The core analytic concept here, however, is the 'rule trajectory', which describes how a rule is innovated in one carrier and is then subsequently adopted by many (Dopfer & Potts, 2008, p. 21). Evolutionary mesoeconomics, therefore, studies the evolution of rule carriers and how they make up social organisations such as industries. The analytic unit of meso is a rule and its population – how their pairing emerges and how it evolves further.

We see that for the purposes of this book – to analyse how industries co-innovate and potentially converge – Dopfer and Potts' framework of mesoeconomics serves well. As Potts (2011, pp. 107–118) has separately explicated, this theory is also useful for understanding the role of creative industries in this process. Yet, their approach needs to be further expanded to interpret especially the convergence issues – how innovations emerge at the boundaries of existing industries and how these innovations then affect the identities and organisation of these industries, to the possible extent of their full convergence. The theory expansion in this book will build, mostly, on the 'interactive learning' approach of Lundvall and on the *cultural science* approach that effectively combines evolutionary economics with various forms of cultural theory, especially Juri Lotman's cultural semiotics (Hartley, 2009, 2015; Hartley & Potts, 2014). We will untangle the combined approach by following Dopfer and Potts' (2008, pp. 46–50) 'three-phase meso trajectory', which tracks, first, the origination of a new rule, second, its adoption into a population and, third, its retention by that population as an established and codified institution.

Origination of a Rule

Dopfer and Potts emphasise (2008, p. 47) that a new idea/innovation/rule when it emerges on the meso-level needs to be able to 'cross boundaries' – that is, it will not stay as the unique property of its inventor, but must be attractive for others to adopt. Our argument here, however, is that what also matters for meso-level analysis is the perspective on the endogenous process leading to the origination of the new rule. If innovation is a combination, as Schumpeter put it, we need to ask how the combinations come about. Our proposition, articulated before by Ibrus (2015a, 2016), is that for a combination of different perspectives of knowledge domains to happen, a dialogue is needed – a dialogue across the existing boundaries of social or cultural sub-systems. As in the example described in Chapter 1, a dialogue between the engineers of the Internet and telecommunications industries first happened that enabled T-Mobile in Europe to eventually come up with a solution that would make websites accessible on mobile devices – a solution facilitating the convergence of mobile and desktop webs and as such creating a new 'rule' of device-agnostic or multi-platform web.

This example also indicates how the dialogue as such is paradoxically also the first instance of auto-communication – the participants in the dialogue articulate their connection, their shared 'rules', that is, then communicate about them, establishing an 'us-ness', a joint identity. It has been demonstrated (Ibrus, 2015a, 2016) how media innovations emerging at the meeting points of different industry sectors facilitate their convergence as the social structures that produced them start working auto-communicatively. To explain the concept, *auto-communication* as introduced by Lotman (1990) refers to the situation where the messages produced address the communicating institution itself, its identity, its boundaries and distinctions (see also Christensen (1997, p. 202), Morsing (2006, p. 175) and Broms and Gahmberg (1983)). Therefore, a new rule is not only boundary crossing in terms of combining rules of different domains, but it is also potentially boundary creating – working towards organising new institutional settings around it and creating boundaries between these and what is outside.

As Potts puts it, creative industries are crucial for the origination of new ideas in contemporary societies. They, especially media industries, facilitate their emergence, but they also contribute to their provision. As we saw in our mobile media case study in Chapter 1, it was media and service industries that gave birth to and drove the development of the 'responsive web' where different users or audience groups can be serviced with different kinds of content (Ibrus, 2013). Yet, this example also evidences how new combinatory rules are then mediatised – they are affected by all preceding rules, including those of the media. The question is about the extent of mediatisation – here the analytic tools suggested by Schulz (2004), discussed in Chapter 1, become relevant. In the empirical chapters of this book, we track the dialogues that different industries have had, to facilitate co-innovation and convergence. In that, we also look at the processes of interactive learning in terms of Lundvall – how does the learning happen, how does it affect designs or products or services and how does it affect the self-organisation of the industries as well as auto-communicative practices? We also track to what extent the innovation emerging at the borderlines of industries establishes a rule that, indeed, starts to work auto-communicatively and to reorganise its neighbouring industries.

Adoption

In terms of Dopfer and Potts (2008), the second phase of economic evolution is when a population of carriers – both individuals and institutions – starts adopting the novel rule. It is effectively the process covered by multiple existing theoretical frameworks such as the innovation diffusion theory (Rogers, 1995) or the science and technology studies framework (Bijker, Hughes, & Pinch, 1989; Felt, Fouché, Miller, & Smith-Doerr, 2016). When it comes to evolutionary economics, Dopfer and Potts broadly agree with Rogers that, for successful diffusion, an innovation needs to balance providing understandable novel gains for adopters with being compatible with pre-existing systems and easy to learn. What the latter means is that all innovations need, to an extent, to be path-dependent (David,

1995, 2000) – they need either to be compatible with existing technological, economic or social systems or to be comprehensible in the existing cultural context. The latter is especially important for media content products and services as they need to be interpretable – they need to make sense to users/viewers/readers. Yet, the classical problem with the creative industries' products and services is that their use value is unknown before the act of usage. As put by Potts, Cunningham, Hartley, and Ormerod (2008), they are the domain of new rules. As cultural products are expected to provide at minimum unique experiences, they are also designated to generate new meaning. If the consumer in fact prefers or understands that meaning or the accompanying experience cannot, however, be known beforehand. In this case, consumer choice cannot be rational, as is believed in neoclassical economics. It is instead mainly dependent on the choices of others, on experiences and recommendations that reach consumers via their social networks. It is for this reason that Potts et al. (2008) have proposed re-conceptualising the creative industries as 'social network markets' – as markets where production and consumption decisions are based on the actions/signals of other agents in the social network. This definition gives primacy to communicative actions in market dynamics and not to economic signals such as price or future gains. That is, it is the communication between market participants, increasingly organised into networks, that affects the adoption rates of specific new rules.

What Potts (2007) and Potts et al. (2008) then also argue is that such communications across social networks become the main means for innovation system coordination in the contemporary service economy infused with mediatisation. Therefore, Potts (2011, p. 115) suggests, the creative industries in general become a crucial element in contemporary innovation systems as they facilitate social networks, constitute means of communication and are able to reduce the uncertainties associated with consumption. All forms of media and culture can be used to handle and process social information about new ideas, new things, new possibilities and consequences. As, for instance, how contemporary TV series such as *Humans* (2015–2018) or *Westworld* (2016–2020) or films such as *Her* (2013) or *Ex Machina* (2014) have introduced the concept of artificial intelligence to broader audiences. Yet, as Hartley has emphasised (see in Şimşek, 2017), the ways in which the media processes these topics are again dependent on the broader cultural and social structures as well as established imaginaries.

What also needs to be considered here is the structure of creative industries. In Europe, as elsewhere, the creative and media industries are generally characterised by an hourglass structure – the markets are dominated by a few oligopolistic enterprises and a growing number of ever smaller independent companies (according to Eurostat in 2014, an average European creative industries enterprise employed 3.1 persons as compared to 5.1 in total services[1]) that generally provide services to those few larger enterprises, but also dynamically organise

[1]See further: http://ec.europa.eu/eurostat/statistics-explained/index.php/Culture_statistics_-_cultural_enterprises

and reorganise themselves into complex value-chains where they sometimes compete and sometimes cooperate. That is, these small companies are often each other's customers and most immediate colleagues, and they form social networks and complex, often reciprocal producer–user relationships. Potts et al. (2008) suggest that it is through such user–producer relationships that much contemporary growth of knowledge and emergence of new rules/innovations is facilitated. Also Von Hippel's (2005) work has emphasised the growing role of all kinds of users in the innovation processes of the digital era. Much of such innovations are incremental; they are effectively constant modifications, improvements or variations of emergent rules (products or services). Their accumulation, however, could sometimes take to more radical innovations, as has been the case, for instance, with content production on the YouTube platform – that constitutes by now an autonomous sub-market for AV content, with its own rules, genres, economies and social hierarchies. The social networks of associated producers and users are coordinating the field, its rules and its constant reorganisation not only in terms of production, but also in terms of user feedback, of communicating about their experiences, and of filtering out choices and making recommendations.

What Lundvall has been emphasising about user–producer relationships, first, is that user feedback has also been classically important for innovating enterprises as producers cannot be assumed to know all the possible outcomes of their activities. Lundvall (2010a, p. 54) proposes that the most basic function of the user–producer relationship, in relation to product innovations, is to communicate information about both technological opportunities and user needs. He suggests that to ease such communications, users and producers will gradually develop a common code of communication, a specialised language or discourse that makes the exchange of information within the specific domain more efficient. This new code, however, could be subsequently used for communicating and interpreting distinctions ('us' and 'them') and for coordinating relationships of loyalty and trust. As Lundvall (2010a, p. 54) also points out, it takes time to develop efficient codes and channels of information as well as relationships of trust and common conduct. To leave an established user–producer relationship, therefore, becomes increasingly costly and involves a loss of information capital.

There are many implications from this for the adoption of new rules. First, users and adopters need to have clear gains from the new rules to compensate the loss of existing information capital. Second, adoption means learning into the new codes, rules and, therefore, also new kinds of relationships. It is also in the broader adoption phase that the auto-communicative mechanisms of the new systems gain steam. Development of own codes is an instrument for codification of the new rule. This kind of auto-communication is, however, to a significant extent, about testing and learning of all the implications, possibilities and circumstances of the new rule and the cluster of related emergent rules. The system participants may need to learn about and develop new forms of transactions, new codes of conduct, new kinds of partnerships, new networks, new regulations and so on. As Dopfer and Potts (Dopfer & Potts, 2008, p. 49) discuss, the phase begins with high uncertainty, but, towards the end of the adoption

process, the cumulative effect of the experience will have notably reduced the uncertainty, the new rule will be customised according to majority needs, it will be reasonably codified and knowledge of it will be diffused at least within the immediate system.

In this book, we will trace mostly the early stage of cooperation and co-innovation systems that emerge at the borderlines of industries with the potential to establish a new rule that could motivate further convergence between these industries. Yet, additionally, we look at some of the instances, especially in the area of the videogames industry co-innovating with the education sector, where we find signs of the broader adoption phase. In these instances, we focus specifically on the complex dynamics between different kinds of users and producers and how these affect the adoption of innovative services. We address how existing social networks may function in order to coordinate the evolution of innovative rules and how, in the process, they may first unravel and then rebuild? And what does it take, potentially, to build new networks across industry boundaries and to develop and communicate about new shared codes and sectoral identities? As one of the converging industries is AV media with special codes of conduct for managing audience relationships with new digital media forms, often relying on more active, participatory involvement of users, our work looks specifically at the effects of these kinds of user–producer relationships on the co-innovation processes .

Retention

According to Dopfer and Potts' (2008, p. 50) theory, the third phase of a meso-trajectory is stable retention of the established rule in the population of rule carriers, that is, the particular industry. The rule is then steadily replicated by the population of carriers, be these institutions or individual people; most ways of transaction have been codified; the networks are settled; and the size of the market clarified, too. This also means that transaction costs have dropped, so various forms of associated service niches will be opened up. Forms of expertise have taken shape, as have forms of training. When it comes to general economy, as Potts (2011, p. 116) suggests, similarly to previous phases, the creative industries are crucial in such kinds of 'normalisation' work – they control the communications platforms and are in the business of explaining or familiarising the generic rules to populations. The phenomena we discuss in this book have not yet arrived at the retention phase, but we are keeping an eye on the potential and circumstances our specific co-innovation areas and new rules need to reach the retention phase.

Firms Over the Meso-trajectory

Dopfer and Potts (2008) emphasise the need to analyse micro-strategies in the meso-context – that is, how firms are adapting to generic change that happens in markets and in industry contexts. Firms may have different kinds of expertise

or risk-taking readiness with which to strategically focus on origination, adoption or retention phases of innovations. Startup companies are generally focused on origination phases, but some may instead focus on developing solutions associated with or spinning from other emergent rules. This suggests that, in practice, it is rarely reasonable to talk about single emergent rules, but rather about clusters of rules that may be either more or less strongly connected. As, for instance, in the case of contemporary interrelated emergences of virtual reality, augmented reality and mixed reality solutions and applications. In these areas, a lot of experimentation is taking place that is sometimes overlapping, sometimes interrelated and sometimes distancing, but it most certainly is emerging as a cluster of new rules potentially relevant for several industries, though with media, tourism, health care and education being the most involved. In this area, then, are firms that may be investing in the origination of new solutions, while others focus on picking the more developed solutions already in the wider adoption phase in order to find ways to customise or modify those to develop unique proposals and provide additional value. In the rest of the book, we investigate the circumstances in which small and medium-sized enterprises (SMEs) choose one or the other option across innovation trajectories.

What we also look at is how firms as well as other institutions in the system develop their strategies. Küng (2008) has demonstrated that, differently from large global platform providers, smaller media companies cannot afford anymore to build on the rationalist approaches to strategy development. This would be through studies of the competitive environment and then developing multi-year plans for how to pursue set goals in that environment. The presumption for rationalist approaches, part of neoclassical economics, is that markets, even if they are sometimes externally disrupted by unexpected entries of new technologies or other innovations, are able to quickly reach equilibria and, therefore, competitive environments remain generally predictable. Yet, contrary to such beliefs, contemporary media markets are evidently characterised by dynamic change and such long-term plans may have limitations in guiding operations. Alternative ways of strategy building that innovation scholars propose are adaptive/instrumentalist approaches (Küng, 2017, pp. 65–70; Tidd & Bessant, 2009) as well as interpretative approaches (Küng, 2017, pp. 70–72).

An adaptive approach to strategic management means that no long-terms plans are devised or held. Instead, strategies emerge through everyday actions as firms react dynamically to changes in their environment. These processes tend to be generally messy; sometimes the goals get formally articulated and codified, but rarely are they systematically acted upon. Strategy development as such is effectively evolutionary, in practice constituted as 'actions upon actions' in terms of Foucault's (2002, pp. 201–222) models of governance and power. When we generalise such individual micro-strategies to the broader level of a meso-population and their generation or adoption of new rules/innovations, we need to realise that this is a highly complex process where individual agents make circumstantial decisions based on their strengths and immediate opportunities (or their lack) in their environment. In the later chapters, we address how SMEs

in the Baltic Sea region adapt to their environment as they co-innovate with various partners.

The interpretive school of strategy development (Küng, 2017, pp. 70−72) focuses in the first place on complexity within firms. It acknowledges that people within institutions may be part of multiple epistemic, social or cultural communities, may be connected to the external environment in multiple ways, may use different kinds of channels to acquire information and may, relatedly, also interpret all kinds of messages that reach them in different ways. An interpretive approach, therefore, looks at strategy evolution as resulting from these differences. Both the challenges as well as the opportunities are related to these. The differences may bring about communicative difficulties or disagreements within organisations, but they also constitute methods to bring in alternative viewpoints and new information, to facilitate diversity of options and, therefore, to enlarge the pool of alternative trajectories for the firm. Inspired by this approach, we address this dynamic, too, in the further chapters: first, in terms of how firms as constellations of people with different professional identities use this to connect to different external communities and, second, in terms of how firms handle these differences in addressing their joint positioning or belonging to broader systems such as an 'industry'.

Diversity

The discussion in the previous section on diversity within institutions introduced the broader question of diversity in innovation systems. As Cohendet and Llerena (1997, p. 227) put it, '[d]iversity drives evolution, and evolution generates diversity'. When the economy includes a wide range of specialised knowledge domains, as well as people and institutions with different kinds of expertise and cultural viewpoints, it is more possible that their unique combinations will generate unique innovations. These innovations then facilitate the emergence of highly productive temporary monopolies that also present the economy's new rules (in terms of Dopfer and Potts) to be widely adopted. That is, inherent diversity is essential for well-functioning innovation systems.

As de Vaan, Vedres, and Stark (2015) have demonstrated in the case of US videogame industries, the larger the 'cognitive distance' between included teams, the more radical tend to be the innovations. When there is some tension, some incommensurability and untranslatability between the perceptions of teams that master different styles or techniques, it tends to translate into distinctive output in the market − into innovation. This relates to Lotman's (2009) proposal, part of his theory of cultural change: the more culturally distant the cultural domains that end up in a dialogue, the bigger will be the cultural 'explosion' resulting from it. The most unique and innovative forms of culture are born from a combination of formerly distant ideas, forms or conventions. The paradox is that the mutual untranslatability enforces the invention of a new form, interpretative code or cultural language. As an example, we could think of the birth of film montage, which, according to Sergei Eisenstein's accounts, was a 'remix' of ideas

from Japanese kabuki theatre, Hegelian dialectics, and so on. The then explosive rules of filmic storytelling have, of course, by now created a multi-billion industry operating worldwide.

In terms of Lundvall's approach to innovation systems as systems of interactive learning, all this means that those systems work well when conditions are created for people or institutions with different expertise to learn from each other in a co-innovation process. Therefore, policies need to be in place that enable such mutual learning. For this purpose, various inter-industry networking and awareness-raising events tend to be among the toolset of many policy makers (Tafel-Viia, Viia, Terk, & Lassur, 2014). An important part of this is the instalment of interdisciplinary training programmes, both formal and informal. Equally relevant are interdisciplinary research endeavours. Interdisciplinary dialogues in research and educational institutions can, over time, extend to become inter-industry co-innovation endeavours.

What the inclusion of educational institutions also points to is the question of public institutions in innovation systems. Johnson (2010, p. 39) suggests that diversity in the institutional system is just as important for economic change as diversity in the production structure. Public institutions are ready to invest in coordination activities that produce public value, that is, that are usable by multiple parties, such as basic research or incubators for early stage start-ups, as well as measures of knowledge diffusion such as public libraries. Furthermore, public institutions, with their multiplicity of conflicting goals, bring alternatives to market-based systems (Gregersen, 2010, p. 136) – they enrich the potential range of innovation trajectories. Diversity in the system in terms of both public and private institutions being involved is also important for potential shock absorption – in the eras of dynamic change, the system needs the existence of alternative operational models and objectives to alleviate all risks and develop resilience.

In the area of media, it has been suggested (Ibrus, 2015b) that public service media institutions can operate as important coordinators of culture-oriented innovation systems because they invest in activities that create public value – such as promoting alternative forms of culture, experimenting with new kinds of content formats, popularising science and producing environmental programmes. These are either high risk activities or programme formats without immediate commercial value. Yet, once public service media has developed functional formats, created brand value for new artists and widened awareness of specific research areas, all kinds of other agents, including commercial forms, can build on this.

In this case, what needs to be recognised is that public institutions in innovation systems produce 'public value' (Benington & Moore, 2011) that can then be utilised by a variety of parties, including commercial institutions. The thing about media markets, however, is that the success of private media institutions depends on their production of public value, too. The eventual focus on facilitating public value generation and on diversity and learning of the innovation systems approaches has been controversial for neoliberal policy makers as they undercut their rationales for small government, deregulation and unfettered

operation of all market forces (Cunningham, 2014, p. 8). In effect, innovation systems thinking has provided new rationales enabling government to intervene in and regulate markets.

Relatedly, in the subsequent chapters of this book, we put a special emphasis on addressing the inherent diversities in the systems we analyse and the role of different kinds of public institutions therein. For instance, public service media institutions have played a major role in developing media formats for all three of our sectoral case studies. Educational TV programmes have a long history in most of the world and so have tourist and health programmes. It is not only that the convergence processes we are discussing in this book have long pre-histories, but also that these previous activities are path-dependent – these same public service media institutions still have important roles to play in cooperating with sectors such as education and health care. The same applies to educational institutions that, in many instances, are the first initiators of inter-sector contacts and are also crucial players in the adoption and retention phases because it is their role to systematise and codify rules and to provide future professionals with tested knowledge.

Cross-innovation

It is at this point that we finally arrive at introducing and defining cross-innovation, the concept of this book's title. The term 'cross-innovation' emerged as part of a policy development project between 11 EU cities and was co-funded by the European Union from its Interreg programme.[2] Interreg is an EU instrument for financing regional development projects. The particular project used 'cross-innovation' in its title, which it defined briefly as 'collaborative and user-driven innovation that happens across sectoral, organisational, technological and geographic boundaries'. The project also produced a manifesto written by Luca de Biase and Patrick van der Duin.[3] The manifesto relates to some of the conceptualisations that we have discussed above. It addresses dynamic change in innovation 'eco-systems' and addresses innovation systems as systems of learning – in line with Lundvall's approach. Generally, however, while we find the term 'cross-innovation' good in terms of its illustrative and explanatory power, we find that the conceptual work that resulted from the particular EU Interreg project needs further development (already conducted above and to be continued in the subsequent pages). Let us here, however, justify why we decided to reuse the cross-innovation term and how we understand it.

In Chapter 1, we established how cross-media strategies as a specific form of media convergence can be understood as a fluid Phase 1 of broader convergence processes enabled by digitisation and the emergence of the service economy. The existing cross- and transmedia studies also indicate the potential natures of that

[2]See further: http://www.cross-innovation.eu/
[3]See further: http://www.cross-innovation.eu/practices/manifesto/

we expect to be characteristic of other cross-innovation processes. We are talking about emergent dialogues across industry boundaries, heterogeneous flows of knowledge and expertise across these boundaries. These dialogues are expected to result in new combinatory solutions as innovations brought to markets. In these markets they are then expected to establish new rules, potentially reorganising the markets and industries or creating a ground for new ones to emerge. This also means the emergence of new kinds of firms and other institutions, new forms of expertise, of professionals and identities.

Cross-innovation, as we understand it, is not a singular event. Once facilitated by digitisation and the development of network infrastructures and digital media technologies, cross-boundary dialogues between different service economy sectors become a constant. As such, they are also strongly underlined by the broader mediatisation trend. It is for this reason that the study of cross-innovation processes between AV media and three other sectors is of importance – it explores explicitly the character and effects of mediatisation, but in ways that try to understand the economic rationales and dynamics behind it. But the fact that cross-innovations are rarely singular events also means that dialogues across boundaries are numerous, that, especially in the early stage, they take to a penumbra of alternative solutions. It is, therefore, justified to talk about cross-innovations as multi-linear clustered processes. It is expected that some of the solutions or clusters may then gain wider adoption and facilitate auto-communication and self-codification processes that will coordinate the further development of the cluster and the emergence of a new market or industry around it.

What the learning from cross-media (or transmedia, as these phenomena are functionally similar) studies should be is that the emergence of a new form or innovative media phenomenon does not mean that the parallel or previous phenomena or institutional setting may disappear. This refers, on the one hand, to the 'convergence paradox' (Ibrus, 2016; Liestøl, 2007) that it results in divergence – emergence of a new form next to others, a process that results in the pluralisation of cultural forms. On the other hand, it means that media forms stay related and that media industries, to neuter the risk of audience fragmentation, develop complex strategies to meaningfully connect them. Similarly to cross-media strategies, mediatised cross-innovation strategies, therefore, involve strategic connecting of different products and services, of institutions and of industries and markets. As in the case of cross-media strategies, full convergence between the connected entities is not even the objective. Vice versa, it is important to sustain their meaningful distinctions in order to provide users with alternative functional options, but still keep them engaged and connected. The question, therefore, for instance in the case of cross-innovation processes between media and health care services is that even if a certain sub-industry of mediatised health services emerges, how are these services interconnected with both the existing other health care as well as media content services and industries?

Another learning from cross-media studies is that rarely are single, even larger media companies able or ready to manage all the composite services of a

strategy. Cross-media strategy means interacting with different firms and other institutions, commissioning services and licensing out rights. The value networks that emerge in these processes create opportunities for small companies to provide specialised innovative services and so strengthen the adoption of the new rule. The management of cross-innovation processes is, at the same time, challenged by difficulties of interactions between such often very different companies.

Last, perhaps most importantly, the learning from cross-media studies is that these value networks no longer consist only of institutional participants; they now feature individual users – people. According to Potts et al. (2008), these people then constitute 'social network markets' while many of their activities may, in fact, be non-market activities. These people may be professionals, but often they are not. These activities may consist of recommendation making, of filtering, of making modifications, of crowd funding or of other forms of assistance. Many of the crossings of boundaries that make cross-innovation processes are carried out by such individual users. Managing mediatised cross-innovation processes, therefore, also involves managing networked users and non-market collaborators.

On the other hand, cross-innovation in the contemporary era also means that while crossings are still mostly executed by users or small companies they are doing it in the environment where most communications channels and platforms are provided by very large platforms. These platforms, increasingly too, are aiming to compete in these emerging markets termed by them as e-health, e-learning and digital tourism. The study of cross-innovations thus needs to include the classical questions of global oligopolistic service markets and the degrees of freedom that smaller players may have in these for innovation.

Cross-innovation Systems and Space

What characterises the case countries of this book – the EU countries around the Baltic Sea – is that these are, mostly, small countries. With Germany and Poland the exceptions, all are small or very small. Furthermore, many of these economies are structurally characterised by the prevalence of SMEs. In this context, we should remind ourselves that innovation systems theory first emerged and is mostly still used to analyse 'national innovation systems'. When Lundvall developed his concept of systems of interactive learning, he used this to make sense of the Danish economy, which consists mostly of SMEs that mainly work on incremental innovations and achieve these by learning from each other – by copying, imitating and modifying. Such interactive learning as a practice is enabled by pre-existing trust relationships, strong social networks and stable exchange relationships. And it is via such interactions that those incremental innovations then diffuse. The feature of such networks and relationships is that they work best if they are, generally, local; if they are bounded in space, that is, they are constitutive, especially in small economies or bounded regions. Furthermore, as suggested in the pages above, cross-innovation systems that incorporate media and creative industries are effectively social network

markets – consisting, to a significant extent, of SMEs and individuals that constitute complex and dynamically changing exchange relationships underpinned by mutual trust and familiarity. 'Interactive learning' is the core knowledge transfer mechanism in such markets and what matters for its effectiveness is relative proximity, along with encounters and embeddedness in real space. It is for this reason that, when addressing the nature of cross-innovation, we also need to address the role of spatial relationships and locality in these processes.

The two concepts and related research traditions that have addressed these issues are, first, 'regional innovation systems' and, second, spatial clustering of industries. The two are closely interrelated, but are not the same. A 'cluster' refers to an agglomeration of 'interdependent' firms within the same or adjacent industrial sectors in a small geographic area (Isaksen & Hauge, 2002, p. 14). Next to it, a 'regional innovation system' has been suggested to refer to 'interacting knowledge generation and exploitation sub-systems linked to global, national and other regional systems' (Cooke, 2004, p. 3). This means that, while local, regional innovation systems stretch across several sectors and include not only local firms, but also public authorities, knowledge institutions and so on (Asheim & Coenen, 2005, p. 1174). Clusters and regional innovation systems can co-exist, but the policy of the latter is to enforce inter-sector dialogues and knowledge transfer upon the former. Both, however, matter for the analysis in this book, because, despite globalisation, most businesses are still local. Also, much innovation governance and many innovation support systems are local. The operations of universities and other knowledge institutions are generally local, too – as are networking and, therefore, also many 'interactive learning' processes. Thus, knowledge and processes of its generation tend to be territorially 'sticky' and embedded in bounded spaces. As Hartley (2015) has been demonstrating, it is in the bounded urban territories where heterogeneity of ideas and, therefore, also moments of cognitive dissonance can exist, resulting in learning and the emergence of novelty.

There is much related evidence of SMEs from creative industries clustering in urban spaces (Davis, Creutzberg, & Arthurs, 2009; Evans, 2009; Pratt, 2004; Roodhouse, 2006) – a phenomenon increasingly facilitated by policy means (Virta & Lowe, 2017). The situation is different, of course, with the three other sectors – health care, tourism and education. While private health industries do tend to cluster around university clinics or other larger public hospitals, the education and tourism sectors do not evidence a similar kind of agglomeration. In our study, however, we aim to understand the mutual effects of regional innovation policies and local clustering on cross-innovation processes, as, for instance, in the case of clustering of AV media and digital technology firms in the Aarhus region in Denmark or the clustering of both media and educational technology industries in the Skåne region in Sweden.

International Cross-innovation Systems

The paradox of contemporary mediatised cross-innovation systems is that the strength and specifics of the local systems are only one side of the coin.

The other side of it is globalisation and the evolving division of labour in global service markets. The digital service economy is, indeed, increasingly globalised. Media markets have been classically shaped by economies of scale and, because digital networks make cross-border service exports easier, the related cross-innovation systems are expected to operate across national boundaries.

Lundvall, when he wrote about national innovation systems almost 10 years ago (Lundvall, 2010a, pp. 67–69), addressed the issue of multi-national firms dominating international commodity flows and suggested that, as user feedback and relations are difficult to manage from one exporting country, multi-national firms are effectively the 'solution' to this problem. In his view, while multinationals may be better at localising interactive learning, resulting in localisation of services or product design, their relative inflexibility in the markets in which they are present may, at the same time, undermine the functioning of local innovation systems. Lundvall then proposed that technical standardisation is needed in order to overcome transaction and interactive learning costs:

> Especially when international institutional differences are involved, technical standardisation becomes crucial for the pattern of international user–producer relationships. Standardisation between countries in terms of business procedures, technology and product quality reduces the uncertainty of foreign users, and limits the room for opportunities on the producer side. Standardisation reduces transaction costs and in some cases it might stimulate international interactive learning. (Lundvall, 2010a, p. 68)

The question about appropriate strategies when it comes to either localisation or global standardisation of media services is a heavily studied topic in media studies (see Rohn, 2010). To put it simply, there are different ways to achieve scale in international markets, some of which may involve licensing out formats for measured localisation (examples), some of which may involve developing 'culturally odourless' universal formats expected to travel internationally as they stand (examples), some of which may involve establishing local subsidiaries doing the local adaptation work (examples) and so on. To summarise, the 'media logic' that presumes being easily relatable by audiences means that standardisation is not the only mode for approaching internationalisation whenever media is involved in cross-innovation processes. Therein, exporting media industries have developed a variety of ways of addressing local interactive learning processes. Yet, with the development of further technical standardisation and the parallel evolution of global online platforms such as Facebook, Amazon and Google, we have arrived at a new situation, perhaps similar to what Lundvall was asking for. The platforms have effectively standardised many of the technical solutions and simplified business procedures when it comes to international online service provision. As such, they have also reduced uncertainties for international users – and, as evidenced, they have, in the process, also limited the opportunities and autonomy of independent media content service providers.

Finally, being effective at collecting user data, they may be good at enabling international interactive learning, in Lundvall's terms.

When it comes to this last aspect, however, they are often not good at sharing these data with media content or service providers, which, again, presents a problem for local and regional innovation systems. Without comprehensive access to user data and audience contacts, it may be difficult to achieve close relationships with audiences and develop various participatory services or service development programmes – that is, it may be difficult to pursue interactive learning processes. Furthermore, these platforms may, instead, use these data to provide themselves services related to health care, tourism or online training. Think here of Google Maps and all its sub-applications enabling informed travelling and tourism. In 2018, there was news about Amazon entering the health care business by relying, among other inputs, on data both from its online store as well as from its digital home assistant Alexa in order to predict and assess health risks and ways of their prevention as well as manage rehabilitation and disease control efforts. What we have, in these instances, is platforms as intermediaries competing themselves in specific cross-innovation areas, limiting opportunities for smaller national or regional firms.

Despite these challenges, the specifics of small markets are that domestic returns and growth opportunities are limited and, therefore, orientation to servicing international markets is commonplace in online service innovation. This has already been evidenced in studies of Nordic AV and cross-media entrepreneurs (Ibrus, 2016). As will be seen in the subsequent chapters, this is again the case with firms working on cross-innovation projects in smaller countries. They see export as a must and use a variety of means – either the existing platforms or their own built applications or channels. For companies in the European Union, this also means using the opportunities provided by the EU Digital Single Market Strategy, as well as taking into account its risks associated with the evolution of European-wide service oligopolies (Ibrus & Rohn, 2016). In terms of the analysis in this book, it means addressing the evolution of international cross-innovation systems where participants are not only the enterprises coordinated by social network markets in the terms of Potts et al. (2008), but also, to a significant extent, by the enterprises running the social networking solutions – that is, by platforms. In terms of van Dijck, Poell, and de Waal (2018) thesis on platformisation – it is increasingly the globally dominant platforms that are actively coordinating these emergent markets.

When it comes to the evolution of international cross-innovation systems, what is also of interest in our study is how the local clustering and evolution of national innovation systems affects the evolution of international value-chains and the division of labour. In the area of AV media production, such divisions and the evolution of local strengths have been evolving for decades. Scandinavian countries have been strong in videogame development, Ireland in special effects production, the UK and the Netherlands in TV format development, Denmark in TV drama series production, Finland and Estonia in mobile games, Norway, Sweden and Finland in learning games and so on. While these local clusters evolve in a path-dependent way that relies on the nature of local

policies and other conditioning factors, they also evolve in interaction with each other – in terms of either cooperation or competition. Contemporary film, TV and videogame industries are notably international in their operations. Therefore, in terms of cross-innovation, it needs to be realised that while the social networks and operations of AV industries are increasingly international, those of other sectors may not be – tourism, in general, is about competition between countries; education is, in principle, national (except higher education); and so is most of health care. International cross-innovation systems are, hence, expected to be coordinated by the international operations of AV media industries and the domestic operations of other industries. The subsequent chapters will shed light on the balances of these orientations and how they shape cross-innovation processes and industry convergence. Regarding the international dimension of cross-innovation processes, this book aims to understand how the evolving international value-chains and the ongoing platformisation and globalisation of the service economy are affecting opportunities for and the roles of small players in small countries.

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Chapter 3

Small Size Matters: Audiovisual Media Industries around the Baltic Sea

Indrek Ibrus and Ulrike Rohn

Abstract

The chapter discusses the characteristics of audiovisual (AV) media sectors in the Baltic Sea region. Therein it focuses on the specifics of media industries in small countries in the region as they are challenged in ways notably different from large countries with large domestic markets for media content. It discusses the differences between the AV media industries in the Nordic and Baltic countries and suggests that while in the first case long-term welfare society policies and conscious policy-driven system building have conditioned growth and international success then also in the second case innovation policy rationales have facilitated recent growth and dynamics. It then discusses the specific challenges, especially platformisation to small media industries in contemporary globalising media markets, and suggests that opportunities to resist these challenges may be in local intersectoral cooperation, that is, in building cross-innovation systems.

Keywords: Media industries; Nordic countries; Baltic countries; cross-innovation; small media markets; media innovation

What Are 'Audiovisual Industries'?

This book and the research project that preceded it are a team effort. The core questions emerged via our many encounters where the skills and competences of what we call the audiovisual (AV) industries were used in the service of other industries. Some of us had worked with initiatives to digitise AV heritage in order to use old films or TV clips in new digital learning materials. Some of us

were interested in the evolution of educational videogames and their industries. Some were investigating the role of videosharing platforms in learning practices – learning about everything from health care and medical practices to tourist destinations. Some had long studied the uses of augmented reality (AR) applications in tourism, while others were digging into the uses of virtual reality (VR) by health care establishments. Eventually, for us, these developments all came together as convergent processes where AV media and videogaming industries – that is, 'AV industries' or 'screen industries' – were cooperating and co-innovating with other industries. To many of us, being media researchers, these processes came across as part of the prevalent mediatisation trend. When it comes to some of the core functions in life – the mobilities, the learning, taking care of one's wellbeing – our related encounters and experiences, the 'textures of our lives' to paraphrase Roger Silverstone (1999) are increasingly mediated and mediatised. Therein these lives have also become more visual as it is the AV modes of representation that increasingly dominate the contemporary cultural ecosystems. And this also means that it is the broadly defined 'AV industries' (as they converge) that get new roles and functions in the process – they develop new lines of practice and business and go through a self-transformation process therein. These were our assumptions and the specifics of these processes we embarked to study.

Yet, what we quickly realised was that the distinctions within the AV industries still matter. While these industries do cooperate and converge and increasing development of various cross-media strategies continues to facilitate this, still, the professional distinctions matter. They matter to people within these industries, but they seem to matter even more to people outside them. While the boundaries between animation, special effects and videogaming industries are increasingly blurry, it was still difficult for some of our interviewees to recognise videogaming industries as 'AV industries'. While independent film studios are also producing commercials, TV series, web series and content for social media platforms, they are not always recognised as 'media' by non-professionals. While public service broadcasters in Europe are primary innovators when it comes to cross-media strategies or transmedia productions (Bechmann, 2012), they are not always perceived as having close relations to the videogaming sector. To conclude, us discussing the 'AV industries' as a particular constellation appeared counterintuitive to some of our interviewees.

Yet, despite this, we see analytical value in this broad definition. First, what all these sub-industries produce or contribute for are by definition still media – collective communication outlets used to store and deliver information. These outlets are all similar in that they are read for meaning by wide populations. They all mediate various realities and use for meaning communication similar (AV) modes and representative conventions, many of which they share and 'remediate' (Bolter & Grusin, 1999) from one to another. Their markets are similar, related or overlapping, all shaped by similar underlying logics – primarily economics of scale and scope. Their products are information goods, intangible and non-rival. Their production, always forms of information processing, presumes specialist creative skills. These industries are inhabited by 'talents'

presenting specific challenges for their managers. They are similar, interrelated and increasingly convergent. It does make sense to take a look at their operations and functions as a whole while keeping in mind their inherent heterogeneity and distinguishing their differences in action.

Audiovisual Media in the Nordic Countries

While different media industries are increasingly intertwined, their constellations in specific countries are always different. Their roles are different, their capacities are different and their relations to international markets can be very different. It is for this reason that we take a closer look in this chapter at the nature of AV media industries in our case-study region – the Baltic Sea region of the European Union consisting of countries from all around the Baltic Sea. The region is diverse, consisting of countries of different economic capabilities (yet converging), but also of different historical backgrounds and of different sizes. There are larger countries such as Germany and Poland, but also several small countries ranging between Sweden (10.2 million inhabitants) and Estonia (1.3 million). Let us hereby focus on the latter – the small countries – as the specialty of this book could be that, differently from much of both media systems and innovation systems studies, it attempts to tell the stories of either small or very small countries.

When it comes to small countries in the region, there are the long-term democracies and welfare societies such as the Nordic countries and there are the Baltic states that only recently underwent difficult transformation from authoritarian socialism to market capitalism. The media markets and industries of Baltic and Nordic countries are notably interrelated with much of both vertical and horizontal integration. But there are also significant differences. In the following we will take a closer look at these specific differences.

The so-called Nordic countries consist of Norway, Sweden, Finland, Denmark and Iceland and are very often discussed in terms of constituting a distinct cultural and geographic entity among the world's nations. These countries share a similar political, social and economic system that has been epitomised in the concept of the Nordic Model. By extension, the media in these countries and their distinct and common features have also been discussed widely (Hallin & Mancini, 2004; Syvertsen, Enli, Mjøs, & Moe, 2014).

Syvertsen et al. (2014) discuss Nordic media in terms of a Media Welfare State, following a widely shared understanding of these countries as welfare states in which the relationship between the state and the people is close and positive. Typical for the Nordic media industries is a consensual and pragmatic policy formation, a combination of far-reaching state regulations as well as support schemes that enable strong, but independent media. Strong adherence to the principle of freedom of speech and to the idea that media contribute to the building of national identity has led to a robust and resilient public media sector that naturally exists alongside successful commercial players and enjoys a high degree of legitimacy (Syvertsen et al., 2014). The same approach underlies also the film policies – a common thread running through the policy histories of Nordic

cinemas is that film needs to be 'useful' – it is a 'means of engaging citizens with norms and values that are integral to the project of building what, at a given moment in time, counts as a good society' (Hjort & Lindqvist, 2016).

A characteristic feature in the Nordic media and AV policies is the tendency to choose policy solutions that are consensual, that is, that are based on consultation with both public and private stakeholders. There is a strong understanding that the media and film should appeal to all and that media should inform and enlighten the population at large. For private media organisations, this has meant that their views, too, are taken into consideration in policy development (Syvertsen et al., 2014). As such, the Nordic countries constitute, in effect, market economies in which there is a high degree of coordination and interdependence – not only between individual firms, but also with the states (Hall & Soskice, 2001). In particular, the Nordic countries see large media companies or film production companies acting as drivers of innovation and growth and as vehicles to turn themselves into advanced information societies (Bondebjerg, 2016a; Syvertsen et al., 2014).

The systematic coordination between the state and the industry has allowed media firms to benefit from protective policies that are designed to defend them from the pressures of marketisation and globalisation. At the same time, however, it has given them a comfortable situation out of which they have been able to take advantage of global market opportunities (Syvertsen et al., 2014). A significant number of media companies in the region have developed into strong media groups that find it easy to operate across the Nordic countries owing to cultural and language proximity across these countries. These include, in the first place, Bonnier, MTG and Schibsted. The strength of these companies has served as an important protection against dominance by companies from outside the Nordic countries and has enabled them to successfully enter other markets, including the neighbouring Baltic countries.

Next to the private groups, public service media has enjoyed similar trust and stable funding, allowing it to invest systematically in improving the quality of its fictional content produce. Toft Hansen and Waade (2017) emphasise that most of the Nordic television drama series that have by now gained notable international recognition was produced by public service broadcasters and funded by public finances and licence fees. The success, they posit, is entrenched in strong traditions of public service drama production that have met faithful domestic commitment and related high market share. The systematic work on this genre has been enabled by a long-term cultural political interest in reflecting local and regional lives in the form of TV drama series. This political mandate has also materialised, in addition to licence-fee-based funding, in various local and regional funding practices. It can, therefore, be suggested that the international exporting success of Nordic drama is owing to a high level of trust in the public value produced by public service media and that such public value is used by a variety of private parties, most notably independent production studios, for their benefit.

Yet, what should be highlighted in this book is that, to a significant extent, the success has also been based on the systematic policy effort the end of 1980s to internationalise the local AV industries. First came the establishing of the

Nordic Film and Television Fund (NFTF) in 1990 that constituted a move towards international co-production and distribution for both television and film. That is, what was significant with NFTF, was that the national film institutes and broadcasters joined forces to give to the development of the AV culture a broader backing and a stronger voice, both in the region and beyond (Bondebjerg, 2016a). This happened in parallel to the creation of Eurimages fund in 1989 and the EU MEDIA programme in 1991 – both putting an emphasis on co-production of films between European countries. And so did the NFTF.

This resulted first in intensified cross-boundary cooperation across the Nordic region. Regarding TV drama, already since the 1980s several of the more significant series have in fact been co-productions between Nordic public service broadcasters (PSBs), a process that only intensified in the course of the 1990s and later. Furthermore, the main international co-producers that stepped in with significant funds during the nineties were the public TV networks from neighbouring Germany. As Toft Hansen and Waade (2017, p. 150) explicate, the decade extending from the middle of the 1990s until the late 2000s saw a steady rise in German co-funding of Nordic drama production. 'The German interest in Scandinavian crime fiction has provided a strong platform for co-production with DR and other Scandinavian partners over the years' (Bondebjerg & Novrup Redvall, 2015, p. 227). In this context, it should, however, be highlighted that it is again mainly PSBs that are actively co-producing content relevant for several territories. PSBs have shown more co-productions involving European co-producers than commercial TV stations (Bondebjerg, 2016b, p. 6). Yet, as many of the series have been commissioned from independent producers and many are co-produced with commercial TV channels or other private partners, the Nordic PSBs could be seen as important coordinators of local drama production (or drama innovation) system.

That the coordination effect is there has been evidenced by the increased exports not only of TV series, but also of film. In fact, film exports have grown notably. As Bondebjerg (2016a) describes this, especially in the Danish case the national film policy has gradually supported the increasing internationalisation and export-orientation of their film production. Since the late 1980s, the explicit emphasis has been similarly to television on international co-production and therein producing more – funding rather more low-budget films than a few expensive productions. Gradually also the definitions of what constitutes a 'Danish film' have been relaxed – while at the beginning it needed to be shot in Danish and the majority of the crew needed to be Danish then more recently only a producer/director has to be Danish (Bondebjerg, 2016a). A shining example of the evolution of the Danish film industry has been the production company Zentropa founded in 1992 by Peter Aalbæk Jensen, Lars von Trier and Vibeke Windeløv. Lars von Trier was producer until 2008. The company that has by now produced more than 200 films has pursued an explicit international network-building strategy from the beginning by striving to working on co-production and establishing or becoming a partner in tens of subsidiaries across Europe. Recognising the effectiveness of their strategy Zentropa was

named in 2000 'European Producer of the Year', just as its distribution company, Trust Film Sales, also won the Eurimages prize as 'European Exporter of the Year'. By also establishing Filmbyen, a set of shooting studios and office spaces for film companies in Avedøre in 1999, it has been, in effect, driving an internationally oriented AV production cluster in Denmark.

All such strategising has been resulting in a steady growth for the Danish film production sub-sector. Export revenues by Danish independent producers grew 400% in the film sector between 2009 and 2017 (export revenues 154 million euros in 2017). In comparison, TV content export by independents (not including public broadcasters and their in-house productions) grew only 2.1% during the same period (in gradual decline in recent years) and videogame production export by 62.8% (growing steadily, with export revenues 74 million euros in 2017).[1]

When it comes to game development industries, however, Denmark is less developed while neighbouring Sweden is a notable powerhouse – with internationally well-known games such as *Minecraft* and *Battlefield* having been developed there. Revenues of Swedish game developers increased to 1.4 billion euros in 2016, representing a 1000% increase since 2010. The videogaming industry in Sweden reported a total profit for 8 years running (2010–2018), and 25% of all revenue is generated by medium-sized and smaller companies.[2] Finland, which had internationally salient success with games like *Clash of Clans* and *Angry Birds*, has been doing similarly well – in 2014, the industry turnover was approximately 1.8 billion euros, representing 100% growth compared to the previous year. Gaming industry revenues have been the world's highest in relation to population.[3] With *Angry Birds* having also spread investment to film production and educational gaming, there have been significant spillovers to other branches of AV industries. Related to this is the early success in VR and AR – revenues for companies in these areas have grown 4.7 times from 1.3 million euros in 2015 to 6.1 million euros in 2016.[4] In Sweden, 10% of games companies are working on VR experiences.

The spectacular growth of game development industries in the Nordic countries is itself an example of cross-innovation. As the sector is effectively coordinated by two policy frameworks – information and communication technology industry development and creative industries/AV culture development. In case of Finland, for instance, the growth has been fuelled by investments from Business Finland (formerly Tekes) that generally invests in technological innovation, but also by various creative industries measures – especially by thematic incubators and accelerators. Across the Nordic countries, an important policy instrument has been the Nordic Game Program that has funded the development of more than 100 'quality games' aimed mainly at smaller children. That is, also in this sphere the Nordic cooperation has been underpinned by the core welfare society values. The Nordic focus on regional film production, that films

[1]See further: http://pro-f.dk/
[2]See further: https://dataspelsbranschen.se/rapporter/
[3]See further: https://www.neogames.fi/fgir2015/
[4]See further: https://fivr.fi/survey2017/

need to represent social and cultural realities everywhere in these countries have been affecting also game production. This is because the regional film and TV cluster organisations have started to increasingly also work with gaming companies – as for instance in case of Aarhus in Denmark where the local Filmby Aarhus, a film production centre and a cluster organisation that coordinates film production in Western Denmark has started to also engage with coordinating game development in the region (see also Chapter 9). That is, increasingly there are local initiatives where the operations of film and television production and game development are coordinated within the same framework.

We did this quick round of statistics and numbers on the Nordic AV industries to indicate not only that this sector is doing good in the region and that it is generally in the growth mode, but also that it is operating internationally and that there are significant spillover effects between sub-sectors. The growth can be understood to be based on a complex set of public (national and regional) policies that start from diversified funding for public television and film production, but also include a variety of support measures such as funding for cluster organisations, incubators or accelerators aimed at gaming and other start-ups (see Chapters 5 and 9 in this volume about the last). The spillovers between subfields and their cooperation are understood to have also been facilitated by educational systems – with programmes in filmmaking, TV production animation, game development and transmedia production existing next to each other and being occasionally integrated.

Audiovisual Media in the Baltic States

Next to the Nordic countries, the Baltic states have a notably different situation. Having restored their independence in the early 1990s, they have broadly rebuilt their media systems anew. This process has had limitations owing to lack of resources and occasional political instabilities, but there have also been opportunities associated with lacking path dependencies. Especially Estonia's success in building up its benchmarking e-governance systems could be related to the latter aspect. Regarding the broader media sector, the early weaknesses and lack of resources and know-how was neutralised in the 1990s with the help of investments from neighbouring Nordic countries – several major Nordic media groups saw the Baltics as their first expansion opportunity and invested in the Baltic media, some of the most visible having been Schibsted, Bonnier, Sanoma and Modern Times Group. As Jõesaar (2017) has demonstrated, their main goal was to profit from newly opened markets and, with regard to television broadcasting, these investments were, indeed, very profitable for a while.

As the Baltic economies were, in general, enjoying quick growth, this also spilled over to advertising. The Baltic regulators being rather favourable towards foreign-owned media groups meant that their television branches showed very high productivity, too. Jõesaar (2017) calls these the 'golden years' of private television in the Baltics. Yet, as the global recession struck in 2008, the Baltic countries suffered considerably. Especially bad was the effect on local media firms – from which they have still not recovered (see Figure 3.1). Furthermore, digital

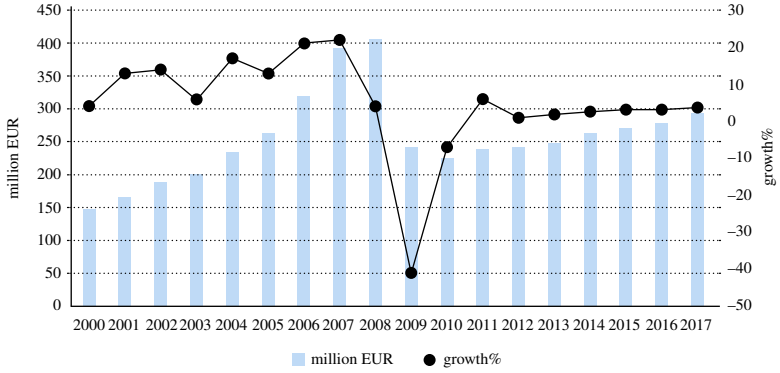

Figure 3.1. Aggregate Advertising Expenditures of the Baltic States (2000–2017). *Source*: Kantar Emor.

switchover with the pluralisation of competing channels and advertising moving to the internet added additional challenges to operating in those very small markets. These hardships were reflected in many foreign investors pulling out. In 2015, Schibsted sold all of its Baltic businesses and what used to be its major Estonian property Eesti Meedia is now solely owned by an Estonian entrepreneur, Margus Linnamäe. Another Estonian, Hans H. Luik, bought back the majority stake of Ekspress Grupp AS shares from its Swedish owners. MTG, in turn, sold all of its Baltic media businesses to Providence Equity Partners, a US investment company.

What the now mostly locally owned media houses have been focusing on is online and cross-media output. The rationale behind this is, on the one hand, to build on the economies of scope logic and make these companies more effective and, on the other hand, to foster opportunities for innovation in the area of cross-media solutions, but potentially also with regard to cross-innovation – that is, working with other sectors. Bonnier-owned business information outlet Äripäev in Estonia, for instance, has recently been digging itself into the educational content business. This is based on the understanding that as it is already a knowledge processing and filtering enterprise, it can be extended to provide knowledge for learning purposes. As some of its advertising income has disappeared – moved to the global platforms (not represented in Figure 3.1) – its cross-innovation strategies are, in effect, strategies of 'deep localisation' – materialising in creative forms of native advertising, in conference and event organisation, etc. – all the stuff that global platforms cannot do.

Regarding online activities especially, it may be that the abovementioned Estonia-based media groups Eesti Meedia and Ekspress Grupp are replicating the cross-regional growth scenario described earlier in relation to Scandinavian groups. Both have expanded across the Baltic states and have considerably diversified their operations. Ekspress Grupp owns the leading online player in all three countries, the Delfi news and online services portal. Eesti Meedia has merged its newspaper, online and television assets into a single company, owns the region's biggest

Table 3.1. Annual State Support for Baltic Film Industries (2014–2018) (in Euros).

Year	Latvia	Lithuania	Estonia
2014	4,306,730	3,024,501	6,954,607
2015	5,747,829	3,073,737	7,072,593
2016	6,770,387	3,519,000	10,390,612
2017	10,462,238	4,619,000	12,467,002
2018	6,192,637	6,423,000	11,055,504

Source: Baltic Films (2018).

advertising network and has bought up all existing Baltic news agencies. Across all their operations, both companies are profitable. Regarding cross-media strategies, both companies are investing notably in online video provision and in developing video-on-demand services. Furthermore, Eesti Meedia has recently stepped into film production based on the recent box-office successes of some Estonian films.

The film industries of all three countries have, in fact, been in growth mode in recent years. This is owing to not only to growth in public funding (see Table 3.1), but also to the evolution of the institutional system needed for the industry and its production culture to flourish. Regarding this one of the first steps was the establishment of the Baltic Film and Media School in Tallinn in 2005 (a college of Tallinn University), which has facilitated growth in the number of skilled professionals. Especially in Estonia, the film policy focus has been on building and strengthening the institutional system and its inherent coordination such that there is a higher education institution, a film institute, an international film festival together with a film market, a set of strong production companies, a shooting studio, a cluster organisation, funds for co-production and a rebate fund to attract foreign productions to the country and, in this way, to provide additional work, 'interactive learning' (Lundvall, 1992) and networking opportunities for local firms and professionals (Ibrus, 2015). This strategy is effectively copying the Danish example – in terms of strong emphasis on co-productions and international networking as well as on developing the necessary institutional system in the country. The strategy has proved successful with Estonia having a recent Oscar foreign language film nomination (*Tangerines*) and two Golden Globe nominations (*The Fencer*, *Tangerines*).

Also, cinema admissions for domestically produced films have grown quickly in the last few years. Demand for domestic films has been growing in all three countries owing also to the recent growth in the number of digital cinema screens – from 109 in 2013 to 187.[5] In Estonia, the number more than doubled

[5]See further for Baltic film facts: https://www.filmi.ee/en/estonian-film-institute-2/facts-and-figures/baltic-films-facts-and-figures

in this period – from 29 to 73 – owing to direct public subsidies for cinemas in smaller towns. While film production is publicly subsidised in general, the growth in digital screens has enabled not only cheaper, quicker and more flexible domestic distribution of films, but also more returns from the box office – motivating private investment in film production as referred to above. That is, the public investment in cinemas (facilitating demand) has facilitated new private investments in production, more of market dynamics and more of diversity (both in terms of institutions engaged in the system as well as in terms of diversity in films produced). What we could recognise here is public coordination of a film innovation system, whereas in the process the provided public value is, in effect, also turned into private value.

Yet, it needs to be highlighted that the budgets of films produced in the Baltic countries are tiny compared to Western standards and significant exporting success is still to come. Still, what the Estonian example of film production (or innovation) system building exemplifies is that, with appropriate public-policy-based coordination, growth can be achieved even if initial conditions are meagre.

Next to privately operating media and film industries, Baltic public service media institutions are in a similar situation – growth and opportunities exist, but the limitations deriving from very small market sizes and still emerging economies are significant and restraining. See Table 3.2 for a comparison of public funding for our case countries around the Baltic Sea.

Despite the restrictions in the Baltics, it is still PSB organisations that can be seen acting as coordinators and facilitators of inter-sectoral cooperation and of various kinds of innovation activities in the media sector. Cross-media formats are successfully used especially for children's programming and educational content. For instance, the European Broadcasting Union elected Estonian Public

Table 3.2. Funding of Public Broadcasters in 2016.

Country	Total Revenues	Per Capita	Of Which Comes from Public Funding
Lithuania	32.9	11.8	92.7%
Latvia	26.5	13.2	79.2%
Estonia	40.3	31.0	95.8%
Finland	473.2	86.0	97.7%
Sweden	867.4	86.7	99.4%
Germany	9177.7	111.0	88.0%
Norway	610.6	115.2	98.1%
Denmark	910.0	160.7	54.2%
Iceland	56.6	188.7	50.0%

Source: Calculations based on European Audiovisual Observatory data (2018a).

Broadcasting's (ERR) *Rakett 69* as the best educational TV show in Europe in 2012. *Rakett 69*, which is still running, is effectively a gamified science show in a cross-media format targeted to older children and adolescents.

Game production is similarly emerging in the Baltics. There is a cluster of indie game developers in all countries with the oldest of them still less than 10 years old and the best of them having annual turnovers of between 100,000 and 500,000 euros. There is, however, one exception – Creative Mobile – an Estonian company that invented the popular 'drag racing' genre for mobile games and has capitalised on that, having produced a whole series of racing games, but also other kinds of mobile games. Their turnover in 2017 reached 7.3 million euros – which is significant compared to, for instance, public film production subsidies in the country. Creative Mobile is, however, also notable for cross-media development as one of their most recent outputs is a cooperation with 20th Century Fox based on the television series *The X-Files*. *The X-Files: Deep State* is a mystery investigation game that was published with the release of the TV series' 11th season in 2018.

As Creative Mobile is also driving Estonia's Game Developers Association, one can recognise a new cluster developing around them. Yet, the developments within this cluster are also based on the broader dynamics within the Estonian start-up scene, recognised to be one of the most active in Europe in recent years (Chakravorti, Tunnard, & Shankar C, 2015; Mets, 2017). More recently, there have been established new publicly and privately funded incubators, accelerators and cluster organisation in Estonia (Digix,[6] Storytek[7]) as well as in Lithuania (Nebula[8]). All of them host start-ups representing the increasingly rich variety of content forms and business models within AV industries. It remains to be seen to what extent are these initiatives able to facilitate interactive learning and convergence between the sub-sectors. Yet, their public funding evidences that in the Baltics too these formerly distinct sub-sectors are increasingly coordinated as one (innovation) system.

This review of the AV media industries in the Baltics paints a picture of the challenges and strategic opportunities that both the policymakers and the managers of media enterprises in very small countries face. There could be opportunities in strategic (innovation) system building and often these may lay, in fact, in cross-innovation with other sectors. Altogether last two sections told us two stories: first, how long-term welfare society policies and their path dependencies can be understood to have conditioned growth, dynamics and international success for the AV media sector of the Nordic countries; and second, what the real limitations are for the very small emerging countries and their media industries and how innovation policy rationales can be understood to facilitate growth in these circumstances. Let us look next in more detail at the specific conditioning factors of small domestic markets to their media industries.

[6]See http://digix.eu/et/
[7]See https://storytek.eu/
[8]See further: http://nebula-cluster.com/

Small Size Matters

Media markets tend to have special characteristics that suggest that larger is better. Owing to high economies of scale in the media, it makes sense to sell, distribute and copy what has already been produced. The variable costs of selling an extra unit of what has been produced are marginal. Where companies operate in large domestic markets, they can reimburse their investments in the domestic market and then, especially in the case of digital content, with no or very limited extra costs of further distribution, sell their products very cheaply in additional markets. Every penny earned in these extra markets is effectively a profit, given that the company was already on a break-even in the domestic market. This point of reaching the break-even point is easier in larger countries than it is in smaller countries. Where investment in production is high, the logic of the economies of scale is that the larger the market and the demand, the better it is financially. Small start-up companies do not have this scale benefit yet, and might have to compete against larger ones that have it. This makes investing in new products and services with high initial production costs, as is the case for the media, very risky. Hence, it is important that they offer something unique to be able to address a niche (Dimmick, 2003; Porter, 1980). Prediction of demand and the degree of diffusion of new AV services is a major topic of interest for both governments and providers. Competitive relationships with existing services are of key concern in these predictions. The competitive Bass model (Bass, 1969; Seol, Park, Lee, & Yoon, 2012) and the theory of the niche (Dimmick, 2003) have often been used as a framework for examining competition patterns in media industries.

Media industries are not only characterised by high economies of scale, that is, cost savings through increased output, however. Another characteristic of media industries is their grant opportunities of high economies of scope, that is, costs savings through synergies. Media companies that own and operate various channels and platforms can share content among these platforms as well as share marketing and other costs across operations. The more channels a broadcaster has, the more costs it can save compared to these channels each being owned and operated by individual players. This cost logic benefits larger companies that own and operate many different platforms and disadvantages smaller players that cannot share costs across entities.

Furthermore, network effects or network externalities play a crucial role in the media. This means that the success of a product may not be directly and foremost connected with its quality, but with the amount of users using it. Media applications are more valuable to a single user the more people use them. Owing to the importance of network effects, it is crucial for media applications to reach a critical mass of users until the product 'takes off', so to speak. Very often, this critical mass is achieved through offering the service or application for free, although this means that the high costs of development and production are not all met with revenue streams from users, which carries a high investment risk, also owing to the uncertainty in terms of demand size that is characteristic of the media industry. Very often, companies follow a freemium model paired

with a paid model for extra services or product features. Entrepreneurs or firms that have larger companies or other money sources in the background are at an advantage and find it easier to test and try new ideas in the market.

The fact that AV industries in small countries underlay special economic logics that influence their international competitive position is well documented (see, for instance, Lowe & Nissen, 2011b; Rohn, 2014). Puppis (2009) describes four primary issues that confront small market systems: shortage of resources, small domestic demand, dependency and vulnerability. In terms of shortage of resources, small markets have smaller probabilities for effectively developing resources from within. Especially for producers of quality films, TV series of games that aspire to be internationally distributed, the pool of skilled workers, directors, etc., is naturally limited. Furthermore, weakness in demand affects the viability of domestic producers. The dependency and vulnerability they experience relate to the distinct advantages of big players as content and capital from larger states flow to smaller ones. Very often, this results in domination on screens and in ownership.

When discussing the role of the small European Union member states in regard to AV policy, Trappel (2014, p. 240) writes that 'the underlying assumption of small states' media research is that this group of countries shares problems, which are different from those in larger states, and that media policies somehow do not take these differences sufficiently into account'. Recognising that 70% of European states (representing one-third of overall population) are categorised as 'small', the viability of small media systems presumably should be a bigger issue for policymakers at the EU level (Trappel, 2014, p. 240). Further exemplifying this tension between large and small countries in the context of media policy, Lowe and Nissen (2011a, p. 7) write: 'Can one realistically expect a media market with a few million people to have the same opportunities as countries with many times the population?'

Yet, when we look at the Nordic countries, we do see strong media companies that, owing to the cultural and language proximity of those countries, have been able to grow to become regional media groups and have performed well commercially elsewhere. Governments see these companies not only as drivers of innovation but also as important bulwarks against foreign ownership (Syvertsen et al., 2014). It is Nordic media companies that dominate the Nordic countries and it is now also Baltic countries dominating the Baltic markets. Nordicom's list of the 25 largest media companies on the Nordic market in 2015 in terms of revenue from the Nordic countries shows that the most successful non-Nordic company, Discovery Communications from the US, is not ranked before 12. In fact, it is one of the only two non-Nordic companies on this list, with a Dutch company ranked 23. What is more, most of the leading companies in the Nordic region receive the majority of their revenues from the Nordic region, with Finnish Sanoma and Sweden's Spotify the exceptions (Nordicom, 2015).

In terms of Nordic companies that are successful in other Nordic markets, we see that in Finland, the second largest player in terms of audience share is Bonnier. In Denmark, the third largest player is the Swedish Modern Times

Group. In Norway, the second largest player in terms of audience share is the Danish private broadcaster Egmont Fonden (European Audiovisual Observatory, 2018a). In Latvia and Lithuania, the biggest online media outlet is Delfi, owned by Estonian Ekspress Grupp.

Despite increasing globalisation, TV markets in the Nordic countries are also predominantly in the hands of domestic players. In Sweden, for instance, Swedish-owned channels earned more than 80% of the total viewing time (The Swedish Broadcasting Authority, 2014, p. 10). As there is no law against foreign media ownership, as is typical for the Nordic countries, the low level of interest in the Swedish media market from foreign, especially non-Nordic media companies is probably explained by its size and the relatively successful domestic players in the market (Open Society Foundation, 2011, p. 10).

Yet, to provide context, we need to compare the Nordic companies with the major European TV groups established in the large European countries where they benefit from the large market economies. In total, companies based in the UK, France, Germany, Italy and Spain accounted for almost 61% of the revenues of the top 100 in 2016 (European Audiovisual Observatory, 2018b, p. 62). From our case countries, only Finland and Sweden made it to the list – the companies from these countries generated respectively 3% and 2% of the revenues (European Audiovisual Observatory, 2018b, pp. 62–63).

Broader Trends in the Media Industries and How They Apply in the Region

Data-driven and technological innovations, digital applications and new business models are conditioning change in all sectors. New forms of work and reshaping of trade opportunities and relations are common (OECD, 2017). In the AV sector, we can observe two interrelated and interdependent trajectories: convergence and platformisation.

Virtually all types of AV services can be distributed these days over the internet, which has also opened the markets to internet-native companies. Furthermore, companies that previously focused only on infrastructure and content distribution are increasingly investing in content itself. Telecommunications firms and over-the-top (OTT) online services that run video-on-demand (VOD) platforms produce films and TV series, or buy premium sports rights (European Audiovisual Observatory, 2018b). This kind of convergence and the new competitors are unavoidably affecting the playground for the legacy television networks as well as independent producers.

They are also affected by what is sometimes called disintermediation – traditional intermediaries losing their roles. Instead, as Bilton (2017) puts it, there are new intermediaries emerging and these are the global ones. Platforms such as Facebook, Google, Amazon, Apple and Netflix together with telecommunications vendors providing broadband services are intent on controlling the business of consumption. They have largely monopolised consumer attention. Furthermore, automated advertising exchange platforms come at the cost

of losing direct business relationships with advertisers (European Audiovisual Observatory, 2018b). What this all means is that legacy AV service providers in small countries are gradually losing control over contact with audiences and advertisers to global platforms; as once all-powerful local 'gatekeepers' to content, they have now been outmanoeuvred.

Evidence of this is the growing share of locally generated advertising revenue going to those platforms and international advertising networks. In Denmark, for instance, the share of total advertising revenue that was generated in Denmark but went to foreign companies grew from 3% in 2007 to 26% in 2015, and for online ad revenues the number grew to 56% by 2015 (The Danish Agency for Culture and Palaces, 2016, p. 57). That they are also gradually losing audiences to global platforms is evidenced by the growth in time spent on consuming AV content on platforms such as Netflix and YouTube. While in Denmark, Finland, Norway and Sweden, the consumption of AV content online grew to range between 52% and 59% in 2017 and while in each of these countries the public broadcaster's streaming platform was among the top platforms to be used, still, Netflix and YouTube were always in the top three, followed closely by HBO Nordic, iTunes, Google Play and others (Audience Project, 2017). Indeed, European Audiovisual Observatory (2018a) data confirms that on-demand revenues have seen the largest increase compared to other sources of income for the European AV industries – here we can see a compound annual growth rate of as much as 43.2% between 2011 and 2016. Yet, the question is, how much of the actual user spend reaches the local industries, especially in smaller countries? That is, despite the relative strength of the Nordic media industries to date, the effects of global intermediaries, advertising networks and platformisation (van Dijck, Poell, & de Waal, 2018) on their revenues and operational models are expected to be increasingly challenging.

Potentials of Cross-innovation Systems for Media Companies in Small Markets

In Chapter 2, when discussing regional innovation systems, it was suggested that, despite globalisation, locality is constitutive for innovation. Most businesses, universities and other knowledge creation institutions are still local – and so are the 'interactive learning' processes among them. Knowledge and processes of its generation tend to be territorially 'sticky'. That is, they are also, to an extent, path dependent. Above in this chapter, we saw how much of the strength of Nordic media relies on developments and steps taken sometimes decades ago. Success is evolutionary; it accumulates. Accomplishments in exporting or in international expansion are locally rooted. Relatedly, as can also be read in Chapters 5 and 9 in this volume, well-coordinated local clusters have proved to be effective instruments for developing media industries in small countries. Clusters are especially needed where small companies operate in an industry that benefits from geographic proximity of other small companies close up- or downstream the value chain. Ideally, clusters promote healthy competition but

also cooperation in the development of knowledge. We also saw above, for instance in the case of Estonia building its film production system, how building a well-coordinated system can start producing good results, growth and international success, even when the initial conditions are meagre.

Another interesting development was Estonia's journalistic media outlets investing in new lines of business including providing interactive educational content and organising conferences and other kinds of events, even concerts and festivals. These are effectively forms of cross-innovation, cooperations with other local stakeholders, with institutions mastering locally relevant information and expertise. Such forms of locally accumulating and culturally specific knowledge are something that the global platforms cannot very easily reach. And, as the markets we are generally discussing in this book are very small, they often do not even try. As we saw, Baltic markets are too small and challenging even for the media groups in their neighbouring Nordic countries. For this reason, cross-innovation, the topic of this book, could be even more important for media companies in very small countries. Not only is it an opportunity to build on the economics of scope logic and open new lines of business that relate to existing ones; it is also an alternative, a way of addressing the risks deriving from global platformisation of media markets. That is, with the decreasing importance of intermediary services, the role of owning exclusive content or providing unique services is increasingly important for local AV media service providers. How well they are managing this can be read in the subsequent chapters of this volume.

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Chapter 4

Education on Screens: Histories of Co-innovation and Convergence between Audiovisual Media and Education Sectors

Mikhail Fiadotau, Martin Sillaots and Indrek Ibrus

Abstract

This chapter introduces the topic of cooperation and co-innovation between the audiovisual media and education sectors. It first discusses the emergence of educational film approximately a hundred years go – together with a new institutional framework, industry media, rulebooks, etc. It then discusses the ways public service media have addressed educational programming over the decades, including developing complex cross-media strategies and educational content databases more recently. The second half of the chapter is dedicated to the emergence of educational digital games, with their own institutional setups, production cultures, and training programmes. The chapter points, however, to a relative lack of cooperation between commercial game producers and educational institutions to date.

Keywords: Educational film; educational TV programmes; public service media; educational games; digital learning games; cross-innovation

Educational Film and Television

"What kind of pictures do you prefer?" a questionnaire asked Chicago school children in 1919. One child wrote, "I like educational pictures best, especially those with Charlie Chaplin" (Moulton, 1920). This quote tells us many things. First, that educational uses of screen content are almost as old as cinematography

itself. Second, as all cultural texts are 'open works' in Eco's (1989) sense, they can, indeed, all be used for learning about the ways of life. This understanding is widely in use today, as much of the content used for education in formal learning contexts may also have been originally produced for other purposes. Lastly, we need to notice that this quote appeared in the opening issue of the journal *Visual Education*, published in 1920. Other journals with similar names and purposes (*Educational Film*, *Educational Screen*) emerged at the time, in the United States especially. These resulted, in fact, from the formation of multiple thematic organisations such as the National Academy of Visual Instruction, the Visual Instruction Association of America, and the Society for Visual Education. This suggests that public concerns about the effectiveness or the functionalities of screen-based learning were also very quick to emerge. Indeed, the potential risks as well as the potential benefits associated with non-theatrical films being shown in classrooms and in other educational contexts have been battled over ever since (Orgeron, Orgeron, & Streible, 2015). This also led to a quick codification of the practices of producing such films in the form of various kinds of hand- and rulebooks (see for instance Hollis, 1926). In larger countries, the production of how-to books that established the rules for the genre continued throughout the twentieth century (for instance Herman, 1965). All this suggests that 'educational film' started to auto-communicate and build itself as an autonomous domain rather quickly and continued to do so until the emergence of the Internet (see discussions on autocommunication in Chapter 2 in this volume).

What we recognise in these descriptions from 100 years ago is the excitement similar to what we, perhaps, also encounter today in the context of digital media being used in classrooms and elsewhere for learning purposes. Film was the new and modern medium then as digital gadgetry is now. There were and are talks of high potentials and associated risks. There was also the heightened urgency to organise; institutionalisation happened quickly, including for content production industries. Yet, as described by Orgeron et al. (2015), the industry built itself with the hope for the future growth ('once all classrooms have projectors, the market will be a lot bigger than theatres') that, however, never materialised. The reasons were similar to those of today: schools struggled with resources and with training teachers; the distribution market for educational films was complicated; while production was cheap compared to theatrical films, they were still relatively expensive to make and the market itself was unavoidably limited – films needed to target specific grades only, etc.

But if the market already had scalability issues in one of the biggest national markets then it was even harder for filmmakers in smaller countries. Yet, in terms of governance, the countries in northern Europe's approached the issue a bit differently. As Jönsson (2016) discusses, the early showings and discussions on educational film started in Sweden about the same time as in the United States (around 1910), and by 1922 the country's leading film production company Svensk Filmindustri (SF) launched its dedicated production unit *skolfilm* (school film). On the one hand, and similarly to the United States, the role of educational films was at the time to give film a more serious function and as such to save it from accusations of having demoralising effects on adolescence. Yet, soon after,

the leaders of the *skolfilm* unit changed their discourse when talking about their films – they started talking about 'cultivation' ('*bildning*') and used this term to address the development of the whole nation. That is, educational films were seen as instruments for cultivating the nation. In parallel, while SF was in principle a private company, it was closely associated with policy makers and its funding for making educational films came mainly from the national government – the then emerging model of Nordic welfare state started to take shape.

Soon after, it settled everywhere that educational film is mainly a public good and as such a responsibility of the public sector. Yet, it has remained an ancillary service for filmmakers in much of the world. Documentary makers, in particular, have relied on commissioned educational films or on returns from the secondary usage of their films in schools (Goldsmith, Cunningham, & Dezuanni, 2017). Still, with the emergence of television, it was the public service broadcasters (PSBs) that took over the role of coordinating the production and distribution of educational audiovisual (AV) content. Most public broadcasters in Europe and elsewhere have had a remit to produce educational content regularly, sometimes directly related to national curricula. Similarly to the rationales of SF in Sweden, the early educational programming of other European public broadcasters was also paternalistic, aimed at cultivating exemplary citizens (Oswell, 2002).

Later, with the arrival of commercial TV channels airing popular family entertainment and especially with the launch of new dedicated children's channels, PSBs have faced a challenge to their education-oriented remits. As the challenge grew with the arrival of the Internet and videosharing platforms, the typical PSB response has been to develop their cross-media universes targeted to children (D'Arma, Enli, & Steemers, 2010). The content of these channels (for instance, CBeebies and CBBC in the United Kingdom, NRK Super in Norway) and especially their web portals is, however, visibly different from the pedagogical approaches of the previous era. Much of this content provision is gamified, with learning turned into an almost unnoticeable and pleasurable process. In Europe, as highlighted in Chapters 1 and 3, PSBs tend to be the eminent innovators in cross-media content and this often includes collaborations with the developers of (educational) games. PSBs are notable drivers of educational game development in Europe and it is mainly in their cross-media environments that the 100-year-old traditions of educational film, educational broadcasting and the newer domain of educational gaming meet. Yet, as will be demonstrated in Chapters 5 and 6, gamification of learning experiences is one of the main 'rules,' in Dopfer and Potts's (2008) sense, that drive the ongoing development of the educational technology (EdTech) sector. Let us, therefore, discuss the nature of 'learning games' in more detail.

Histories of Digital Learning Games

Digital learning games (DLG), or digital educational games, are video, computer, mobile or web games that are specifically designed for fulfilling educational

objectives: teaching a particular discipline, changing students' behaviour, and so on. Gamification refers to the use of game elements in non-game environments and does not necessarily involve producing a full-fledged game (Deterding, Dixon, Khaled, & Nacke, 2011). Game-based learning (GBL) is the use of any games in a learning context (Simões, Redondo, & Vilas, 2013). It may involve digital or analogue (e.g. tabletop) games, and the games themselves do not, strictly speaking, need to be educational: the learning goals may be achieved, for example, through a discussion of the playing experience. A narrower subset of GBL is digital game-based learning (Prensky, 2007). Serious games is a broader concept that denotes digital or analogue games designed to fulfil any non-entertainment purpose, from advertising, to advancing a political agenda, to collecting scientific data (Djaouti, Alvarez, Jessel, & Rampnoux, 2011). Digital learning games are thus a subset of serious games.

Despite games and learning sometimes being seen as a binary opposition – a perception originating in the industrial era (Svahn, 2009) – games and play have been an integral part of education since time immemorial. For centuries, chess, *go* and various other tabletop games have been used for both formal (Kersey, 1980) and informal (Adams & Edmonds, 1977) education across the globe. Following the advent of computer technology, it was inevitable that digital games, too, would be adopted for the purpose of education. The first such applications were developed for the US military, where warfare simulation games such as *Hutspiel* (1955) and *NEWS* (1958) were used for training purposes; however, these were not widely available and are mostly known through declassified military documents (Djaouti et al., 2011, p. 29).

A better-known and more influential example is Logo, an educational programming language developed by Daniel Bobrow, Wally Feurzeug, and Seymour Papert in 1967 (Games & Squire, 2011). While not a game per se, Logo was designed to create a playful experience, easing children into the world of mathematics and programming through a 'conversation' with the computer using commands resembling natural language (Games & Squire, 2011). The original implementation of Logo ran on PDP-1, a 730 kg 'minicomputer' primarily sold to universities and research laboratories, which is also known as the platform that the first mass-distributed computer game, *Spacewar!*, was developed for in 1962. Many subsequent implementations of Logo have been created, and its success has inspired numerous programming games whose content ranges from abstract visual programming (*LightBot*, *Kodable*) to using actual programming languages to complete levels (*CodeCombat*, *Screeps*).

One of the first examples of a full-fledged educational computer game was *Oregon Trail* (1971), a text-based strategy game developed by three history majors from Carleton College in Minnesota to teach US geography and history to school children. The game was additionally notable for being distributed by the Minnesota Educational Computing Consortium (MECC), an early state-owned organisation aiming to provide computer services and increase computer literacy in schools. Thanks to the efforts of MECC, *Oregon Trail* found its way on school computers throughout the United States and was subsequently remade multiple times, receiving a commercial release in 1985 (Djaouti et al., 2011, p. 32).

The advent of home computers in the 1980s created a mass market for educational games, pioneered by the aforementioned MECC, alongside such private enterprises as Brøderbund Software and The Learning Company (Shuler, 2012). Many games produced during that period are best characterised as 'edutainment', as they both contained educational content and targeted the entertainment market. Notable among these were reading game *Reader Rabbit* (1983), geography-teaching detective adventure *Where in the World Is Carmen Sandiego?* (1985), and city-building game *SimCity* (1989). All of these spawned successful franchises, with *Carmen Sandiego* in particular growing into a large transmedia franchise including video games, board games, a popular television show aired between 1991 and 1995 on PBS, as well as an upcoming animated series by Netflix. As such, *Where in the World Is Carmen Sandiego?* set an important precedent: an educational game going beyond the realm of digital computing and being adapted into a television show by a major public broadcasting channel.

This was the first of many examples of the interaction between the digital game industry and public broadcasting. In the years that followed, public broadcasters in North America and Europe became increasingly cognisant of the popularity and potential of digital gaming, which was also growing ever more accessible thanks to CD-ROM technology and the Internet. As a result, the BBC and National Geographic, among others, began to commission short browser-based games to complement their main content (Prensky, 2005).

More recently, major players in the video game industry, including Nintendo and Microsoft, have stepped up their interest in the edutainment game market for personal computers and game consoles. Nintendo, for example, published a number of educational games for its consoles: the *Kids Learn* series, covering subjects from math to music; *Letter Quest Remastered* (2017) for vocabulary training and word analysis; and others. Microsoft's most notable contribution has been publishing *Minecraft* (2011): a multiplayer action-adventure sandbox game which, among other things, invites players to collaborate on crafting their own environments and game objects. The game became not only immensely popular, but also lauded for its creative and educational potential, and has been used to teach subjects as diverse as language, informatics, social skills and chemistry (Nebel, Schneider, & Rey, 2016).

Over the past few years, much innovation in the digital learning game market has been associated with the development of virtual and augmented reality (AR) technology. Virtual reality (VR) is now used widely in medical training where it has been found to improve surgical performance (Larsen, Oestergaard, Ottesen, & Soerensen, 2012); its other notable applications include language-learning (*Mondly: Learn Languages VR*) and mathematics (*Number Hunt*). AR, with its capacity for blending virtual objects with a real-life environment, has most notably been used to teach history through reconstructing historic events and places (Kysela & Štorková, 2015). At the same time, the relatively brief history of VR and AR in learning games has not yet seen many truly

breakthrough successes; it appears that the full potential of these technologies is yet to be harnessed by educators and game developers.

The growth of the field of educational games (and serious games on a wider scale) has led to the establishing of various academic organisations, such as the international Serious Game Network (SeGaN), and numerous academic conferences and journals. Professional organisations have emerged, too, albeit on a more local scale: consider, for example, the Learning City project in Espoo, Finland, which brings together digital/AV companies and public organisations including schools. A number of educational game design frameworks and methodologies have been also created (Ibrahim & Jaafar, 2009). These developments indicate a progressive institutionalisation of the field.

Throughout much of the history of digital learning games, the Baltic Sea region largely stayed on the periphery of the movement, compared at least to its major driving forces: the United States, the United Kingdom and, to some extent, Japan. However, since the turn of the century numerous developments in the region have received international attention. The German political strategy game *Ecopolicy* (2009) was translated into four languages and was tested at schools and universities on three continents. In 2013, the Viktor Rydberg school in Stockholm, Sweden garnered international attention after becoming the first school to introduce a compulsory course based on *Minecraft* (O'Brien, 2014). In 2015, Estonia's Tallinn Uniersity became the first institution in Europe to inaugurate a Master's programme in digital learning games. Thus, thanks to a growing number of regional developments, as well as international collaborations, the Baltic Sea region looks poised to make a meaningful contribution to the field of digital educational games.

Future Prospects of Digital Learning Games

Throughout their history, digital learning games have been frequently criticised due to their perceived failure to integrate learning and 'fun' (An & Bonk, 2009). This perception has been fuelled by the abundance of low-quality games designed without the expertise or the resources necessary to produce a game that is both truly engaging and effective as a learning tool. Yet there are many games that accomplish just that, a number of which are discussed above. The recipe for success is generally the same: a deep and meaningful integration of player actions and game challenges on the one hand with learning content on the other (Franzwa, Tang, & Johnson, 2013).

As discussed above, since its early days the digital learning game movement has been propelled by two parallel forces. On the one hand, many educational games have originated from the public sector: universities, public broadcasters and educational consortia, driven by their mission to contribute to the public good. These organisations have also been instrumental in developing a better understanding of the role and potential of digital games; the MECC, for example, produced numerous studies on computer literacy in the

1980s, while the BBC funded a highly influential 2005 study on digital gaming in the United Kingdom (Westecott, 2009). On the other hand, much of the momentum behind digital learning games came from the commercial video game industry, where edutainment was seen as an extension of the general game market and, thus, mainly as a source of revenue. The unfortunate side effect of this was that many games positioned as educational were not in fact based on any existing curricula or academic standards (Klopfer & Osterweil, 2013).

The recent resurgence of interest in public–private partnerships offers a solution to this challenge, bringing game companies together with schools and public institutions, which allows to combine the skills of professional game developers and educators, as well as connecting game studios to their target audiences and customers (as discussed in Chapters 5 and 6). Such partnerships can also lend greater agency to schools, which previously often remained in the relatively passive position of adopters of educational games, as opposed to active contributors to their development.

On a technological level, the emergence of consumer-grade VR and AR technologies has marked another important development for educational games. While both technologies have already found highly meaningful applications (e.g. the use of VR in medical education), their potential is yet to be fully explored and put to use in the classroom (as discussed in Chapter 6).

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Chapter 5

Meso-analysis: Modes of Cross-innovation Between Education and Audiovisual Sector

Mervi Rajahonka

Abstract

This chapter is based on the findings of the empirical material gathered in Finland and Sweden through interviews with education and audiovisual (AV) media actors and policymakers in 2017–2018. The aim of the chapter is to discuss the innovation systems of the education sector and Finland and Sweden in general, compare the sectoral innovation models of the two sectors, and conclude with discussing the resulting challenges for policymakers. Our results show that a new EdTech sector employing the competences of the education, information and communication technology, and AV media sectors has begun to emerge and actors in the both countries have eagerly taken actions to boost its development as a business and export field. We discuss the reasons and consequences of this development.

Keywords: Cross-innovation; EdTech sector; Finland; Sweden; educational media; convergence

Introduction

The chapter's objective is to shed light on the cooperation and its development between education and audiovisual (AV) media sectors. The chapter is based on case studies of Finland and Sweden (particularly Malmö and wider Skåne region in Sweden). We chose these case countries as their education sectors are renowned and there are interesting initiatives in both countries for enhancing cooperation between education and other sectors. The case study is based on 37 semi-structured interviews conducted in these two countries between August

2017 and April 2018. The interviewed persons worked in the AV media or education sector, in companies, industry associations, or in the public sector. The interviews were mostly face-to-face meetings, and the study followed a multi-staged data analysis process.

We begin with the description of the co-innovation landscape, including the overview of the education sector's development, and the institutional landscape in the case countries supporting cooperation and innovation. We then describe the two sectors' differences in sectoral innovation models. We observe the emergence of a new sector, EdTech sector, since crossing the borderlines of sectors for innovation activities is easiest realized in organizations, where people with different backgrounds and competences are gathered together. The chapter ends by discussing challenges for policymakers, and how they could better support cross-innovation between education and AV media sectors.

Co-innovation Landscape

This section discusses the development stage, markets and trends of the education sector, and the innovation and cooperation landscape and models in Finland and Sweden.

Education Sector – Development Stage, Markets, and Trends

Education is not easy as a market. There are several reasons for that. First, in most countries, education sector is controlled by the state, and the Nordic countries are no exceptions. The "public sector fingerprint" is due to the fact that in education, "there is the future of the nation at stake," as one of the interviewees described it. Therefore, the sector is regulated and restricted in many ways – there are national curricula and legislation on for example public procurement that schools have to follow, but also rules taking into account that there are children and young people involved, whose rights and privacy have to be protected, making it a sensitive environment, etc.

> There is a clear public sector label in the sector, as the activity is run in Finland and in almost all countries at least partly by the public sector. When private operators provide tools and partial solutions to education, building co-operation and how these actors work together is rather peculiar. And learning is, of course, rather important and under the protection of the state. You are talking about the future of the nation and people […] and of course that the learners themselves are at least to a certain point minors and young, so this brings certain dynamics to it, too.
>
> Project Manager (Education Association, Finland)

Moreover, the education market is fragmented, both at global and national levels. Reasons for fragmentation are that typically procurement decisions are made in local school districts, and even there, many different decision makers

influence these decisions (teachers, schools/principals, school districts, state authorities, parents, and students). Such different decisions are made at many levels and fields of education (primary, secondary, vocational, higher and adult education, etc.). Also, getting fair pay for the development work is hard, because public sector resources are scarce and the rules of public procurement make cooperation complicated. It is also hard to scale innovations, products or services developed in one school, school district or region to another, because every school or district has slightly different requirements and operation models even in one country. In addition, national curricula and language barriers make internationalization hard.

For the time being, BtoG (business to government) market is prevailing, and the BtoC (business to consumer) market is insignificant, while there is to some degree a BtoB (business to business) market. The BtoB market is growing, but slowly; for example in Sweden, private primary schools have become more popular, because of the "school money" which parents can take to private schools. In any case, these markets are not global, because every country has its own curriculum, and this and small language areas, such as in the Nordic countries, reduce opportunities to conquer markets globally.

One of the big problems regularly mentioned by the interviewees is the scarcity of public funds. Due to pressures of saving public sector expenses, resources in the education sector have been shrinking recently. In Sweden, there is a severe lack of teachers, which makes development work even more challenging. Pressures of increasing efficiency in education are immense. Another problem is that, as in other public or service sectors, development work is rather invisible, hidden in the day-to-day work, and usually no or very few resources (money and time) are allocated, particularly in the research, development, and innovation (RDI) work. Even though teachers have a rather wide autonomy in the Nordic countries to decide how to organize their work inside the curricula, the general framework is decided by politicians. All this makes changes difficult and slower than in many other sectors.

> I would say that in education, when the resources are so tight that there are big challenges in the basic education processes, then it simply is not possible to make large-scale or even a small scale innovation activity […]. The teaching activity has traditionally been open, but if there are no resources or time to do it, it will not work.
>
> Project Manager (Education Association, Finland)

> There are quite many good initiatives in Finland and there are several schools that are very open to try and test and be pioneers with innovations. I think that there is not a terrible shortage of innovation, and we have a huge competence pool in Finland in education. Perhaps commercialization and productization is a bigger challenge. There is the challenge of commercialization and

> locality in education, whereby scalability internationally can be more challenging.
>
> CEO (EdTech start-up, Finland)

> In the education sector, there is different kind of inertia compared to entertainment games, so that the edu sector is very slow to change. And what else characterizes it that it has not the same kind of uniform global market, as in the entertainment sector.
>
> Director (Games Association, Finland)

All the above being said, education has long been a significant market globally. And the market is growing fast – the biggest driver being the rapid growth of population. Moreover, it is not a new market, and in both Finland and Sweden, there are big incumbent companies offering educational content to schools, for example big textbook publishers. They know well their current market and customers. They also have their own digitalization schemes, but they have been rather careful not to spoil their profitable traditional book publishing businesses. Therefore, they have not taken any radical disruptive steps in their innovation paths.

Digitalization has been a big trend in education for a long time. Therein, the education sector has been one of the first sectors where the usage of information and communication technologies (ICTs) has been offered and tested actively. However, the sector has been slow to turn digital. There is still much fewer digital learning materials than there are analog materials. According to the interviewees, less than 10 percent of learning material is digital in Sweden, for example. Many interviewees claimed that the reason for this inertia has been the reliance on political decisions and scarce resources. However, as one interviewee put it "Sweden has gone beyond 'app fest' to the phase of asking where and why to use digital in learning."

> Often I see in countries that they are what I call, they are having an app fest, they find some kind of app and use it without thinking about the gains or the pros and cons of using it they just use it because it´s there and we had that development in Sweden for say five years ago. Nowadays we are much more critical thinking about, where we are applying technology and why […] A more realistic view of what could we gain and […] we are introducing new models and methods in a low impact way that is more affective.
>
> Official (School district, Sweden)

Some interviewees also pointed out that digitalization would be an opportunity to make the education system more inclusive, efficient, and effective. Due to lack of teachers, the digital turn is expected to happen even faster. Efficiency pressures are increasing the interest on AV content or technology usage, and digital technologies can be seen as saving resources in the long run. Examples given by an interviewee were using artificial intelligence (AI) in student counseling

or arranging teaching for pupils living in isolated villages via video lectures. Efficiency (cost savings and speed) of education may be increased with technology, but at the same time also effectiveness of teaching becomes better (quality and impact using best teachers distantly, but interactively). Technology is sometimes seen as a solution for many problems in the education sector, including customer demand for new ways of learning, quick and personalized learning, quality of teaching, impact of education, social inclusion, cost efficiency, and lack of teachers. Technological trends are driving change also in the education sector. There are big opportunities coming from the usage of AI and data analytics, but also virtual reality (VR), augmented reality (AR), and mixed reality (MR) technologies. Also gamification of education is expected to become more and more popular, and this offers the AV sector big opportunities to apply its competences and develop services for the education sector.

> I would rather have the teachers, but since we don´t have them, we have to see that it´s the next best thing […] There are happening things both in robotics and in audiovisuals and so on where we can use good or really good, excellent teachers to teach more students and not only in the classroom.
>
> Official (School district, Sweden)

> Gamification is maybe a sort of rising trend, so that how you can make teaching and learning more like an experience and for that the AV sector would have a lot to give.
>
> Project Manager (Education Association, Finland)

As one can see the power of users is increasing in several sectors, the development of individualization has continued in the education sector for decades. All this is argued to lead to increased student-centricity and eventually seeing "school as a service." Consequently, the curricula have to take into account more the situation of every individual student. Also lifelong learning and mobile (micro) learning are trends that become increasingly important. As the power of students as consumers is seen to increase, there is a challenge to develop educational contents that motivate to learn and can compete against all the technology-based leisure time activities that are offered today. Use of social media and crowdsourcing is increasing, and the role of students is changing from passive listeners to active makers. New learning concepts will be needed. In this context, new digital solutions could enable new kinds of personalized and flexible education solutions. New cross-sectoral products and concepts could be developed to match such changes of curricula. There are new actors coming to the education markets from other sectors, not only global platform providers, such as Google or Apple, but also start-ups, and actors from the "old" industries. This has increased the interest of the incumbent companies, such as

traditional book publishing companies, to boost their digitalization schemas and to cooperate with ICT and AV sector companies.

> The role of audiovisual know-how in learning materials is growing all the time. So it's an increasingly important area of expertise for us, and we want to have good competences of it in house.
>
> CEO (Educational book publishing company, Finland)

Cooperation Landscape and Models

Finland and Sweden are Nordic welfare states, and their societies are generally considered being among the most functional in the world. Both countries rely on democratic systems, and they typically have low hierarchies and participative democratic cultures in public and private sectors. The government and public sector in general are valued for being relatively flexible, open, and trustworthy. People are usually approachable and easy to reach, and cooperation networks work well in both of these small countries. The sense of community, flat organizational structures, efficiency, trust and reliability of the society, and businesses were mentioned as the countries' special features by the interviewees.

There are also rather well-functioning support systems enhancing RDI in both countries, thus, these countries are considered among the most innovative in the world. Companies have the tradition to cooperate with other actors, when developing new things. ICT sectors are strong compared to the sizes of the economies. In both Finland and Sweden in recent years, strong start-up culture has developed. There are success stories in both countries, especially in the ICT and games sectors, such as Spotify in Sweden, and Rovio in Finland.

Domestic markets are small, but in general, people are believed to be curious and eager to test new things, and therefore these countries constitute a good test market. About Sweden it was said that people understand human behavior and other cultures and are good at designing digital services due to "adaptable, fast-changing society, where people understand digital change" or because of the "functional social contract and welfare system, leading to diversity and equality."

> Our socialist heritage is pretty obvious, when it comes to innovation system, because it's pretty welcoming innovation system. You can get hold of people pretty easy […]. Here people know each other in the innovation system. You're always one knock from the right person.
>
> Manager (Public funding agency, Sweden)

> I think that there is a huge support from the regionally driven science parks […] it's not hard to find partners […] so I think there is a good cooperation environment.
>
> Project manager (Education company, Sweden)

There is also a rather long tradition of boosting cross-sectoral networking as well as creative sectors in both Finland and Sweden, facilitated by the actors offering public innovation funding. This has been based on the common belief that innovations are created at the borderlines of sectors. Mainly this has been done by arranging networking events. However, there have also been cross-sectoral funding schemes before, such as in Finland Tekes' Education Solutions (*Oppimisratkaisut*) program, which was initiated particularly for cooperation between ICT and education sectors, but could have been used between other sectors, too. Also, both in Finland and Sweden, companies and public sector organizations can apply for funding for their RDI projects from Business Finland (former Tekes) or Vinnova, Sweden's government agency for innovation – and most of these projects have to be to some degree cross-sectoral to get funding.

Considering the games industry, there is an important difference between the two countries that has probably had some influence on these sectors' development. In Sweden, AV media and games industries have been considered as part of the creative sector and not much innovation funding has been given to these sectors. However, Creative Europe and other EU funding schemas are available for the games sector. Also large cities support the sector, including Malmö. On the contrary in Finland, innovation funding agency Tekes took a more cross-disciplinary approach and considered games as a part of the ICT sector, but at about the same time (around 2005), it started programs to fund service development and a bit later, creative sectors.[1] Related to film and TV industry, Nordic Film and TV Fund has programs and funds for supporting cross-innovation, such as *Propellor*.[2]

Yet, the dominant opinion about various kinds of networking opportunities – at least among companies – is that it is good to have some networking, but that there has to be a reason for attending the events or even for cooperating with other actors, and that sometimes there really is no reason. Also public sector provision of rapid prototyping and testing opportunities or innovation platforms have risen in the recent years.[3] Yet, the question of whether the public sector has actually done too much for the companies, distracting them from meeting their potential clients, was asked. Instead, more cooperation was wished for between small and big companies; namely, some interviewees pointed out the potential that big and small companies could offer joint offerings to the export markets.

> Our system is that the government takes care of a lot of things. We don't have any tradition of large companies taking care of things.
>
> Manager (Public funding agency, Sweden)

[1]See https://www.neogames.fi/2015-tekes-10-years-of-funding-and-networks/
[2]See https://cphdox.dk/en/propellor/
[3]For example, the current government of Finland has aimed toward regulations and funding schemes that would enhance experiments (the Prime Minister's Office's Experimental Finland key project, etc.).

> For example in the US it is very normal that bigger corporations and start-ups work closely together, and corporations appreciate the start-ups because they are doing innovation and corporations have the resources to take them further. It is a small challenge how we could boost this kind of co-operation in Finland. Certainly this is valid in the education sector.
>
> CEO (EdTech start-up, Finland)

Universities have had crucial roles in the cooperation landscapes due to publicly funded research projects with companies and other actors.[4] However, today there are also other actors mediating innovation processes, such as accelerators and cities. There are not too many cross-sectoral clusters developed around the borders of AV media and education sectors in Finland and Sweden yet, but there are at least some associations and initiatives advancing cross-sectoral cooperation, for example, *Serious Gaming Cluster*, or *Education Finland program* (initiated by the Ministry of Education and Culture) in Finland. Furthermore, there have been projects established for boosting cooperation between universities, companies, etc., some of which have developed into permanent structures, such as *Playful Learning Center* in the University of Helsinki. There are also other actors in Finland advancing cross-sectoral innovation activities between ICT, AV, and education sectors, such as *xEdu accelerator* and municipalities (such as *Espoo city* and its Kyky model).[5]

> In Finland, we have this Serious Gaming Cluster, representing these firms […] but the proportion of serious gaming of the total turnover of the industry is fragmentary. 99.9 % comes from the entertainment games.
>
> Director (Games Association, Finland)

> Now we have Education Finland process that has just started, led by the Finnish National Agency for Education. And it is, of course, important for our members.
>
> Chairman (Games Association, Finland)

One can see other kinds of clustering in Sweden, such as Media Evolution or EdTech Southeast Sweden and Swedish EdTech association. These actors can be

[4]However, in Sweden (contrary to Finland), typically the leading role in EU projects, for example, has not been in universities, but companies, cities, or "Triple Helix organizations." Also in Finland, cities have taken a more active role in recent years (in, for example, the program of the six leading cities in Finland, 6Aika).

[5]See http://www.seriousgamingcluster.fi/; https://www.educationfinland.fi/; http://plchelsinki.fi/; https://www.xedu.co/; https://webfronter.com/espoo/kykytori/

referred as "Triple Helix organizations,"[6] because their purpose is to support cooperation between actors in universities, public sector, and businesses. Generally, the interviewees emphasized that there are good relationships between schools, companies, science parks, and associations in Sweden. *Media Evolution* is a community platform fostering innovation and connecting people within and around media industries with people from other sectors. It organizes, for example, big conferences for this purpose. *EdTech Southeast Sweden* is a cluster of science parks, incubators, schools, companies, and municipalities. It does cross-sectoral work – creating connections between companies and schools and teachers, and claims to be "an environment where opportunities grow into scalable EdTech solutions."[7]

> The Conference, organized by Media Evolution, is a really strong, good meeting point for the people in the educational industry […] And that's under the umbrella of […] a cluster, which is also a house, a building, and the company. Regionally owned company.
>
> Manager (Public funding agency, Sweden)

However, if we think about sectoral umbrella organizations, such as associations in AV media or education sectors, their support for cross-sectoral cooperation, innovation, or cross-innovation is rather weak. The resources of sectoral organizations are typically small, and their main task is lobbying and increasing the visibility of their members. However, this does not mean that they would not appreciate cross-sectoral cooperation or innovations, but just that they do not have resources needed. Actors such as Serious Gaming Cluster in Finland and Media Evolution in Sweden can be seen as slight exceptions because their mission is in cross-sectoral work.

Specifically if we concentrate on the Helsinki and Malmö areas and their cooperation models or innovation potential, Helsinki is the capital and the biggest city of Finland, making it the nexus of business, creativity, and political attention. Malmö is the third largest city in Sweden, and in 2017, it was the most innovative city in Europe measured by patent applications. Malmö is attracting entrepreneurs from other parts of world to create business in the city. Also, both Malmö and Helsinki are big in ICT, software development, and gaming.

> Because of these game companies, and some successful film companies and the different cross-media things […] So, that the entrepreneurs are attracted to this region, because they see that here they can […] get support, there is education here […] so they feel

[6]Triple Helix was a term generally used by the Swedish interviewees. In the Finnish interviews such terms as public–private partnerships (PPP), platforms, test environments, or living labs were more common.

[7]See http://www.mediaevolution.se/; http://edtechsoutheast.se/en/

> that this is a good environment to develop their ideas. This is also a way how Malmö actually develops.
>
> Project Manager (AV funding agency, Sweden)

Interviewees were asked to mention examples of cooperation between, on the one hand, AV media and other sectors, and on the other, between education and other sectors. Some interviewees suggested that cooperation between the AV media sector and traditional industries is not easy, because of the prevailing conservative attitudes in traditional industries. However, the general attitude has begun to change, because the creative sectors have benefited from the success of the games industry, and their increased importance in the economy. Reaching out for cooperation is in general more popular among young companies and sectors, such as animation or the emerging VR sector actors. Small companies have to do cooperation with others, because they do not have resources inside the company. Their attempts to reach out for cooperation with companies in traditional industries has had diverse success. Moreover, the interviewees pointed out that because education is a big market but also an important sector in the society, there is an interest in other sectors to increase cooperation with it.

> Small companies yes, I'd say they have a positive attitude, because they have to be, it's for their own survival necessary to look at many different possibilities. But from the bigger companies, the publishers, I get the opposite feeling. They're not looking for much cooperation […] They like to do their work, but not very much more or take a lot of risks. That's the main reason I guess, why smaller companies reach out more, in my opinion.
>
> Founder (EdTech start-up company, Sweden)

> Education is a complex market, which means EdTech is a complex trade. And have many different actors in it […]. Many people or sectors are really interested in contributing to schools, because everybody thinks schools is one of the most important things we have in society […] So I think that is something that can be a driver of cross-collaboration.
>
> CEO (EdTech Association, Sweden)

As a corollary, we can conclude that in Finland and Sweden, the societies function well, and the cooperation culture is open and hierarchies low. Therefore, the common attitude toward cooperation with other sectors is positive. Cooperation networks work rather well in both of these small countries. There are also good systems offering innovation funding and rather long tradition of boosting cross-sectoral cooperation. An important way to increase cooperation has been networking facilitated by the public sector actors. Mainly this has been done by arranging networking events, but today also by offering piloting schemes or building innovation platforms. Sectoral umbrella organizations typically have narrow missions and small resources, but new actors mediating innovation processes between AV media and education sectors have begun to emerge.

Differences in Sectoral Innovation Models

This section discusses differences in sectoral innovation models in AV media and education sectors, attitudes, drivers and challenges of cooperation, sectoral peculiarities in their innovation models, and the emergence of a new EdTech sector.

Attitudes, Drivers, and Challenges of Cross-innovation

Both AV media and education actors in Finland and Sweden are generally rather open for cooperation and innovation. Also, both sectors generally benefit from the good education system in the Nordic countries. Some of the interviewees claimed, however, that the education system has been rather siloed, focusing on certain subjects and experts fields. Therefore, there is a problem with people in one sector not knowing, how other sectors work. However, cross-disciplinary initiatives have increased recently, such as in Finland, the new national curriculum[8].

> The whole new national curriculum of Finland is something that tries to break the old silos. But that´s also something that will take time. So when you are implementing new national curriculum and reforms, it takes at least 10 years for it to function in the way that it´s designed to function.
>
> Manager (EdTech cluster, Finland)

> I'm sad not to being able to know all about how the innovation is driven in the other sectors. We're making our first steps into understanding each other's business models, but still innovation and how it's driven and how it's funded within the different sectors, what's the same, what's different […] It's a learning path we're walking ourselves as well.
>
> Consultant (AV funding agency, Sweden)

The general attitude was that the education in the AV media sector is rather good (however, sometimes too theoretical at the university level for the needs of companies), and cross-disciplinary enough to give students competencies that they need in the project work done in the sector. However, the education does not support broader, cross-sectoral work. Also, in small countries, there is a constant lack of skilled people, especially in the video games sector. In Sweden, education in the primary school has long been more contextual (developing cross-sectoral understanding) and in the secondary and tertiary education slightly more practical (due to tighter relations to business life) than in Finland. In the teachers' education, the situation is slightly different. The Finnish teachers' education is appreciated for offering excellent pedagogical skills. In Sweden, due to

[8]See https://www.oph.fi/english/education_development/current_reforms/curriculum_reform_2016

the fast population growth because of immigration and lack of interest by young people in becoming teachers, there is a severe lack of qualified teachers in the primary and secondary schools.

Cooperation is quite common in the *AV media sector* due to the project-based operation models and complex value chains. There are many drivers for cooperation. Among them is money. By cooperating with other actors, the company can find new markets, customers, or partners. Furthermore, a company may need complementary competences that it does not have, and therefore have to cooperate with other actors. It may be cheaper to cooperate with other companies than to hire people. Also cooperation may be useful if the company needs outside opinions, new perspectives, or new ideas. The company can make novel, bigger and better things in cooperation with other actors. Or the company can get more visibility by cooperating. Especially cooperation (co-creation) with customers and users when developing new products or services has become more popular lately, and for some actors, it is crucial – for example, many games companies co-create games with their audiences. However, cooperation has to be always a win-win situation for all partners and it requires trust between actors. It is always based on the chemistry between people, and therefore it is not easy to start and organize – normally the cooperation networks take a long time to evolve, most such projects take place between partners with a longer history of cooperation.

> It's because we're self-funded company, we've never had any investments from outside, and that also means that we cannot close ourselves off that we're dependent on our clients and on other industries.
>
> CEO (VR company, Sweden)

> To do the good things, you have to work with others and then also more possibilities for innovations obviously because you get other companies or other people's point of view and you can involve that in your own way of doing things or seeing things […].
>
> CEO (Digital media start-up company, Sweden)

Several challenges were mentioned in the interviews that may hinder cooperation cross sectors. First, individual ambitions may make cooperation unattractive; creative people's passion is to concentrate only on their own art and dream, making the world's best game or film, etc. Therefore, they do not want to cooperate with other actors, if not forced. Second, IPR may prevent cooperation; trying to protect their intellectual property rights (IPRs) and business secrets may make companies reluctant to cooperate. Third, focusing on a company's own business and customers; some interviewees mentioned that if you are from a BtoC industry – like the games industry typically is – it does not make sense to try to cooperate with actors from other sectors, because they are not your typical clients. There are also challenges that make succeeding in cooperation

difficult; in joint projects, you need to agree on the rules, be clear about what you and others want, have good communication and coordination, and enough time.

> No, we don't support (cross-innovation). We're not against it, but we need to have, we need to see the use for it […] But for the companies who are consumer focused, there isn't really any reason for us to do so.
>
> Executive Director (Games Association, Sweden)

Also, as one interviewee put it, as games can be used in many other consumer industries, like advertising, there are different ways to tackle the challenge of cooperation: first, increasing openness between companies, second, using mediators, that is, niche game design consultants specialized in working at the sector borderlines, or third, other sector companies may hire game designers themselves.

There are several drivers of cooperation in the *education sector*. Among these is an understanding that in the changing world, there is a need for new skills and competences needed in the future working life. Recently in many countries, including Finland and Sweden, changes of national curricula have been made accordingly. These include ICT skills, learning skills, media skills, and problem-solving skills. In Finland, the new national core curriculum contains the idea of phenomenon-based learning, where students study a topic or concept in a holistic approach instead of in a subject-based approach. As a result, due to the recent changes to the national curricula in Finland and Sweden, besides students, also teachers need new skills (transversal competencies, programming, using digital material in teaching, etc.), but this constitutes a genuine challenge for them and schools, and therefore more cross-sectoral cooperation is needed.

Some interviewees, especially in Sweden, claimed that schools are not ready for innovation, because there are challenges in attitudes, such as strong feelings that public sector has a different logic, and should not cooperate with the private sector. Also, as there are no resources for RDI work in schools, there is no culture or motivation for trying new things. Schools use different processes, tools and skills to other sectors, there is bureaucracy and restrictions, and if, for example, laws of public procurement are used incorrectly (focusing on price), a school could not commission innovative solutions. Furthermore, earlier mistakes in implementing technology can make it hard to motivate people to try again. However, most of the interviewees emphasized that cooperation has become easier as the public sector has opened up for cooperation lately.

> There is no tradition of co-creating. It is difficult for a company that wants to do something to get, go into schools and cooperate there. It is difficult for teachers that find unmet needs to turn that into sort of solutions […] Cooperation and co-creation is […] the lack of experience there is really a key.
>
> Coordinator (EdTech cluster, Sweden)

> Maybe it's an attitude problem from the municipalities […]. They might not feel that they need to be innovative […] Maslow […] basic needs must be in place before you can start being really innovative and doing your things. Again, if they don't have books material, a good class-room atmosphere, then innovative things, they tend to come a bit later.
>
> Manager (Public funding agency, Sweden)

Sectoral Peculiarities in Innovation Models

Our interviews with the representatives of the AV media sector suggested that the biggest driver for innovation in the sector is the changing technology, and the sector has been fast to adopt the new affordances that the technology sector has provided. Another big driver is the users; co-creation of innovations with customers and users/audiences have become popular lately. Also the project-based operation models in the sector lead to flexibility and high innovativeness. The sector is different compared to other sectors, because creativity and arts – not the business problems as in other sectors – are starting points for innovations. The sector is often seen as the first to test things that later come to be used by other sectors. Mediatization means that competences of the AV media sector, such as storytelling, video, games, etc. can be used – and more and more often are used – in many other sectors.

It has been claimed that because the education sector has been slow to change, it is not innovative. However, as our interviewees pointed out, in the Nordic countries, teachers are open to new ideas and are rather independent, and can decide a lot inside the limits of curricula. The system is not an obstacle, because a lot depends on the individuals who are or are not interested in the world around them. However, time can be a scarce resource. Companies' cooperation with schools is difficult because there are many rules and many levels of decision makers – and in the end, a lot depends on the individual teacher, and how open and interested she or he is in cooperating with other actors in the busy days of teaching work. The situation is slightly better in Finland, whereas in Sweden the lack of teachers makes the situation worse.

> Of course, it's up to staff to make sure that schools and colleges, teachers and other staff at schools have an open and active relationship with the surrounding world. That is, it depends more on people.
>
> Project Manager (Education Association, Finland)

Some interviewees suggested that particularly the public sector dominance in education slows down the sector's development. Public sector savings have let to diminishing education resources, and this development has lasted for a while. Cooperation in the education sector with private sector organizations is not that regular, yet, However, there are trends in the public sector that have increased public sector's openness and cooperation with the outside world to develop better services. Before, the regulations were stricter than today, and cooperation of schools with companies was fully denied. Still, even now, the regulations are

strict about what companies can or cannot do while testing their products or services in schools.

> 2010–2014 […] back then we could see that we had structural problems […]. It was more or less categorically forbidden for the schools to work with smaller companies because […] they might disturb the everyday life of the school and the teachers and the pupils. But then 2015 with the new government and their digitalization programs, so then the schools in a way had to open their doors and they also themselves realized that this is needed. So the story goes back all the way to 2010 but the operationalization of this was 2015.
>
> Manager (EdTech cluster, Finland)

There are several trends behind the development, why public actors have begun to open up for collaborative innovation. First of all, applying theories from the private sector to the public sector management has led to a shift toward a more managed and "market like" orientation in the public sector and treating citizens, or in the case of education, students as customers. Furthermore, more recently, innovation research, particularly its open and user innovation streams, has begun to emphasize cooperative innovation processes. In innovation policy discussions, the roles and relationships between the public sector, private sector, academia, and citizens have come to the fore. Collaborative culture and public–private partnerships (PPPs) have in general become more popular in the public sector, making cross-sectoral co-development more common.

Moreover, concerning the education sector in the Nordic countries, the governments have started to see education as an export opportunity, as the PISA[9] success has raised the interest of other countries to the Nordic education system, and the global BtoC market for education has started to emerge. In the future, it is expected that consumers will be more willing to pay for the educational content that is relevant for them, and mobile devices reach also consumers living in developing countries, where schools are rare, but education is more in demand. However, because the education sector is not an easy market, the governments have started to encourage cities to open their schools for companies as test environments or platforms for testing their products and services. In the education applications, there is the fine balance between innovativeness and applicability: if the solution does not relate to existing curricula, nobody will buy it. Therefore, tight cooperation between start-ups and schools is essential. There is

[9]The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. More than half a million 15-year-olds took part in the OECD's latest global education survey, known as PISA. The main focus was on science, an increasingly important part of our economic and social lives. More info: http://www.oecd.org/pisa/

a need for cross-sectoral mediators between companies and schools, too, the role which cities and governments, but also "Triple Helix organizations" can take.

However, at the same time, some interviewees raised the questions of schools' mission in advancing equality and teaching children responsibility: As global challenges are increasing, schools should advance sustainable and human values, such as the United Nations sustainability goals. After all, "there is the future of the nation at stake." The schools have been a strong democratic and equalizing force in the Nordic countries, and some interviewees emphasized that – even though today there are many challenges in this, or maybe because of that – they should take this mission seriously. Moreover, as many of the interviewees saw the competitive advantage actually being the Nordic pedagogical knowledge and democratization of education, some even emphasized that exporting the Nordic school system, and solutions developed for it, is an opportunity to export the Nordic democratic values in the same package.

> We from the Nordics we can talk about democratizing education and […] Finland and Sweden have done it […] For the EdTech sector, democratizing education globally is an interesting trend and an interesting thing you can sort of monetize […]. We're working to establish the Nordic EdTech alliance to sort of work together, drive the industry, and just put focus on the Nordic values in […] democracies, access to education.
>
> Coordinator (EdTech cluster, Sweden)

Emergence of the EdTech Sector

There are several reasons why a distinctive EduTech or EdTech sector seems to be emerging, and why there is also a need for it. First, the power of consumers is increasing everywhere and this concerns both the AV media and education sectors. Therefore, there is a challenge to develop interesting educational content that motivates students to learn. Learning cannot be considered to be dull anymore. Also, people need constantly new skills, which the current education system is not able to provide. Changes in curricula emphasize learning by doing and digital competences. Both of these competences can be supported with AV media content. Second, the public sector has increased its openness and cooperation with the outside world. The vivid start-up culture in the Nordic countries has generated growth of enterprises, particularly in the ICT-related sectors, among others in the games industry. Education is one of the new areas where competences gained in the games industry can be applied. Third, technologies have developed rapidly, and it is now possible to implement personalized and flexible education solutions with new digital solutions.

In addition, there is a need for a distinctive EdTech sector, because there are big challenges in directly applying competences of the ICT and AV media sectors to the education sector. Our interviews suggest that professionals in the sectors usually do not know too much about the other sectors or their operational models. There are also structural and contextual issues making certain sectors

"unfit," that is, creating obstacles of cooperation. In the case of AV media and education sectors, the industrial cultures and competence areas are quite different. In addition, the lack of resources (monetary and time), professional silos, and different social dynamics, values, and "languages" in different sectors, constitute thresholds. Furthermore, the customers and markets are quite different; the educational content sector typically focuses on national or local solutions, and the customers are public organizations or in some cases companies, but typically not directly consumers. The AV media sector on the contrary is facing global competition and markets, and the value is generated mostly in the consumer markets – although there are complex value chains where smaller companies work together with bigger companies. For example, if the business is doing well and customers are individual consumers (as generally, for example, in the games industry), there is no motivation for a company to begin to cooperate with other sector actors, such as schools.

The education sector relies on informed pedagogical knowledge and the AV media sector on media related competences such as storytelling, genre conventions, audience segmenting, etc. These cultural and competence areas are so different and "sticky" that without including expertise on both of them in the same company or cluster, it is rather difficult to produce workable products or services to be used in schools or otherwise in the educational sector. Moreover, both AV media and education sectors have been challenged by the global platform economy. These sectors, one could say, have "common enemies," and for the interested parties, it is reasonable to "join forces." Some of the differences of the AV media and education sectors are presented in Table 5.1.

The emergence of the EdTech sector is also connected to the bigger trends of digitalization and cluster thinking, leading to the emergence of the so-called XTech sectors – there is a belief that if you combine anything to technology, you get a new cross-sectoral cluster. There are several examples based on this thinking in the innovation policies and funding, such as boosting the emergence of CleanTech, BioTech, and MedTech.

> It's the cluster thinking […] There is a strong idea that something new, like FinTech, Financial Technology, or EduTech, technology and education. Typically taking two, because it's always a short word and it's clear to figure it out […] education and games […] And then you create a sort of concept out of these. When it exists in the human brain, he will think of them and start looking for something between them […]. If a new cluster is created from two clusters, for example the FinTech cluster, then nerds and business people suddenly talk much more frequently in meetings with one another and establish a firm and so on. So, this is it how it goes.
>
> Chairman (Games Association, Finland)

It is worth arguing here – also taking into account the long joint history of education and AV media sectors, that much of the EdTech sector – such as

Table 5.1. Typical Differences between the Audiovisual Media and Education Sectors (Simplifications Made).

Feature	Audiovisual Media Sector	Education Sector
Markets	Global	Local (national)
Customers	Consumers	City (or other public authorities)
Incumbents	National or international broadcasting companies	Traditional national publishing companies
Challengers	Internet platforms	(Born global) start-ups and global platforms
Changes	Rapid	Slow
Drivers	Technology and global audiences	Politics and curricula
Strengths	Digital media competences	Pedagogical competences

serious gaming – is actually not pure "education" and "tech," but the competences and content are deeply rooted in the AV media sector; the platform being technology platform, but content being AV media content combined with education content. In other words, the technology competences "carry" or mediate the competences of the AV media sector to the education sector (see Figure 5.1).

EdTech is claimed to be one of the fastest growing markets globally.[10] The growth is accelerated by the interest of venture capital firms seeking new investment opportunities. This growth is connected to the growth of the (lifelong) education sector in general, enhanced by not only rapid population growth, new skills needed in work-life and school, such as programming, creative skills, media literacy, and collaboration, but also by mediatization and increasing power of consumers and individualization of education. Recently, start-up companies, mostly offering digital solutions, have started to pop up and grow in the field. Also new actors outside the sector, especially platform providers (such as Google and Microsoft) and actors from old manufacturing industries are getting interested in offering services to the education sector. Google, for example, offers content for defined age groups and subjects for the primary and secondary school teachers. However, for most big global actors, small language areas such as Sweden and, in particular Finland, offer only small commercial value.

[10]EdTech market is estimated to grow about 17 percent every year, reaching about 250 billion dollars by 2020 (EdTechXGlobal, 2016). See https://www.prnewswire.com/news-releases/global-report-predicts-edtech-spend-to-reach-252bn-by-2020-580765301.html

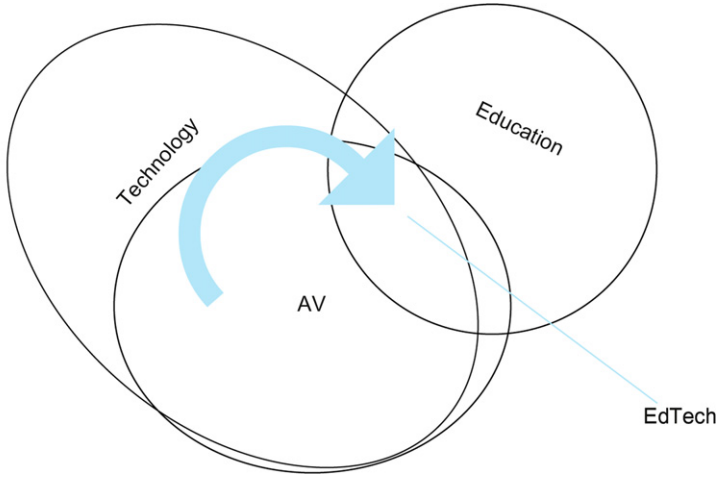

Figure 5.1. The Competences of the Audiovisual Media Sector Are Mediated to the Education Sector Through Technology Competences and Platforms.

> I think that at the moment we're in a very strong innovative product developing phase in the entire industry […] We have had EdTech for really some time, 10-20 years, and now technology development in all of society has gone really fast. We have artificial intelligence, we have language technologies, we have so many different technologies being developed. VR, AR, it's so many new technologies emerging, and this is of course influencing what kind of product development of existing EdTech products. And it's of course developing new, completely new services that wasn't possible five years ago. So the innovation is really driven by technology development.
>
> CEO (EdTech Association, Sweden)

> For example Google, and other major players in the Internet, are developing or innovating services that are aimed at […] forming relevant learning packages for schools' use […] Such cross-border learning materials will, of course, be in certain areas. But there are, of course, language questions. Finnish is not the most common language in the world, and that is why you cannot see this here so much. A clear trend is that not local learning materials are made, but rather those that are used cross borders.
>
> Project Manager (Education Association, Finland)

The business cases in the EdTech sector are based on multiple grounds. There are underserved customer groups all over the field. First of all, in those countries that students have to pay for their education, tuition fees have risen rapidly, and students are searching for alternatives. Also the markets of lifelong

and mobile micro-learning are growing. As schools compete against each other to get the most talented students, usage of new technologies, digitalization, distance learning, online services, virtual environments, gamification of education, and other new learning concepts are becoming competitive advantages for schools. Moreover, at least some actors see huge opportunities, especially in those markets, where school systems are underdeveloped and populations growing, for example in Africa. This view is amplified by the emerging trend of democratizing education globally, also by offering platforms for crowdsourcing of educational content. Thus, in this context EdTech solutions and exports are often perceived or marketed as "meaningful exports," akin to social entrepreneurship or development aid.

The EdTech market is complex. The complexity comes from the complexities of the education sector described earlier, combined with the differences between the AV media and education sectors. The fragmentation of the BtoG/BtoB markets and the immature BtoC markets has led to a situation where there are no clear global leaders in the EdTech market yet. If we take as an example educational games; usually video games are made for global audiences, because otherwise, the business model would not be economically sustainable. However, because there are different curricula in different countries, this is not possible to accomplish for educational games.

> It's really, really tricky to do educational games […] Because you have different set of learning goals in different countries, you have different curriculums you have to take into consideration if you want it to be used in school, and for it to work as a game it also needs to be fun to play. And we have a lot of great games that are also in a way educational, but to do a specific educational game there isn't a market for it. And you have to be able to sell it all over the world, because you can't make a game only for Sweden or Finland. Not without some kind of external funding.
>
> Executive Director (Games Association, Sweden)

Crossing industry borderlines and co-creating products, services, and solutions is not easy and therefore, bridges are needed. Sometimes even a bridge as wide as a new industry sector is needed. Therein the most straightforward way may be to gather people with different backgrounds and competences in a single organization where they can work together on an everyday basis and create a new culture. Therefore, companies that act as industry hybrids and bypass the current system have opportunities to grow fast. However, one must ask, on which markets will these companies focus, with which logics will they operate, and will the needs of individual schools or nations be fully served in the future? Some of the characteristics of education and AV media sectors and trends stimulating the change and emergence of the EdTech sector are described in Figure 5.2.

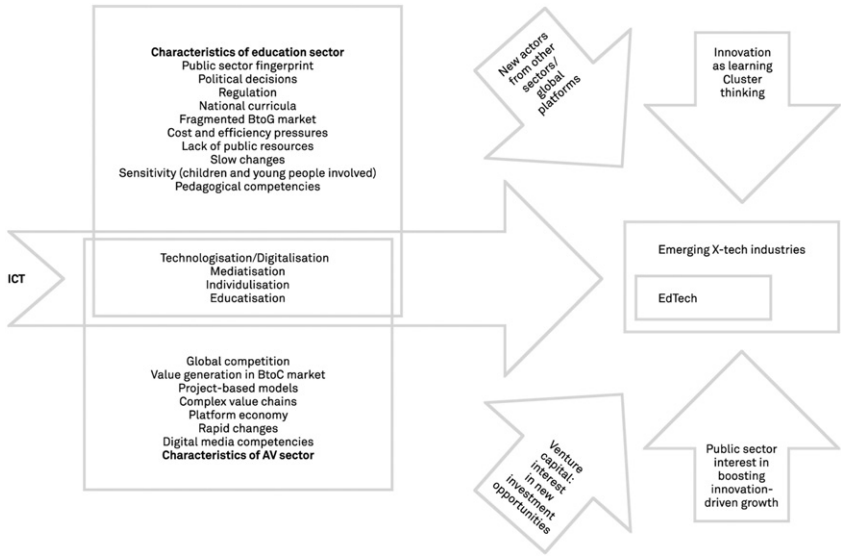

Figure 5.2. Characteristics of Education and Audiovisual Media Sectors and Trends Stimulating the Emergence of the EdTech Sector.

> In the Nordics, and Sweden, and definitely globally it is really one of the fastest growing markets, because the needs are so big […] So, it's a growing market because the needs for education will just speed globally […] because we're not done really with the digital transformation of our education systems yet.
>
> CEO (EdTech Association, Sweden)

> If you look at the successful companies lately, during the six or twelve months in this EdTech space, they're all hybrids […] because nobody knows, what is going to become out of this industry. There's two types of companies, those that build the future and those to try to serve the market that was.
>
> Founder (EdTech start-up, Finland)

To conclude this section: both AV media and education sectors are innovative. This is due to people working in these sectors having a lot of freedom, creativity, and competences. However, innovativeness is different in these sectors. The AV media sector is many times a trendsetter, testing things that later come to other sectors. In the education sector, there are other drivers like changes in curricula, etc. The challenges in directly applying competences of AV media sector to education sector are significant. These cultural and competence areas are so different and "sticky" that without including the understanding of both of them in the same company or cluster, it is rather difficult to produce workable products or services to be used in schools or otherwise in the

educational sector. There is a new sector emerging, namely the EdTech sector. EdTech is one of the fastest growing markets globally. Companies that identify themselves as EdTech sector companies may have very varied backgrounds and business models. Bypassing the current system is an option for companies aiming toward disruptive innovations.

Concluding Remarks: Challenges for Sectoral Policymakers

There are also drawbacks according to our interviews in the current innovation support systems in Finland and Sweden. Among these is that there are too many actors involved in the innovation support system, making it complicated and hard to understand especially for small companies. There are many funding agencies, funding systems are different for different sectors, etc. The interviewees wished for lighter and clearer public funding mechanisms for supporting innovation.

> It gets a bit confusing for the entrepreneurs, who can give us what kind of support. And they have to walk around in the system […] I think we have about 80 or 90 organizations supporting early ideas.
>
> Manager (Public funding agency, Sweden)

Also, in both countries there has been a predominant tradition to value heavy manufacturing industries and product innovation more than creative or service industries and immaterial innovation. This however, is slowly changing. As cluster and systems thinking have become more widespread, supporting service and creative industries as well as cooperation and innovations crossing sectors have become a popular trend in the innovation policy strategies, and at least moderately in actions, too. Especially the success stories coming from the games sector are gradually changing the general attitudes, and creative skills are slowly seen as crucial for business success. It was also stated that the changes in the working life generally (usage of technology, flexible organization structures, etc.), and the ever increasing specialization lead to perceptions that cooperation between companies is needed and will increase; cooperation is vital, because a company cannot do all by itself.

Furthermore, there is also still some friction between public and private sectors, as well as between different administrative branches in the public administration, although these "silos" have been noticed and work done to make cooperation better. Also, there have been attempts to make the education systems more multidisciplinary, so that cooperation between people that have different educational backgrounds would become easier. However, as some pointed out, this shift has not been completed yet.

Innovations in the AV media sector are at least partly driven by creativity and culture, and in the education sector, innovations are "hidden" in the day-to-day work, pedagogy, and politics. A big challenge is the traditionally fragmented public innovation support mechanisms: cultural versus business funding

mechanisms. This applies both in Finland and Sweden. This is of course more commonly a challenge for companies, but also for the whole innovation systems' functionality. Companies in the film sector, etc. are supported by cultural sector public institutes, and companies in other sectors by business funding institutes. Further, there are many funding schemas by different agencies that are not compatible – this means that cooperation of grass root actors across the borders is not possible. The same borders and structures are seen at the EU level, too, or they may even have trickled down from the EU funding terms. There are certain features of the sectors that may justify certain sector-specific measures and the structure may have developed based on the peculiarities of the sectors, but we have to ask if this structure still is valid.

However, some coordination is expected to come soon. At least in Finland, as Team Finland[11] started in the beginning of 2018, an aim of clearer division of work and coordination between funders was declared. There are also piloting schemas in Finland that in fact were born in the creative sectors and expanded to other sectors. Public sector actors' roles are important in removing obstacles of cooperation and facilitating RDI work in the education sector. In both countries, the usage of, for example, public–private partnership (PPP), public procurement of innovation (PPI), or Triple Helix approaches, has recently increased. This has made creating innovations for, with, and in the public sector easier.

There is a new EdTech sector emerging. An additional challenge comes from the fact that companies that identify themselves as EdTech sector companies may have very varied backgrounds and business models. Their services can be very different, spanning from educative games to solutions for the school administration. Users of these services can be children, young people, adult students, or teachers, principals, school assistants, etc. Their paying customers can be individual parents or grownups, but more often public or private schools, school districts, cities or national governments, or even other companies in the EdTech sector. The EdTech sector has also a stream that is close to social entrepreneurship, trying to solve global problems, such as education in crisis areas or developing countries, which we could spot in our interviews, too. Therefore, this sector will need a combination of different support mechanisms in the future to grow and prosper.

EdTech sector will have a mix of education, AV media, and ICT backgrounds. The new sector has to build its own identity and build bridges over the silos. In fact, in the Nordic countries, EdTech communities, associations, and accelerators have emerged to give the start-ups and even old companies in the field support, voice, visibility, and networking opportunities. Examples of these

[11]Team Finland is a network of public sector actors providing internationalization services. The network consists of the Ministry of Economic Affairs and Employment, Ministry for Foreign Affairs, Ministry of Education and Culture, Business Finland (Finpro and Tekes merged), Finnvera, Tesi (Finnish Industry Investment), etc. See more: https://team.finland.fi/en/team-finland-in-brief

are xEdu in Finland, and the Swedish EdTech Industry and Edtech Southeast Sweden in Sweden.

Besides the public sector, silos can also be found inside the AV media but also in education sector where cultural, political, and creative versus economic values can sometimes be in conflict. However, it can be suggested that it could be easier for a culturally oriented AV media sector company to cooperate with and understand the logic of the education sector, which does not have as strict economic values as business sectors.

The US and UK as major English language countries have dominated the international education market, but this is changing. There are reforms ongoing in education systems all over the world, and therefore some of the interviewees emphasized that just now it is a good time for the Nordic companies to move to the global markets. Combining this with the good reputation of the Nordic education and the strong and rising start-up culture, supported by the Nordic governments, could enhance education and education technology becoming a strong export field.

Finland and Sweden have been seen as good test environments, because people are willing to test new things. In the EdTech sector, the question is: Is the testing relevant? The education market is fragmented everywhere, because there are different curricula in different countries, many levels of decision makers, and different languages. Scaling up innovations is difficult. Companies have to invent ways how to tackle or go around this problem. Market research and knowledge about different countries' markets are needed and public support may come handy for this.

Sometimes it can be more reasonable to export the whole education system with all its values, nuts, and bolts, and not just individual EdTech solutions. Yet, what the interviewees also emphasized was that while both countries will be Nordic welfare states in the future, country-specific features could vanish or diminish, because in the end, global operation models will win and become the same all over the world. An important challenge for education sector policymakers everywhere, therefore, is to find ways for balancing between the international standardization of mediatized educational platforms and localized, culture-specific provision of educational services to citizens.

Chapter 6

Micro-trajectories: Small Firm Struggles at Boundaries between Audiovisual and Education Sectors

Mikhail Fiadotau and Mervi Rajahonka

Abstract

This chapter examines the micro-level dynamics of cross-innovation involving audiovisual and educational expertise through the prism of two cases: an augmented reality-based chemistry learning app developed in Estonia and a 360-degree short film project aimed at documenting and raising awareness about historical buildings in Lithuania. Based on the two cases, the chapter outlines several trends: the broadening of the notion of education beyond institutional education; the growing interest in public–private partnerships; and the emergence of heterogeneous networks feeding into the larger epistemic community of educational innovators. It also highlights a number of challenges that members of this community may face, including institutional resistance to change, schools' lack of resources, teachers' and administrators' reluctance to use new technology and emerging technologies' lack of maturity.

Keywords: Educational innovation; augmented reality; virtual reality; public–private partnerships; lifelong learning; cross-innovation

Introduction

Discussion of educational innovation related to audiovisual (AV) media has been a mainstay of both institutional education and academic research since at least the 1910s (see the discussion in Chapter 4). Regarding digital forms of

media, universities were among the earliest adopters of computers, followed by public schools in the 1980s, and the advent of the home computer in the same period was also in part connected to its promise as a learning tool (Epstein, 1985). And yet, despite the ongoing talk about the potential that technological innovation has to revolutionise the landscape of education, that revolution has only occurred slowly in the classroom (Buckingham, 2013).

More recently, the emergence of such technologies as virtual reality (VR) and augmented reality (AR) has reinvigorated the sphere of educational innovation, triggering further discussion of how new technology can benefit teachers' work and students' experiences. Coupled with the increased support for public–private partnerships in education, this has led many innovators to develop educational products for the classroom and beyond. But what has their experience been like and what challenges have they faced?

This chapter will introduce two cases: an AR app for learning chemistry originating from Estonia and a Lithuanian 360-degree film project aimed at digitally documenting historic buildings to educate the public about them. The accounts of the respective cases were constructed based on a series of interviews and communications with the project teams, spanning a period between March and November 2017 for the former and between March and October 2018 for the latter. The discussion will highlight the commonalities, as well as the differences in the two teams' experiences, ultimately linking them to the broader landscape of AV innovation in education, as outlined in Chapter 5.

Case 1: Augmented Reality Chemistry Learning Solution

The idea for a chemistry-teaching game occurred to Roksolana owing to her younger sister's struggles with the discipline. Roksolana wondered if a more visual, hands-on way of learning chemistry could make it more fun and if her sister, a junior high school pupil, could benefit from that. At the time, Roksolana was a Bachelor's student at a university in Tallinn and was already taking part in hackathons and looking for an idea of her own to pitch.

An AR educational game seemed to be a promising option. The game would consist of playing cards corresponding to chemical elements. The cards could be arranged together, allowing participants to experiment with element bonding and play with chemical equations. A smartphone or a tablet would be used to visualise chemical processes and the atomic structure of different elements. An optional element of competition would be added, pitting players against each other for additional incentive. At the same time, the product would also function as a learning app that could be used as a reference by chemistry learners.

When Roksolana and her newly formed team presented the idea at Skype University Hackathon in April 2017, the team ended up winning and drawing in new members in the process. This boosted the team's hopes of bringing the project to fruition and led them to participate in a number of other start-up incubators and hackathons, including Cross Motion, which was where the team found a lead developer, a computer science student called Roman, to join their ranks.

Each subsequent event would help them hone their vision, fine-tune their pitch and receive feedback from experienced mentors. The team was also able to receive funding for the initial development of both the mobile application and the card game.

Roksolana and her teammates set up a company, even as they juggled their start-up work with university studies, and, in the case of Roksolana and one more team member, a full-time job. Three of the six members of the team were able to channel their experience with MoleQL (as the product was eventually called) into Master's or Bachelor's theses at their universities.

The team came into contact with a high school chemistry teacher in Tartu, Estonia's second-biggest city, who was willing to collaborate with them and help test their product in an actual classroom. This, however, presented something of a challenge: the game needed translating into Estonian, and half of the team's six members were not Estonian speakers (the team used English to communicate). The team also mulled over their future plans; once they finished their current project, could they use the same platform to create another product for learning another discipline, such as physics? Or could they build on their experience with AR to venture beyond the sphere of education and develop other solutions based on this technology?

In August 2017, the MoleQL team went to the European Innovation Academy in Lisbon, a prestigious three-week entrepreneurship programme, with the costs covered through a grant they had won at a start-up event in Tallinn. Even before the visit, there was some frustration among the team: their ranks were short owing to one member having decided to leave and focus on her day job, and only three of the remaining members were initially able to receive funding for the trip. When in Lisbon, things did not get off to a smooth start either; as Roman, lead developer, explained, 'some people were there to work and some were there to party', leading to tensions within the team. Ultimately, however, the team ended up bonding. Roksolana attributed this to the shared experience the group had 'outside their comfort zone' and the opportunities the trip provided for non-work-related interactions. Having parted ways with one teammate prior to the trip, the team attracted new collaborators: two psychology teachers from the UK. The involvement of native English speakers helped jumpstart negotiations with American investors. The team also discussed collaboration options with other institutions, including a public university in Lisbon.

Ultimately, the shared experience led the group to realise that they wanted to continue working together as a team even after their current project was finished ('the team became the priority, not the product'). At the same time, they concluded that the education sector was too restrictive and not yet ready for AR solutions. At least, this was the case in Estonia, owing to its tiny market and school teachers' often wary responses to the new technology; some did not consider AR beneficial, while others felt the technology was not developed enough, and still others did not like the idea of students openly using their smartphones in the classroom. Several teachers also pointed out to them that the curricula and teaching methods were ultimately decided by school councils and that public schools typically lacked the money to purchase innovative teaching solutions.

Thus, it was decided that even as the team would build upon the expertise acquired while working on MoleQL, their future work would involve a departure from education and an openness to other fields.

Roksolana and her team's story speaks to the many experiences, anxieties and needs a start-up in the education sector is likely to face. One of these is the experience of participating in start-up accelerators, incubators and trainings aimed at promoting innovation. These events, as Roksolana explained, provide opportunities for networking, helping to negotiate opportunities for collaboration and recruit new members. Roman, who joined MoleQL at the first Cross Motion event after he was intrigued by the team's presentation (and after his own VR game project had fallen through due to funding issues), also stressed the importance of start-up events in terms of networking. Additionally, Roksolana recalled how hearing mentors' and previous participants' success stories bolstered the team's confidence in their ability to succeed. Some of the events also helped team members improve their skills in a particular area, such as, in Roksolana's case, accounting.

At the same time, Roman argued that the vast majority of the events MoleQL participated in were too business-oriented, providing few opportunities for developers such as himself, who do not deal with the business side, to improve their technical skills. Roksolana concurred, saying that many events she had attended overly focused on finding a business model and securing private investment, leaving little room for discussing other financing models, including ones more typical of public–private partnerships in education. Even the networking opportunities offered at start-up events may not cover all the needs of a team interested in the education market, who often require access to a real classroom for testing purposes and guidance from a practising teacher.

A central challenge the MoleQL team had to deal with was finding funding to keep the project going. As funding, especially in the earlier stages of development, is often procured in small instalments from a range of sources, this caused a lot of anxiety in the team over the long-term sustainability of the project. Roksolana and Roman also lamented the communication problems with some of their partners in the public sector, leading, among other things, to delayed funding and jeopardising the project's progress.

Establishing team relations and an efficient work process was also a challenge for MoleQL. When the team were just beginning to work on the project, it took them an entire week to decide on their name. The lack of stability in the team in those early days meant frequent hiccups in the project's development: for example, when a web designer left the team, the remaining members had to create a new website using a free website builder, as no one had the competences required to update the old one (a new web designer has since joined the team). Both Roksolana and Roman wished events their team had taken part in during the early stages of its existence had involved more team-building exercises, although their trip to Portugal did ultimately help the group gel together.

The ultimate concern for Roksolana, however, was her team's future. Education appeared to her to be a niche market for AR solutions, most likely not big enough to remain the team's sole focus if their ambition was long-term

survival. This concern was fuelled by a number of factors. One of these was the fact that Estonia, with its population of 1.3 million, is just too small a market to operate in. Expanding beyond that market, however, poses the issues of differing school curricula in different nations, as well as language barriers – not to mention the lack of contacts needed to gain access to actual schools.

At the same time, Roksolana did begin to note a gradual increase in teachers' awareness of and receptiveness towards AR. Some of the teachers she spoke to had even tried it in the classroom, and others were willing to. But many also pointed out that the responsibility for adopting new teaching methods did not lie with them, but rather with school councils, which still tended to be fairly conservative. Ultimately, Roksolana sensed that the education system, at least in Estonia, was slow to transform and, by and large, not yet ready to adopt AR technology on a mass scale without a push from outside. Added to this was the anxiety that such a push could come from one of the transnational tech giants such as Microsoft and Google, which had begun to display an increasing interest in education. To Roksolana, this meant that a similar solution with a disproportionately larger budget and visibility could appear at any given moment, jeopardising her company's future. And even beyond such a David-and-Goliath scenario, the rapid proliferation of AR solutions elsewhere meant that the existing market for AR was rapidly becoming competitive, forcing the team to keep track of their competition while making their own focus more versatile.

This story highlights a risk for innovation in the education sector, especially when smaller private companies are involved: at the moment, applying the same skill set to other sectors such as entertainment may appear to be a safer and more sustainable survival strategy, leading to 'brain drain' from this particular cross-innovation area and promising projects never seeing full-scale adoption. In some parts of the world, however, the education sector has responded to this challenge by offering centralised institutional support to innovators (see Chapter 5 for examples from Sweden and Finland).

Case 2: 360-Degree Film for Virtual Preservation of Historic Buildings

While innovators crossing over into entertainment may pose a challenge to the education sector, it may also be an opportunity. 'Edutainment' has long established itself as a meeting point between entertaining and educating the public (see Chapter 4); and many educational apps and projects in recent years have relied on the business-to-client model, sidestepping interactions with the formal education system.

However, when cooperation with the public sector does occur, it does not have to be limited to dedicated educational institutions. Education, in various ways, has become an important part of the agenda of many museums, theatres, zoos, civil organisations and other public institutions.

Consider the story of Ruta, a producer at the Baltic office of a transnational media production company based in the Nebula Cluster, a cross-media cluster

comprising a variety of companies and start-ups working on AV and digital projects in Vilnius, Lithuania. When Ruta learned of the plans to reconstruct the Lithuanian National Drama Theatre, in Vilnius she was concerned that the building's distinct Soviet architecture would not be preserved in the process. The cultural context is important here; the Communist past is something that Lithuania, occupied by the Soviet Union in 1940, has been eager to sever symbolic ties with; thus, preserving Soviet-era architecture is hardly a priority for a state otherwise concerned with protecting its diverse architectural influences. Similar tendencies can be observed in other post-Soviet states, where notable Communist-era buildings have been demolished or reconstructed due to not being protected as cultural heritage.

To Ruta and many Lithuanians young and old, however, the National Drama Theatre has come to symbolise the city of Vilnius itself, with its rich cultural life and complex history. Losing the distinct grandeur of the building, which Ruta semi-jokingly compared to the Grand Budapest Hotel from Wes Anderson's eponymous film, would indeed be a blow for the city. And yet, the fact remained that the building was in need of reconstruction but the chances of preserving its distinct style following that were slim. Moreover, there was a host of Soviet-era buildings with similarly unclear futures in Lithuania and across the Baltic states.

Ruta began thinking about the theatre's predicament and what could be done to preserve it in some form. While 'virtual preservation' of historic sites has been a popular trend worldwide, Ruta thought that many such projects failed to attract public attention and often ended in obscurity. Instead of merely documenting every square inch of the building, she reasoned, she could attract public interest by framing the Drama Theatre as more than a historic building: as a setting for a story.

Together with her colleagues and experts at other companies in the Nebula Cluster, Ruta devised a project that would revolve around shooting a 360-degree fiction film set in historic buildings in Lithuania and beyond, starting with the National Drama Theatre. The film would not focus explicitly on the buildings; rather, it would feature an independent storyline that would take part in different parts of the buildings, guiding viewers around them as the story unfolded. While this approach may seem to make the buildings themselves incidental to the entertainment, Ruta, after extensive deliberation with her collaborators, came to the conclusion that a captivating story set in a building with a unique character was the best way to motivate viewers to learn more about the building itself; and the project would include transmedia resources to that end. Ruta thus saw her project as education through entertainment.

Through a friend who worked as a stage director at the National Drama Theatre, Ruta pitched the idea to the theatre and received an enthusiastic response. Her position in the Nebula Cluster was an asset, as the companies in the cluster covered a diverse range of skills – which was exactly what the project needed – and frequently collaborated, rather than competed, with each other. Ruta was also able to find the funding to start working on the production, including from Cross Motion.

The production, however, posed a number of challenges, some of which were novel to Ruta despite her experience and connections. There was little expertise

in Lithuania or elsewhere in the world when it came to non-documentary 360-degree films. From the technical side, the ability to look around afforded to viewers meant that no additional equipment could be used, as it would be visible in the film. Filming in 360 degrees also meant a radically unconventional approach to scene composition, which was no longer limited to a single shot at a time; viewers would need both the freedom to look around and to be able to follow the progress of the story.

Writing a screenplay that would lend itself well to this format was a further challenge, as few screenwriters had the necessary expertise. It did not help that, according to Ruta, there were only a handful of international-level screenwriters in Lithuania in the first place, and all of them had their schedules planned for years in advance. It was decided then to turn to professionals from abroad, with proposals submitted by screenwriters from Japan and the US.

Once the screenplay was selected and approved (a comedy focusing on the misfortunes of an actor who forgets their lines mid-performance), the filming had to commence almost immediately, so as to wrap up before the reconstruction started a month later. The time pressure meant that Ruta and the team had to make things up as they went, but ultimately the production concluded on time.

The challenges Ruta faced were of a rather different kind from those experienced by Roksolana. As the project had been conceived from the beginning as oriented towards the entertainment sector, things like integrating its contents with school curricula or studying its learning effects were never a consideration; neither did a shortage of resources or lack of public interest pose a problem. As the market for entertainment is larger and more diversified, Ruta's team were not too worried about the prospect of a similar solution appearing elsewhere: there was likely enough space in the market, as consuming one product did not preclude the target audience from purchasing another one. (This is a different logic from that of, for example, learning platforms, whereupon an institution's choice to purchase one platform typically means that it will not also buy other solutions with similar functionality.) Moreover, unlike Roksolana who launched a start-up, Ruta was based at an established production company with an existing team and professional experience, so team volatility was not a concern.

However, much like Roksolana's account, Ruta's story also highlights the importance of networking. Experienced as her team were, they had little prior expertise with VR and 360-degree videos. Luckily, these technical skills could be found elsewhere in the Nebula Cluster. Ruta's studio, in fact, had a history of cooperating with development companies and sound design studios in the cluster. Ruta's friendship with a stage director based at the National Drama Theatre also provided an early point of entry, making it easier to approach the theatre for collaboration.

Applying innovative technology to a new setting still inevitably meant a significant element of trial and error and made it difficult to find talent with relevant expertise, especially as no formal training was yet available in cinematographic 360-degree filmmaking. The avenues for disseminating such work were also somewhat limited; however, the situation was beginning to

change with an increasing number of film festivals organising 360-degree screenings as part of their programmes.

Ultimately, Ruta's account makes a case for public–private educational cooperation beyond formal education itself. At the same time, the way her team was able to leverage the potential of both networking and collaboration points to an opportunity for institutions of formal educations as well: formation of, or integration with, clusters of diverse stakeholders involved in AV and digital projects could help streamline educational innovation at large.

Conclusion

The two cases discussed above point to a number of considerations pertinent to the current status and future potentialities of educational innovation. One of these, stressed by both Roksolana and Ruta, is the primacy of networking, which serves the threefold function of finding collaborators, keeping abreast of the competition and gaining access to actual educational institutions for testing and potential adoption of the innovative technology. This is similar to the healthcare sector (see the whole of Section III of this volume), which is also characterised by relative difficulty of access; more generally, this speaks to the established understanding that networking is crucial for innovation owing to its role in 'obtaining access to new markets and technologies; speeding products to market; pooling complementary skills; safeguarding property rights /-/; and /-/obtaining access to external knowledge' (Pittaway, Robertson, Munir, Denyer, & Neely, 2004, p. 137).

Roksolana's account highlights a recurrent tension in institutional education: on the one hand, there is growing recognition of and interest in innovative technologies; on the other hand, there is institutional resistance to change. Digital technology, after all, has been touted as being about to change the face of education for decades now, without producing much tangible change – even as it has become an ever more integral part of young people's lives (Buckingham, 2007). This is not to say that change does not occur in schools: as Cuban (2013) pointed out, school education across the globe has been subject to frequent structural and curricular changes, but more often than not they have not yielded far-reaching results.

Several factors have played into this status quo. On the one hand are a number of extrinsic barriers; teachers find it difficult to productively integrate new technology into their classrooms because they 'lack time, training, professional development, access to sufficient hardware and software, and support' of administrators and officials (Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013, p. 311). Roksolana encountered many of these barriers when introducing her team's project to Estonian school teachers. On the other hand, teachers' own mentalities and attitudes towards technology can pose a hurdle (Blackwell, Lauricella, Wartella, Robb, & Schomburg, 2013, p. 312), as in the case of the teachers who were not comfortable with the idea of students using their phones in the classroom, even if for learning purposes.

In recent years, however, recognition of the importance and potential of technology has started to translate into more systemic and sustained efforts to

integrate technological innovation into school practices. This has coincided with a resurgence of interest in public–private partnerships in education (Robertson, Mundy, Verger, & Menashy, 2012, p. 5), with private AV and digital content producers providing the skills and resources needed for innovation, which public institutions of education often lack. Such collaborations are not unprecedented, with television and radio historically playing an important role in providing educational content (Saettler, 1968), but they are now opening doors for technological innovation in the classroom and beyond. This is exemplified by such projects as Learning City Espoo in Espoo, Finland, which is a dedicated effort aimed at bringing AV and digital companies together with educational organisations and policymakers (returning us, thus, to the importance of networking; see also Chapter 5). Such projects indicate an ongoing convergence process and the emergence of an epistemic community at the intersection of education, technology and AV representation/storytelling. The increasing visibility of this community should contribute to a change in administrators', educators' and students' perceptions, which is crucial as positive effects in educational innovation demonstrate a strong correlation with positive belief in such effects (Blackwell et al., 2013). At the same time, it is important that public–private partnerships eventually spread beyond dedicated 'islands of innovation' into wider educational innovation systems, in order to have an impact on society at large (Avidov-Ungar & Eshet-Alkakay, 2011), a process that also needs to be supported by well-thought-out policy (Lubienski, 2009).

Ruta's story exemplifies another shift: a move beyond institutional education. An increasing number of public and private institutions, including museums, libraries, zoos, NGOs and, in Ruta's case, theatres, are recognising the importance of educating their public about their own activities and the wider societal issues relevant to their work. This results in higher engagement and deeper contextualisation of learning content in the realities of society beyond the classroom (Dillon, 2012). This shift also means greater opportunities for innovators, as learning and educational solutions are sought not only by schools and universities, but also by a wide range of institutions, as well as individual learners. Under this paradigm, entertainment becomes a key part of the equation, which is exactly the added value that technologies such as AR as well as storytelling expertise can provide (Bacca, Baldiris, Fabregat, & Graf, 2014; Dede, 2009).

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Chapter 7

Conclusions: Cross-innovations between Audiovisual and Education Sectors

Indrek Ibrus and Mervi Rajahonka

Abstract

The chapter concludes the section on cross-innovation and convergence processes between audiovisual media industries and the education sector. It addresses, first, that these processes are not driven by any specific technology, but by two broad and interdependent processes – individualisation that makes people in insecure careers search for personalised learning opportunities and the experience economy that produces expectations for learning experiences to be pleasurable and fun, that is, gamified. The chapter demonstrates the emergence of EdTech as a new dialogic subsector operating between the publicly operating education sector and the private media and information and communication technology industries. It demonstrates the inherent institutional diversity in and around this subsector and discusses the nature of the dialogues constituting it. It, lastly, addresses the risks deriving from global platformisation to the education sector and demonstrates how Estonia's government-run platforms, effectively cross-innovation systems linking teachers, learners and content providers in dynamic ways, could present feasible alternatives to the global platforms.

Keywords: Mediatisation of education; platformisation of education; EdTech; cross-innovation; education innovation; learning gamification

Mediatisation

What was, perhaps, most salient in the last three chapters was that education is, indeed, mediatising intensely. It is mediatising as it is gamified and getting ready

for platformisation. What we learned is that some of the social forces described in Chapter 1 are at immediate play in the education sector. New learning applications and digital audiovisual (AV) forms of content are emerging as the broader individualisation process is shaping our learning patterns and making us seek unique experiences in learning – not only because these forms are more entertaining, but also because they may be more effective and because they are dynamically changing society and culture and the associated neoliberal fears make us constantly seek new knowledge and skills.

But there are, of course, important distinctions in how education is mediatising. In Schulz's (2004) forms of mediatisation, the concern is not what he called *extension* – when the form of media is used to extend, complement or enrich the experience of learning, such as when an educational film is shown in a classroom. What is in question are the justifications for *substitution* – for instance when, in Chapter 5, the Swedish policy makers discussed substituting their lacking teachers with artificial intelligence (AI) based learning assistants. Or what does it mean when mediatisation takes the form of *amalgamation* – when media use is woven into existing social practices in ways such that the media's definition of reality merges with the realities of that practice, creating an entirely new amalgamation. An example of this is when well-known videogames are used for teaching various school curricula, as with the School at Play[1] initiative in Denmark. Film, TV and videogame industries are contributing to all these forms of mediatisation and can make a business out of them. That cooperation could be beneficial to all parties. Yet, paradoxically, it is Schultz's last form – *accommodation* – that presents a challenge for the education sector. By 'accommodation', Schultz is referring to situations when media itself becomes an influential economic and social actor – such that other sectors need to transact with and, therefore, accommodate it. For the contemporary education sector, such accommodation means *platformisation* with all its accompanying risks. We will come back to this at the end of the chapter.

Diverse System

Our sub-studies where we looked at how screen industries are co-innovating with the health care (see Chapter 9) and tourism sectors (see Chapter 13) suggested that, to an extent, it has been the arrival of new technologies that has motivated the new waves of cross-innovation to emerge. In tourism, it is augmented reality (AR) that has enabled experiences to be augmented in new ways. In health care, virtual reality (VR) has motivated experiments with regard to various forms of preventive care and rehabilitation. In the case of education, we did not identify any specific new media technology that could be argued to have motivated a specific cluster of innovations to emerge at the time of our study. Instead, in education we realised that a whole range of technologies is employed, from more traditional computers and tablets to newer technologies – AR, VR,

[1]See further: http://www.schoolatplay.dk/

AI and so on. A prevailing technique, however, that could be understood to have motivated inter-sector engagement is *gamification*. To emphasise, the system is diverse in the technologies and material forms used. Yet, instead of technologies, the main motivators for innovations are still, first, collectively shared recognition of the importance of learning and, second, the also widely sensed urgency of learning, the understanding that learning needs to happen anytime/anywhere and that it needs to be effective, that there is no time to waste. Such perceptions can be understood as resulting from broader individualisation, and also from the general fear of losing out in the ongoing social flux and in the automation of everything that is understood as threatening all careers and professions. Such fears result often, first, in the instrumentalisation and, then, the commodification of education.

Yet, as Chapter 5 focused mainly on formal education, it needs to be stressed that in this context other, perhaps more immediate forces hold sway. As for instance when both of our case-countries – Sweden and Finland – were seeing an opportunity to start exporting their successful educational model abroad. This could be seen as a way to satisfy the demand described above, for which, again, mediatised solutions may be appropriate. Connected to this, both countries were at the time becoming more open towards private sector interventions into formal education systems and, relatedly, of course the entrepreneurial activities were another notable force leading towards market-driven innovations and cross-innovation therein.

What the latter aspects also indicate is the very high institutional diversity in the education sector. In Northern Europe, it consists mostly of schools as public institutions, but also of private partners that service the sector in various ways. Regarding educational content, perhaps the most influential have been textbook publishers, usually dominated in each market by a handful of very large publishing houses. But next to schools and their private partners are, of course, a variety of interest groups and political governing bodies – parents bodies, alumni organisations, governments and so on. This means that the educational systems are, in effect, very diverse in terms of their institutional setups and heterogeneous in terms of the rationales that drive them. If we think back to what was argued in Chapter 2, diversity in institutions and in their rationales and objectives tends to be generally good for the health of innovation systems. Let us look next at what we learned about the exchanges between these very different institutions and their effects on innovation processes.

Dialogues

We learned, first, that dialogues are hard, often because the broader system includes sub-systems that enjoy their autonomy, where path-dependencies are strong and there are systemic auto-communication processes, too. For instance, we learned that the entertainment-oriented videogaming industry (the sheer majority of it) is generally not interested in working with public partners. This is simply because its usual business-to-customers (B2C) markets are comparatively

much more free of bureaucratic hassle and related uncertainties. This constitutes the first threshold for inter-sector dialogues. We also learned that established textbook publishers, although they are gradually digitising their properties and offerings, generally tread carefully so as not to cannibalise their lucrative textbook business. This also slows dialogues.

However, it is not unexpected that incumbent firms and industries are careful about undermining their bottom line. Similarly, it is also not surprising, as we saw in Chapter 5, that start-up companies are more willing to experiment with industry boundaries and learn across those. In Sweden and Finland, there are plenty of cross-sector networking measures in place, designed to facilitate these efforts. While the number of measures may be even confusing to start-up companies, many of them are gaining from their existence, as also seen in the MoleQL example in Chapter 6. Young people and their micro-sized companies are looking up these opportunities and seeking new expertise as they do not have much in-house. Such networking and cooperations is easier in Scandinavian countries with their decades-old dialogical and consensual cultures and high trust levels. Yet, Chapter 5 also revealed slight differences between their cross-innovation facilitation policies. In Sweden, these build more on the triple-helix model where universities have a central role – as in the case of Malmö where the local university serves as a knowledge and experimentation hub around which both media and EdTech sector companies cluster. In Finland, again, company-to-company type interactive learning processes (in Lundvall's sense) and related forms of clustering are more salient, although there are also hubs/accelerators organised by universities, such as xEdu, which operates at Helsinki University Campus, as well as living lab-type experiments that also include users, such as Kyky in Espoo.

Yet, what emerged in both cases was the need for a certain 'translation function'. As for videogaming and media content companies, the complex public nature of the education sector continues to be a challenge. It is understood that a new breed of niche companies is needed – consultancies or expert game or content design companies, also public agencies and umbrella organisations that intermediate between both sectors – to translate the needs and peculiarities of one to the other and establish linking nodes in cross-industry value-chains. This niche, a new industry mostly consisting of an army of start-up companies, has been long in development and it is popularly known as the *EdTech* industry.

EdTech Emergence

Our interviews with insiders in both sectors – AV media including videogames and education – suggested that EdTech is a well-defined example of a dialogic and translatory boundary industry between two worlds. The industrial cultures and competence areas of these worlds are quite different. While the potentials of working together are apparent, they are difficult to achieve owing to lack of resources (monetary and time) on both sides, different expectations for business conduct and different professional identities, social dynamics, values and

'languages'. As a result, the EdTech industry that has been emerging is one that is inherently very hetereogeneous. One aspect here is that, in terms of broad professional identities, it includes not only education and technology, as the name suggests, but also creative and media professions – the makers of content, the designers of games, the writers of narratives and those shooting the pictures.

But we also learned that there is a plurality of ways in which people have tried to put digital media and technologies in the service of learning. As one Swedish interviewee, an educational policy maker, put it in Chapter 5, there was the time of the 'app-fest', but now, this period is over and the search is on for more informed, systematic and transmedial ways of integrating media into formal education – solutions based on evidence and lessons from previous attempts. In terms of Schulz's (2004) forms of mediatisation, these new ways could be understood as *amalgamation* – where media is woven into existing social practices in ways that merge the media's definition of reality with the realities of that practice. One needs to recognise in this context that EdTech has a variety of subfields – autonomous apps for acquiring specific skills or knowledge; solutions supporting specific activities in classrooms associated with specific curricula; solutions for communication between learners and teachers; solutions for monitoring learning processes and so on. The variety in terms of forms and functions is very big. All together they form a complex new amalgamation of mediatised education.

This new amalgamation as a dynamic constellation of technologies and representative forms has an equally complex set of producers. Yet, as already suggested earlier, despite the heterogeneity, they have gradually formed a specific auto-communicatively funding whole – the EdTech industry. Perhaps, this is more visible in small countries with clusters such as the one in Malmö, Sweden (and in the broader Skåne region) where it is systematically facilitated by local policy makers and their at-arm's-reach organisations (specifically the Malmö Media Evolution City, a cluster organisation).

The more integral educational media solutions that have emerged post 'app-fest' seem to be based on the perception that the public sector needs to regain a driving role in commissioning solutions. This perception is based on the view that education is, in effect, a common good central to the advancement of societies and that educational media and technologies need to support this function. In this context, further commodification and privatisation of educational services by those just happening to gain access to them as a market presents a risk. Furthermore, that the 'app-fest' could be over may also suggest that EdTech is graduating from the typical early fluid phase of any innovation in terms of Tidd and Bessant (2009). Or, as Perez (2003) suggests that it is leaving the so-called installation phase. This is the initial phase when entrepreneurs and financiers call the shots because they are the ones investing in new technologies that have barely emerged and that very few people understand at the time. However, according to Perez, this is followed by the 'deployment phase', in which a society starts realising it is being shaped by a new paradigm. At this stage, governments take charge and build institutions that can render new ways of living more sustainably and inclusively. It is difficult to assess, based on our Swedish and

Finnish case studies, whether these countries are arriving at the deployment stage, yet. The question is critical, however, owing to the risks deriving from platformisation that were also discussed in Chapter 5.

Platformisation

The platformisation of education has been extensively discussed in a recent book by van Dijck, Poell, and de Waal (2018, pp. 117–136). They demonstrate how the platformisation and more specifically the dataification of education has facilitated forms of teaching and learning that may undermine the status of education as a public good as well as weaken educational systems oriented towards facilitating equal opportunities and upward mobilities. The personalisation of education, that individual learning processes, their success and effectiveness are analysed and shaped accordingly may, in effect, result in forms of educational 'filter bubbles'. It may also result in what van Dijck et al. (2018, p. 124) have called 'learnification' – in learning processes divided into short-term personal missions focused on acquiring specific skills and not in facilitating education as *Bildung* – in bringing up enlightened and self-reflective citizens able to creatively synthesise multiple bodies of knowledge and arrive at judgements in complex and dynamically changing environments. Furthermore, as recent studies (Beetham & Sharpe, 2013) have demonstrated, there is in fact no clear evidence that dataified forms of online learning will significantly improve the academic outcomes of the majority of students over the long term. Also, the UK government has questioned in a report whether dataified and personalised education can be assumed to improve trust and public confidence in contemporary societies.[2]

To conclude, platformisation could present a variety of risks to societies and their educational systems. Yet, this book is about cross-innovation systems in rather small countries – and in this context, we need to highlight that platformisation may present itself in rather different ways in different countries. For instance, while van Dijck et al. (2018, p. 117) are arguing that most online educational platforms are corporately owned, this is not the case in small countries such as Estonia – a country and a distinct culture too small to interest the global online giants. Instead, its government has invested notable funds in providing its junior citizens with a wide range of open learning materials and open, government-run platforms[3] to host this content as well as any other content produced by different parties; for example, *e-koolikott* (e-schoolbag in translation) is in effect a platform for educational content-related *social network markets* (Potts, Cunningham, Hartley, & Ormerod, 2008). It is an environment where solutions and offerings, both free and not, can accumulate; where free content can be reused, modified and remixed, and where incremental improvements can

[2]See further https://www.policyconnect.org.uk/hec/sites/site_hec/files/report/419/fieldreportdownload/frombrickstoclicks-hecreportforweb.pdf
[3]See further https://www.opiq.ee/; https://e-koolikott.ee

gradually amass and the best solutions get highlighted and receive wider adoption. These processes are coordinated by a network of students, teachers, EdTech professionals, educational content creators and so on – all connected by a government-created platform. That is, the government contributes here as a facilitator and coordinator of a cross-innovation system.

The existence of such a platform does not fully eliminate the possibilities of large international platforms eventually reaching Estonia or other small countries around the Baltic Sea and elsewhere, but it does reduce the potential negative effects predicted by Lundvall (2010), who considers that multinationals rarely contribute positively to national/local innovation systems. Instead, they tend to directly undermine these systems, especially by discouraging local effort – as we saw in Chapter 6 where the founders of the start-up MoleQL were afraid of the looming competition from large international players. A healthy, locally relevant innovation system consists of a diverse set of public and private players and creates opportunities for interactive learning among them, as well as resulting in the emergence of locally relevant novelties – for instance, learning materials well adapted to specific cultures. That is, platformisation, if executed locally and with a focus on public value generation, can facilitate innovation systems that advance education systems as public goods. In relation to Schulz's (2004) theory of mediatisation, privately held international platforms become threats to education when they take the form of *accommodation* – where the platforms themselves become influential economic and social actors that other sectors need to transact with and accommodate. This is not only because they promote 'learnification' and undermine privacy, but also because they risk undermining local 'interactive learning', in Lundvall's term – the effective functioning of education-related cross-innovation systems born to generate the most apt forms for local learning.

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Chapter 8

Audiovisual Industries and Health Care: Overview of Forms of Co-innovation and Convergence

Madis Järvekülg

Abstract

This chapter addresses the forms of co-innovation between the audiovisual (AV) industries and the health care sector. It gives a brief overview of how media have been used in health promotion, medical training and treatment by drawing on selected examples from television, entertainment and video game industries. Informed by an array of case-studies, this literature review suggests that the emergence of the new digital audiovisual media and online technologies bears a great potential to improve health care services in multiple ways, while it also recognises the risks associated with the crumbling of medical authority in thoroughly mediatised worlds. Therefore, it maintains that a successful adoption of entertainment-oriented media formats in health care always requires a close relationship with professional medical expertise.

Keywords: Health communication; audiovisual media; cross-innovation; mediatisation; health apps; video games

The media are key agents in articulating and disseminating information on health and shaping the audience's health behaviour. Television, for example, has long been viewed as a tool for health education (Long, 1978). Health themes have been prevalent in television and radio programs for decades; at the beginning, this was in the openly promotional, mainly informational and educational form, and directly associated with national health care policies. This approach can be illustrated by many examples. The Finnish series *Keys to Health*, in

which volunteers were documented and televised during their attempts to change their unhealthful habits, such as quitting smoking (Puska et al., 1987); BBC's television series *You in Mind*, which addressed mental-health problems (Barker, Pistrang, Shapiro, Davies, & Shaw, 1993); or televised public-service announcements to help children suffering from diarrhoea in Egypt (Elkamel, 1995).

Alternatively, health promotion can merge with the fictional narratives of various films and serials. Over time, films and television shows have effectively made use of medical experts contributing to the storyline to propagate healthy lifestyles among audiences. Vicki Beck (2004) has highlighted the cooperation between Centers for Disease Control and Prevention (United States) and the hit drama *The Bold and The Beautiful* or MTV's special HIV programme for the youth audience among many other examples. Similarly, Elkamel (1995) has exemplified the case of an Egyptian soap opera, *The Family House*, which is specifically designed to address an array of interrelated health issues.

These cases effectively combine various bodies of knowledge and skills for the common social good by bringing actors together from public health organisations to major creative hubs, such as Hollywood. One of the strengths of this type of cooperation is that it serves two functions at the same time: educating and entertaining. On the one hand, it has been shown that planned cooperation between health care and mass media, such as television, can have a significant impact on the audiences by raising their awareness of any particular health issue, leading a change in unhealthy behaviours and even saving lives. On the other hand, in the academic analysis of more recent forms of entertainment, such as audience-oriented reality shows, research focus has shifted to the theoretical framework of mediatisation, to reveal the shortcomings of health communication presented in contemporary audiovisual (AV) formats.

Christensen (2016), for example, has applied this framework to examine the transformations of health expertise in public-service television programmes in Denmark. Health, from this perspective, can be viewed as a central aspect of modern lifestyle, where it 'is regarded as a project for which people individually account' (2016, p. 205). Along this line, health issues are increasingly conveyed as matters of the individual, rather than as a collective responsibility. Further, health becomes the fabric combining various other aspects of everyday life under the conditions of 'lifestyle programming' (2016, p. 205) – for instance, reality shows about developing healthy eating habits or losing weight. Christensen noted that this tendency, influenced by British TV, started taking shape in Danish public-service health communication from around 2000.

As an example, she describes the transformation of a series, *The Doctor´s Desk*, which provided scientifically grounded information on health and diseases, into a youth-oriented entertainment show, *Take Care of Yourself!*, which motivates 'viewers in good health to live healthier, stay in shape, and feel better' (2016, p. 211). Within the framework of mediatisation, this process can be understood as submitting to media logic by reframing health as lifestyle and by creating 'their own experts, who are produced and tailored to the needs of TV and the demand for dramatically successful content' (2016, p. 214) – an outcome of coping with market competition in TV programming. Christensen

(2016, p. 215) suggested that this tendency opened up a potentially endless number of various health topics for entertaining TV production.

Consequently, the questions of reliability, authority, and ethics of health promotion arise. The emergence of new media technologies has further fed into these anxieties. In practical terms, of course, digitalisation of health care has improved the doctors' work and their patients' experiences in numerous ways. Personal digital records have allowed easy transmission of information between medical specialists, clinical procedures have become much quicker, telemedicine delivers health care across distance (Matusitz & Breen, 2007), such smart technologies as iPads or smartphones have strengthened the relationship between the doctors and their patients and raised consciousness of one's medical situation by allowing them to keep track of it. Likewise, social-media technologies provide an effective platform to discuss and disseminate information on health care, as well as providing a dangerous arena for inaccurate or confidential health information, which brings forth the questions of privacy. It has been found by the Pew Research Center that 72% out of the adult Internet users in the United States have looked online for health information in the past year (Fox & Duggan, 2013). In addition, it has been estimated that 4.5% of all searches on the Internet worldwide are health related (Eysenbach & Kohler, 2003). In this light, the complex dynamics of the online world as a primary source for health education and information needs further attention, especially because the efficacy of social-media-marketing techniques in health promotion has lacked empirical evidence (Kontos, Emmons, Puleo, & Viswanath, 2010, p. 217).

It has been noted that media interventions in health education work better when a multimedia approach is applied (Barker et al., 1993, p. 282). Along with the increasing complexity of emerging media forms, studies have refocused their attention from studying the mass-media effect to examining the interaction of the audience with specific media. These perspectives lead us to explore the use of more participatory, information and communication technology-based digital media in health and physical education, especially the application of video games. While traditionally this domain has been associated with numerous risks for mental and physical health, especially considering media's role in intensifying these assumptions, over the recent decade researchers have started to emphasise its positive effects and confront the belief that video gaming is an exclusively sedentary or introvert activity.

For example, the exergames, which engage players in physical activity through innovative interfaces, such as 'electronic dance pads, motion platforms, bicycle ergometers, haptic devices and motion-tracking cameras', are used to enhance the degree of interactivity (Papastergiou, 2009, p. 604). The most famous one being a dance-simulation game, *Dance Dance Revolution*. Also, mobile phone applications and games can be seen as promising tools to increase physical activity and encourage healthy eating or other positive health behaviour – especially when virtual avatars, social media and gaming elements are combined in their development (Hswen, Murti, Vormawor, Bhattacharjee, & Naslund, 2013), and considering their potentially wide reach among populations at

relatively low costs (Broom & Flint, 2018). One of the most notable commercial examples in that respect is the augmented-reality game *Pokèmon Go*.

Another field of innovative use of games is their application in surgical training. For example, some studies have shown that experience with certain video games may contribute to the professional skills of a physician in endoscopic simulator performances (Harper et al., 2007, p. 1207; Kato, 2010, p. 118). However, the full potential of tailor-made game solutions for improving surgical skills is still to be discovered as there has not been enough research carried out on this topic.

Relatedly, by combining the online infrastructure and the potential of gaming-oriented rehabilitation and disease management, companies have emerged that offer integrated platforms of various services for both medical staff and patients. One of the examples of this is an e-health company called Cognuse, in Estonia; it operates in the areas of neurological diseases and speech therapy. Another is a Danish digital health-communication platform, Visikon, which helps patients to overcome their concerns regarding their treatment through animated AV narratives. Both these cases are included in the analysis in Chapter 9.

In addition, interesting results have sprung from the innovative cooperation of health and AV initiatives in the sphere of virtual reality (VR). During the last 20 years, VR has been widely applied in the treatment of mental-health problems (Riva, Wiederhold, & Gaggioli, 2017, p. 5), and the use of this technology has found support when dealing with anxiety disorders, stress-related disorders, obesity and eating disorders and pain management (Riva, Baños, Botella, Mantovani, & Gaggioli, 2016). These forms of treatment often require a significant amount of creative AV content and can, therefore, be considered as a form of artistic practice.

Sheldon Brown, for example, created the VR solution *Smoke and Mirrors*, which enables multiple participants to 3D scan their faces, inhabit a personalised avatar and enter into a shared immersive environment, filled with a series of mazes, through computer screens and a user–interface station, consisting of a joystick, trackball and button. The purpose of this was to enforce engagement in activities regarding the social and cultural history of the tobacco industry and consumption and ultimately, through an aesthetic experience, have a positive effect on the user's harmful health behaviour – smoking. As the author said, it is 'about the translation of media spectacle into physical reality and social effect', while both 'form and content deliver this message together' (Brown, 2003, p. 39).

This chapter focused on the various forms of co-innovation between the AV industries and the health care sector. As discussed earlier, some of the practices of treatment, recovery, training and promotion in health care have benefited from the innovative use of AV media technology. However, in health communication specifically, adopting forms of representation which were originally produced for the purpose of entertainment, such as video games or reality shows, can be subject to commercial-market competition, propagating conflicting values, losing sight of educational motives and leading to dubious effects regarding health issues. In the circumstances of inevitably mediatised worlds, the sure way to avoid these risks seems to be in maintaining tight connections with medical professionals and scientific research.

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Chapter 9

Health and Audiovisual Sector: A Meso-analysis of How Systemic Coordination of Sectoral Cooperation Leads to Convergence

Külliki Tafel-Viia

Abstract

In times of converging and diversifying audiovisual (AV) industries, digitising health sector and the increasing phenomenon of cross-sectoral innovation, the question arises about the state of affairs between the health and AV sectors. The chapter aims to explore what the main modes of cross-sectoral cooperation between the health and AV sectors are and what supports and hinders the emergence of a related cross-innovation system. The chapter introduces two case studies carried out in Estonia and the wider Aarhus region (Midtjylland) in Denmark. At each site representatives of the main stakeholders of both sectors were interviewed – policy makers, entrepreneurs, educators and professionals. The results demonstrate the crucial role of path-dependencies – in terms of both hindering and enabling cross-sectoral dialogues – and also the importance of effective coordination in supporting cross-innovation.

Keywords: Cross-sectoral dialogues; path-dependence; health sector; audiovisual media industries; cross-innovation; innovation systems

Introduction

In this chapter, we introduce developments in the field of cross-sectoral dialogues between the health and audiovisual (AV) media sectors. We use Estonia and the Aarhus region in Denmark (Midtjylland) as case studies. We chose these cases as

our observations identified that amongst the six countries we studied at the initial phase of the study, the manifestations of these sectors' convergence in these two countries was most visible and/or offered the most interesting initiatives to explore. In Aarhus, we observed the emergence of new convergent enterprises, and in Estonia, the overall systemic development of information and communication technology (ICT) infrastructures and e-governance systems offered a promising starting-point for cross-innovations. The empirical study consisted of 36 interviews with sectoral entrepreneurs, professionals and policy makers of both countries.

We start the chapter with an overview of the sectors' development stage where we outline the main changes that influence the sectors' current and future development and their overall readiness to adapt to these changes. Thereafter, we describe the current institutional landscape that supports the sectors' cooperation. In the second part, we continue with the sectors' general openness to cooperation and describe the common modes and peculiarities of cross-sectoral dialogues. The chapter ends with challenges for policy makers by outlining the main shortcomings that policy could address to better support cross-boundary innovation between the health and AV media sectors.

The Changing Face of the AV Media and Health Sectors

AV Media Sector

The interviews revealed the changing nature of the AV sector – this applies to both Estonia and the Aarhus region. In Aarhus, the AV content and services sector has a rather strong position (2nd place in Denmark after Copenhagen) with a large-scale concentration of AV industries, which are divided into four main categories: films and animation, video games, television production and production of commercials. In Estonia, the main hub of the AV sector is the capital Tallinn. Estonian interviewees were troubled in defining the scope and borders of the AV sector, which demonstrates that sectoral identities remain an important issue. Different opinions existed in terms of what to consider as part of the AV sector and what not, including whether video games are part of the larger AV sector and what fractions of the IT sector should be included. These discussions reflect well both the overall mediatisation trend and convergent processes (discussed in Chapter 1) which have given to the increase in the AV modes used in different sectors and to the borders between different media and creative sectors becoming blurred.

Estonian and Danish interviewees acknowledged that the AV sector is growing and expanding. Growth is particularly noticeable in certain subfields of the AV sector, for example, animation, games, etc., which have gone through a tremendous change from a marginalised sector to a globally ascendant industry. However, micro and small-sized companies (one man to 20–25 employees) still dominate in this sector. The growth of this sector is also reflected in its internationalisation. In particular, the Danish interviewees stated that the sector has heavily internationalised during the last decade. On the one hand, there are increasing numbers of expatriates working in AV companies and, on the other hand, the majority of local companies have ties with big international

corporations. The growth of the sector also means that the amount of AV content is increasing. The interviewees (in particular, the representatives of the AV sector) highlighted the belief that the importance of AV content and tools will continue to grow – thus, the interviewees pointed to the mediatisation trend.

The other important key characteristic of the AV sector is, paradoxically, its both converging and diversifying nature – the multi-directionality of convergence, that Ibrus discusses in Chapter 1; the borders between different subsectors are blurring and the intra-sectoral convergence of the AV sector can be observed; the amount of different kinds of cross-, trans- etc. type of content is increasing, the channels and formats have changed, the business models have altered (e.g. emergence of VOD providers as crucial players in the industry), technologies are used more mixedly, the audiences are changing and attracting their attention is becoming more challenging. In addition, the AV sector is also converging with other fields.

The importance of augmented reality (AR) and virtual reality (VR) is expected to increase. The interviewees emphasised that the technology is still rather immature; there are plenty of unused opportunities and less successful solutions. However, quite unanimously, the interviewees argued that the technology will become cheaper and more user-friendly. VR and AR were also seen as engaging technologies that will blur the borders between different AV subfields. As the head of a Danish AV incubator described:

> VR and AR call for people from both worlds […] we work with these new technologies in an engaging way. That's why we work with the term 'digital experiences' instead of 'films' or 'games' or 'audio'.

As flexibility and fast learning ability were seen as main keywords to adapt to the changes in the future, we may argue that social capacities were considered important in coping with (technological) changes. In the light of those changes, the orientation towards constant product and service innovation was also rather obvious. The interviewees highlighted the fact that innovation process is a daily practice. One Estonian AV company CEO discussed that almost everything they do is experimental. He considered this a challenge, because trying out new things is always money- and time-consuming. Although the interviews pointed to innovation examples across the sector (across companies of different development stages), still, in case of Estonia, we can see that innovativeness, especially innovating in new convergent areas, is more common among younger companies. More traditional and long-term AV companies, including production companies, are somewhat more reserved when it comes to innovation in terms of entering new fields. The matured content production companies also did not consider themselves to be innovative. An owner of a company producing films and commercials explained: 'the answer to that, how we feel, we do not feel that we are innovative […] the [audio-visual] sector is not innovative'. Several Estonian AV sector interviewees argued that innovativeness (in Estonia) is first

and foremost associated with the ICT sector and with the start-up world. Quoting the owner of an Estonian AV company:

> At the moment in Estonia, there is a hype that all IT and start-ups are innovative and awesome […] How are feature films related to innovation? If you don't come up with a new ID card or Skype, then you are just doing your movies […] despite the fact that, in my opinion, it is innovative to create a world-class film and bring out a new story and thought.

These attitudes reflect that AV media companies, especially those working on film production, often find it difficult to think beyond their traditional practices. The novelty they work towards is usually their next film, but not a new type of cooperation or cross-innovation initiative outside the AV sector. Awareness of development opportunities that cooperation with other sectors would offer is low. Estonian public sector and sectoral umbrella organisations' representatives also stated that the older companies are in something of a comfort zone and do not see the ultimate need for innovation. As the representative from the Estonian Ministry of Culture remarked: 'the situation [is] not bad enough that something new should be developed'.

The situation is somewhat different with broadcasting companies. The focus on cross-media output was obvious in the case of large Danish broadcasters. To quote the programme manager of a Danish TV production company:

> They're also looking for unique formats, unique content, produced straight for the big internationals – Facebook, YouTube, stuff like that, but also for their own digital platforms. Two of the major broadcasters in Denmark have their own digital platforms, where they put all the flow TV, but they want unique content there as well. They want new ideas and the stuff that's produced directly for their own platforms as well.

The public media and broadcasting sector has also become more interactive in Estonia; producing content for different platforms has become an everyday practice.

The Health Sector

The health sector in Estonia and the Aarhus/Midtjylland region is predominantly public. The share of private sector involvement in the health sector is growing, particularly in Denmark. Differently from the AV sector, which was seen as rather progressive, the health sector was often described as old-fashioned and slow to respond to changes. However, the interviewees stressed that a certain shift has already occurred and the health sector is becoming more open, including in terms of its readiness to cooperate with other sectors. The topic that the interviewees very often addressed was the need to change current medicine

education. The interviewees emphasised the need to make it more interdisciplinary and facilitate the connections between students of different fields already during the studies that would facilitate their cooperation in the future.

As to the trends, both Danish and Estonian interviewees highlighted several changes that significantly influence the sector's future development, including those that may also facilitate the emergence of cross-innovations between the health and AV sectors. One of them is the overall change towards a user-centred approach in health care: to put the patient at the centre of the health care system and increase the responsibility of the user for his/her health. Several interviewees also talked about the need to refocus the patient−doctor relationship. The doctor needs to ask the patient what she/he needs (not to define patient's needs by him-/herself). This in turn presumes that the patient should be ready to take active position about her/his health behavior, including to answer about his/her needs, goals in life, etc. Related to that, the interviewees referred to the necessity for new types of personal assistants and new types of 'help-desks' that will change the communication between the patient and the doctor. The CEO and founder of Danish AV + health company remarked:

> the trend is maybe that […] actually resonates with people. So building feelings into the product, building personality, building character into the product […]. We don't have an avatar that speaks to you, but we do have character.

The trend that is already happening in the health sector is the strategic refocusing towards rehabilitation and prevention. As most of the cooperation with the AV sector predominantly happens in this field of the health sector then this can be seen as a good precondition for cross-innovations to emerge. Another trend that is expected to positively influence cooperation between the AV media and health sectors lies in the generational shift. Future patients are also expected to be more prone for gamified solutions.

The changing technology was also seen as the main trend influencing the sector's development. The driver is the sensed feeling that as technologies evolve one needs to keep up to stay relevant in the marketplace. But the new technologies were also seen as offering opportunities for solutions that were not possible before. Especially, health sector representatives emphasised that the sector's innovativeness lies primarily in the usage of new cutting-edge technology and related infrastructure. Technology-centeredness in innovation (or technological innovation) was explicitly brought out by Estonian interviewees, but it was highlighted also in Aarhus. As part of technological change, the interviewees also discussed more personalised patient information systems and software developments. Cooperation with the technology-intense AV sector would amplify the technological shaping of the health sector. Health sector representatives also expressed the expectation that the world would become more diverse when the sectors' borders become more blurred and the mixture of different competences, including social and technological competences, are highly valued.

Institutional Landscape for Cross-sectoral Dialogues

The current supportive institutional attitudes towards cooperation between the health and AV sectors in Aarhus and Estonia reflect several understandings in contemporary innovation theories. On the one hand, we can notice developments expressed in contemporary cluster-development theories that focus on cross-sectoral cooperation and social and interaction processes that support it (Granovetter, 1985; Harrison, 1992). On the other hand, for policy developers also, the stream of innovation studies that focus on space and proximity issues has been relevant as they attempt to understand how innovations emerge and develop in particular places (e.g. Asheim, 2012; Florida, 1995; Hassink & Klaerding, 2012; Healy & Morgan, 2012). As demonstrated below, the institutional landscape supporting the sectors' cross-innovation in both studied cases is not limited to the narrow models of 'innovation system' (Edquist, 1997; Nelson, 1993), but also encompasses actors other than research institutions and firms. However, it is interesting to point out that research institutions may not be part of the landscape when it comes to the Estonian case. We shall now describe the institutional landscape of cooperation in more detail, starting with Aarhus.

As to Aarhus, the key players of the supportive institutional landscape are: (a) higher education institutions (HEIs) as regional sectoral hubs, (b) private sector organisations and community-based initiatives specially targeted to foster intersectoral cooperation and (c) public sector measures that facilitate cooperation and partnerships.

HEIs have had a special role to play in supporting the clustering of the AV sector and being the central hub that attracts different actors into the region. Quoting the interviewee from one Danish production company:

> Because we have the school in Viborg, the animation school, and they have this environment around school with the companies […]. People graduating from schools, […] some people coming back to Viborg starting [their own business]. Because it's very convenient to be very close to truly educated animators and have access to them.

The main ways that private sector organisations and community-based initiatives support the sectors' cooperation are via creation of physical environments that include (a) labs, incubators, etc., and (b) the organisation of events that aim to bring actors physically close and support face-to-face meetings of different actors. One example here is Interactive Denmark, which is a non-profit organisation. Its mission is to accelerate, coordinate and support the development of the Danish game and interactive cluster by focusing (among others) on the interaction between what they call Digital Visual Industry (DVI) and health.[1] The other example relevant to highlight is the Filmby Aarhus Incubator located in

[1]In addition, cooperation with the education sector is supported.

Aarhus, which is a new incubator for start-up companies working within DVI and is aimed at matching them with companies from other sectors and public organisations that have specific challenges for which they need digital visual solutions. The importance of these kinds of initiatives and physical environments, in particular, were highly emphasised both by companies and policy and sector representatives. Quoting the CEO and founder of the Danish AV + health company:

> We are there [in IdeaLab] because we want to be a part of something bigger. There's several considerations in it. One is like it's awesome to go to work and there's more people than us. So it is nice to have a lot of people to talk to, but it's also a part of our identity that we are at a place with people who build digital experiences. So that works really well, just the story about it. […] And then we use people sometimes – […] [when] we are testing the product. We have a few conversations with some of the game developers about technical stuff or sometimes they look at it and comment on what we're doing. So, basically, it's really, really good to have this option of talking to other people about what we do.

In Aarhus, the AV sector is the active player in pursuing cross-sectoral cooperation; AV sector organisations build the partnerships and find ways to facilitate cooperation with other sectors, including the health sector. One of the latest examples is the creation of the Vision Denmark alliance,[2] which has been established by seven AV sector organisations and actors, and whose ambition is to support the growth of digital visual industries. Quoting the representative of a Danish AV sector umbrella organisation:

> Vision Denmark […] the aim of this organization is to focus precisely on how we can develop the relationship between the audiovisual sectors. We call them the Digital Visual Industry. […] both […] developing their entertainment products, but also developing collaboration with other industries – so, for instance […] creating simulation software for training stewardesses or making VR products for physiotherapy in other sectors.

Danish interviews highlighted several additional relevant innovation support measures, but also targeted sectoral measures, including AV funds from which the companies can apply for support. One of the central joint health sector initiatives is the MedTech Innovation Consortium,[3] which was founded in 2009 in response to wishes from biotech and medtech companies in the Central Denmark region as part of the business development programme. Also private

[2]See further: http://visiondenmark.dk/
[3]See further: http://www.mtic.dk/

sector initiatives, for example, the Egmont fund[4] and the Lego fund, have had a special role to play in supporting cooperation between the health and AV sectors, as they support financially different cooperation projects.

When it comes to Estonia's support ecosystem for the health and AV sectors' cooperation, the general conclusion is that, compared to Aarhus, the support is more modest and the main actor is the public sector. Characteristic of Estonia is the policy focus on generic support measures and lack of private sector initiatives. The main actors in the cooperation ecosystem are: (1) externally (by public sector) supported sectoral cluster organisations and (2) generic public sector measures that facilitate cooperation and partnerships.

As to the clustering support, the emphasis is put on strengthening the AV sector. Estonia supports (through creative industries development centres) the development of different incubators and accelerators in the AV sector that contribute to strengthening the sector in general. Examples include Object, an incubator for AV sector start-ups in Narva and Storytek, an accelerator often highlighted as a good example that fosters cooperation between the AV and technology fields. As to the health sector, recently a new measure has been introduced – an innovation fund – to better plan and support innovative solutions in the health sector. In contrast to Denmark, in Estonia the active parties who seeks cooperation with other sectors are health sector organisations, specifically the Connected Health Cluster[5] (also initiated by public authorities). Estonia has also launched a financial support measure, 'Support for creative industries cooperation projects', which aims at supporting the growth of value added to other sectors through the development of business models, products, services, sales and marketing by building on the specific skills and knowledge from the creative industries. Interviews suggested that this measure has not fallen on fruitful ground: there has not been enough cross-industry initiatives to make use of the available funds.

The fact that educational institutions do not play an important role in the cooperation landscape allows us to argue that this could be one of the reasons why cooperation between the health and AV sectors has remained rather modest in Estonia. According to Chaminade, Lundvall, and Haneef (2018) and as discussed in Chapter 2, educational systems play a crucial role in the evolution of innovation systems and are among the first initiators of intersectoral contacts. Not to mention that, to refer to Johnson (1992), the diversity in the institutional landscape is extremely important from the knowledge diffusion point of view. Thus, we may conclude that the lack of actors involved in the institutional landscape has been the hindering factor of sectors' cooperation in Estonia so far and

[4]The Egmont Foundation works to safeguard children and young people against 'modern poverty' – the lack of learning and life skills. See further: https://www.egmontfonden.dk/int/What-we-support-/

[5]Estonian Connected Health Cluster (ECHC) is committed to accelerate the adoption of connected health solutions, at scale and on commercial terms. See further: https://www.estonianclusters.ee/estonian-clusters-2/connected-health-cluster-3/

will also slow down changes in the future. In addition, when speaking about public sector intervention mechanisms, we may argue that, despite the creative industries' policy prominence in Estonia for more than 10 years now, the achievement of its core policy objectives has remained modest, including to enhance spillovers to other industries and stir dynamics and growth in them. We may similarly argue that the development of cross-sectoral policies that are associated with creative industries policy by numerous authors (O'Connor, 2009; Potts & Cunningham, 2008; Throsby, 2008) have not become common practice.

Openness, Modes and Peculiarities of Cross-sectoral Dialogues

This section explores the different modes of dialogues and cooperation between the health and AV media sectors. We start with the sectors' general openness towards cooperation and describe the main challenges that hinder cross-sectoral cooperation, which also outlines the peculiarities of sectoral innovation practices.

Sectors' Openness for Mutual Cooperation: Club-mentality and Sectoral Path-dependencies

In contemporary innovation studies, innovation is understood as an interactive process and interactive learning (Edquist, 1997; Lundvall, 1988) is considered an important prerequisite for (cross-) innovation. Our study, however, highlighted certain differences of sectors' dialogic capacities and readiness to cooperate. At first sight, the results of the study reveal that, in general, both sectors are open to cooperation with other sectors. The 'traffic' of cooperation activity goes both ways. In particular, Danish AV and health sector companies reported that, as a rule, others are turning to them to seek cooperation. One Danish production company representative remarked: 'it's actually like 90% of the time it's the people come to us'.

However, in the case of Estonia, proposing the question about cooperation with other sectors to AV companies or related sector organisations and public sector representatives usually led to an answer about cooperation with other creative industries sectors. The typical answer was for instance that films and games need music and actors. Only after further guiding question(s) did a discussion about cooperation with other sectors (outside creative industries) follow. That is, to consider these kinds of cooperation was somewhat unnatural, with only secondary potentiality.

The motivations for cooperation are very pragmatic both in Estonia and in the Aarhus region: mostly it is a lack of certain type of competences. While some cross-sectoral cooperation, for instance with technology providers, is long term the work on innovative solutions, however, requires seeking out new 'knowledge' partners from other sectors. The study also demonstrated that the activeness of seeking cooperation is conditioned by the stage of development of the companies. Start-ups are more active in looking for cooperation and trying it out in convergent and thus uncharted waters than more matured companies. As described by an interviewee representing a start-up working on a VR solution

in life-saving: 'So we have to make some phone calls, knock on the doors, just spread the word, to see if they have some interest in it.' This argument especially applies to companies that are active in emerging convergent fields and that still have to justify their existence and find their place in the market. The emerging businesses in convergent areas (digital health communications, telemedicine, gamified rehabilitation, etc.) also create the need for new type of interdisciplinary dialogues, knowledge transfer and new type of cooperation needs. Quoting the CEO of a Danish VR company that develops apps for the health care sector:

> I don't really have a background in any healthcare related area. But in each project that we do, there's a very big emphasis on having a collaborative partner. […] once it was an occupational therapist, [and] in the case of a physiotherapy project it was a physiotherapist […] and in the case of these multi-handicapped children it was some people that took care of the children at the facility […] pedagogues.

As to the health sector, the interviewees complained about its 'club-mentality' – the establishment of very strong 'us-ness' of the sector as described in Chapter 2. The results of the interviews indicate that the health sector seems to have created its own rules (Dopfer & Potts, 2008) that do not cross sectoral boundaries and that cannot be (so easily) adopted by agents from other sectors. The interviewees expressed rather explicitly that it is hard to cooperate, even harder to do business, if you do not have connections within the health sector. The problem is amplified by the fact that different parties do not understand each other (enough). As illustratively described by a Danish health sector organisation representative:

> You have to be very precise in how you try to get close to especially the doctors. Because if you don't speak their language, if you don't know what they're saying, understand what they're saying, you get nowhere.

Estonian interviewees claimed similarly that 'outsiders' – those who do not have any background or competence in the health sector – have difficulties to convince the health sector to buy new solutions. The crucial factor that facilitates the sectors' cooperation is having a person with a health sector background involved in the development process. Quoting an Estonian health sector umbrella organisation innovation manager:

> if a technology person develops an application, then [they have] terrible [problems with] persuasion and sales in the direction of [the] healthcare sector. But if an application is developed in cooperation with [the] health sector, then you don't need the whole sales works […] it is said that one of the success criteria for

> health sector start-ups is whether a health sector person is involved or not in your team. He/she doesn't have to be a team member; they may also be a consultant or shareholder. Even in [the field of] prevention […] as unbelievable it is […] a person does not trust advice from non-medical practitioners.

Although, we may conclude that the health and AV sectors have begun to become increasingly important to each other, they still have little tendency to cooperate, as historically the two sectors have not worked together. The study results also demonstrate that dialogues across sectoral boundaries are hindered as the sectors are still learning to know each other: their language, needs and practices. Despite that, we may argue, the potential for cross-innovations is high. This proceeds from Lotman's argument, elaborated by Ibrus in Chapter 2, that the more culturally distant the domains – as the health sector and AV are – the bigger the probable innovation may be when these domains end up in a dialogue.

Four Modes of Cross-sectoral Dialogues

The study results demonstrate that co-innovations between the AV and health sectors do not concern the whole spectrum of activities in these sectors. As to the health sector, we can see that emergent dialogues across industry boundaries have concentrated on primary care and rehabilitation (the spectrum is more varied in Aarhus where different new solutions have also been developed for instance in the field of insurance). From the perspective of the AV sector, the main cross-innovation potential with the health sector at the time of our study lay in post-production, or in the development of VR or AR solutions, 360-degree videos, video games, mobile applications, and so on. The CEO of a Danish VR company who develops apps for the health care sector stressed that:

> I really think that the healthcare market is a good place for VR technology. And I think that a lot of people can actually make use of this technology […] Because it's so natural. It's such a natural step to take because VR technology is all about involving the whole body. And if you wanna do physical rehabilitation you want to involve the whole body. […] I think in the future there will be more time or more focus on how people spend their time. So if people can't really see that they're making any progress with doing normal, boring physical rehabilitation exercises, then they won't do them. So, they want to have fun experience, they want to have engaging experience, they want to feel like they learn something from doing exercises. And we can do that with VR. We can create an actual world for them to rehabilitate in. So I think it will happen, eventually.

Somewhat separate are those cases where (especially Danish) companies demonstrated articulated awareness that they build their enterprises in

convergent ways, and as such explore new waters. To quote the CEO and founder of Danish AV + health company:

> It's this certain mix of digital storytelling, gamification, research-based health insurance. That combination is in itself apparently innovative because we wanted to do something that was new with a new approach.

All in all, our study allows four modes of cross-sectoral cooperation and co-innovations between the AV and health sectors to be highlighted. It is important to stress that the sectoral dialogues are often afforded and invoked by specific new technologies. The importance of the technology component increases the closer the dialogue between the sectors gets (Figure 9.1).

The *first* mode can be considered as 'traditional' cooperation. The interviews talked about the following two forms. On the one hand, this can be the situation where AV tools are used for health products promotion (e.g. a promotion video for a hospital). Another example of the traditional cooperation is where health content

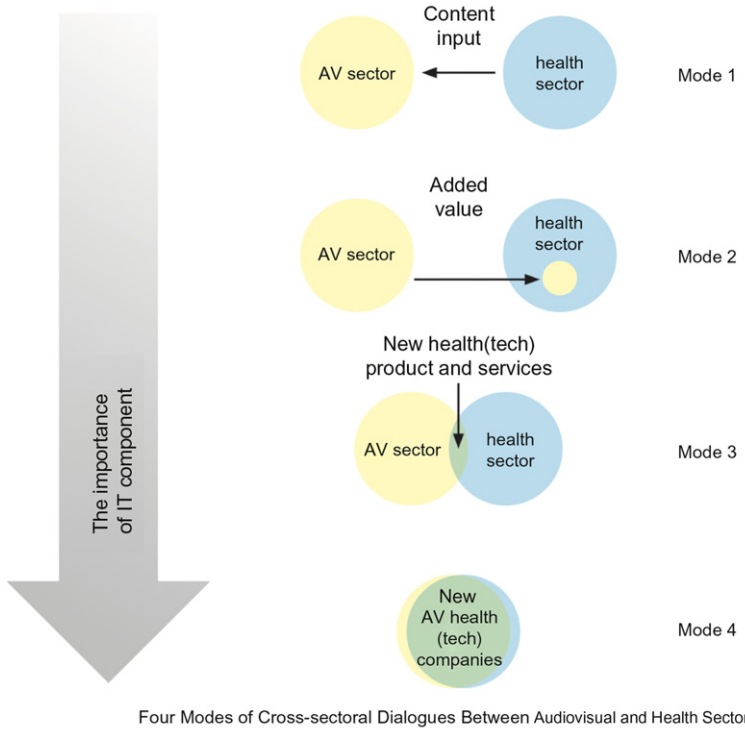

Figure 9.1. Four Modes of Cross-sectoral Dialogues.

is used in health-related TV shows or in other forms of health journalism or communication, but also in some educational films on health.

The *second* form refers to situations where AV tools are used in health service/product development. Here, the use of AV tools can provide additional value or new features to the health product or service or lead it, in effect, to the next level from the user point of view. In this type of cooperation, the examples include the use of a videos or a VR experiences in medical education to provide new kinds of teaching methods or new user experiences in the health service. Quoting the interviewees:

> For example, a person walks in the robot – he does not move his legs, but the robot moves – he sees that he walks over the meadow. […] We use quite a few such programs.
>
> (Manager of Estonian rehabilitation centre)

> So we are trying to make a VR solution, so when the kid comes to the dentist, they can watch a movie… which makes them feel […] relaxed and […] they might think it's fun. And the dentist can do the examination much faster. So, there's a business case because they save the time as the kids are more relaxed.
>
> (Coordinator at Danish local municipality in the field of social services)

The *third* mode of cross-sectoral dialogue is a more developed form of the second one. Here we can notice that the sectors have understood that the next new solution may exist outside their sector and innovation can happen through dialogue with the other sector. The co-innovations have resulted in the development of new health products and services due to using AV tools and content in the health sector. Examples are new app-based solutions, new VR rehabilitation tools, games, etc. The interviewees described the following examples:

> We are building a product to use in companies or in the insurance sector to help people fight stress. So we use [a] scientific or research-based technique that builds the stress resilience of people in a physiological way. So we work with the training and flexibility of the autonomous nervous system. […] We build a smartphone-based product that lets people train the flexibility of the nervous system as [a] supplement for cognitive-based therapy or organisational stress measures. So this is [an] individual tool-based product that people can use to build their stress resilience.
>
> (CEO and founder of Danish AV + health company)

> We have developed a product for people who have had brain damage from a stroke. And this application helps them in their rehabilitation from this stroke and from the handicap that came with the stroke. Another group that we develop for is multi-handicap

> children and what we did for them was an application that helps with the visual stimuli of their senses because these children have such difficulty and are so handicapped that they have no language – our language or physical language. So what we need to do is just stimulate their senses to give them some sort of value in life […] [it] is a VR system for physiotherapy.
>
> (CEO of VR company that develops apps for the healthcare sector)

As to the *fourth* mode, one can no longer talk about just cooperation, but a new level of convergence of the two fields. In this case health and AV are rather one convergent field – a new field of activity where health and AV competences are converged on a company level. Thus, as discussed by Ibrus in Chapter 2, this can be considered as a clear manifestation of cross-innovation as dialogues between sectors have resulted in a new kind of firm. In particular, in Aarhus, we could observe several new converged AV health companies as embodiments of a new level of cooperation. As one Danish health + AV company described, for their work they have to combine competences from the fields of digital storytelling, gamification, research and health insurance; and that the aim of that is to create a new type of company.

These four modes indicate that the connectedness of the AV and health sectors has developed over time: from traditional types of cooperation towards the (partial) convergence of these two sectors. However, the development process has not been linear, where one form of cooperation is replaced by another. The results of the study demonstrate the diversification of cooperation: new modes of cooperation have been added to existing ones. The fact that the convergence of the two sectors is manifested in the emergence of new types of company – the AV–health(tech) companies – allows to argue that, at least to a certain extent, the latter itself is the phenomenon of cross-innovation as the borders between the two sectors have disappeared or at least become very blurred. Interviewees discussed that the VR solutions are expected to become a 'normal' part of the health sector, for example in surgery, and therefore cooperation between related professionals has to be encouraged during their studies. A support organisation manager in Denmark argued similarly that the future is moving more towards interdisciplinarity and mixed sectors:

> I think they're going to be better and better at looking at different kind of business models. […] Maybe in the future you don't have to be either [in the] entertainment or other sectors, but you can make some kind of collaboration where it makes sense that it's something in healthcare but also it's entertainment.

The results of the study also highlight the differences between Estonia and Denmark. In Estonia, cooperation between the health and AV sectors happens more in the traditional form (the first mode of cooperation described above): a hospital needs a video or a media company makes a TV production about a

certain health-related topic. Health service/product development (mode 3) can be found in both Estonia and the Aarhus region. The examples of new emerged companies were more explicit and prevalent in Aarhus, although there are also examples of company-level convergence in Estonia.

We may conclude that the cooperation pattern is rather path-dependent – and that in different aspects. On the one hand, as the study demonstrated, the more traditional types of cooperation are especially common to developed or matured AV sector companies (content production, broadcasters); they continue to practise traditional forms of cooperation – they are path-dependent in terms of their activity. Whereas the new emerging types of cooperation practices come from the start-ups in the field. On the other hand, the more advanced convergence in the Aarhus region suggests that (cross-)innovations are at least to a certain extent path-dependent – meaning that there have to be certain prerequisites that support the innovations to happen. In Aarhus, there have been years of support via public and private initiatives to bring these two sectors together. As Hassink and Klaerding (2012) argue, at the local level, path extension and path creation are intrinsically linked with endogenous characteristics like regional and industrial culture. The study results fit well with agglomeration and cluster theories (Asheim, 2007; Healy & Morgan, 2012; Rutten & Boekema, 2012), but also with the discussion on creative industries' overall path-dependent nature (Florida, 2002; Hall, 2004; Jones, Lorenzen, & Sapsed, 2015) that stress the importance of (local) 'milieu' and 'environment' that can support or hinder the changes to occur.

Peculiarities of Cross-innovation between the Health and AV Sectors

Despite the increasing connectedness of the sectors, there are also a number of challenging factors that complicate cross-innovation between them. The five peculiarities described below reflect the nature of the dialogues between the sectors both in Estonia and in the Aarhus/Midtjylland. It can also be noted that cross-innovation challenges are mostly due to the specificities of the health sector, and to a certain extent derive from the specificities of the cooperation between the two.

The first peculiarity relates to user involvement difficulties that make cross-sectoral cooperation time- but also money-consuming. In other words, we may talk about the high sensitivity of the cross-innovation as both Danish and Estonian interviewees stressed that the development of new solutions always presumes testing and a validation period, but it is difficult to find contributors and supporters during the test phase. But in the health sector, without having a solution tested, one cannot gain access to the market. At the same time, the safety of the patient has also to be guaranteed during the test period. Quoting the CEO of a Danish VR company:

> Because we do applications for healthcare. It's very, very difficult to make actual tests, user tests, end-user tests because from the clinic or the therapist perspective you want to make sure that the

> patient doesn't hurt himself. But still we want to make a test on end-users to prove that this functionality that we make is working or is not working. So it's a grey area often. […] So, I would say, that's one big hurdle that we have.

Health sector interviewees explained that it is very difficult to involve expert users in testing, because it comes at the expense of their working time. Testing is an extra activity and requires extra resources. Quoting the head of department of an Estonian health company:

> [it is hard to] find these three, four, five doctors [for] […] your projects. First, they won't agree to do it for free and at the expense of their spare time; as a hospital I find it difficult to finance it from my own budget; thus, you have to motivate them somehow.

The second peculiarity is the complexity of finding viable business models for novel cross-disciplinary solutions. As noted by one interviewee, the ultimate goal for co-innovation must still be added value and, as a general rule, this added value should be expressed in terms of money. Partly, this problem derives from the lack of business thinking in the health sector, but, however, there is a certain rigidness in the system that prolongs the development processes and makes them more complex.

The third peculiar aspect relates to the mindset or attitude problem towards using AV tools and content in the health sector. This means that gaming is still often associated with entertainment and leisure, not with serious activities such as health care. This argument particularly applies for the older generation: today's elderly people have not been used to playing computer/mobile games, compared to todays' younger generation. In addition to that, the underlying attitude tends to be that people spend too much time behind the screens (and) on playing (computer) games. Therefore, it has been complicated for gamification experts and video games companies in the area to make themselves heard and taken seriously in 'serious' fields like the health care sector. As screen media is associated with entertainment, these rather relate to something that is 'nice to have', but not necessarily needed. Thus, as the (financial) resources are always acute in the health sector, the support for these kinds of developments is not considered a priority. Quoting the CEO of a Danish AV content company:

> People may be sceptic […] We have a lot of people saying: 'This is a computer game, is it okay, can I used it for training? […]' Computer games for them are often these things their grandson is doing every day and then they just sit and look at the guy playing computer games and that doesn't make much sense to them. So why should they do it? […] They've always been saying: 'Oh, you play too many games.'

The fourth main challenging factor for cross-innovation between the AV and health sector is the complex nature of the cross-innovation process. The results of the interviews indicate that usually it is not about the development of one new solution, rather about a large-scale reorganisation of the existing system. This usually demands investment in wider (IT) systems and the related maintenance costs, including general IT support (helpdesk) to support the implementation of telemedicine solutions, not to mention the costs of reskilling or upskilling the health sector personnel. Often the development of new solutions presumes the introduction of corresponding new technical devices. These altogether raise the cost of the implementation of the new solutions significantly and hinder cross-innovation between the two sectors.

The fifth peculiarity is closely related to the previous one and is associated with guaranteeing security and health requirements, which also make the innovation process more expensive. Innovations in the health sector have to deal in the health sector have to deal with guaranteeing the security of personal data. Data security as a specific health sector problem was pointed out several times. The interviewees argued that this is a topic whose significance will increase significantly. The manager of an Estonian rehabilitation centre remarked:

> At the same time, we must also take into account the threat of cyber-attacks […] if you consider [a] hospital's information system where you have patients' information […] and you have devices connected to the internet […] so security is something that should definitely be guaranteed, because we cannot predict all these dangers.

Challenges for Sectoral Policy Makers

In this last section, we discuss the main challenges that policies could address to facilitate cross-innovation between the health and AV sectors. The related policy challenges can be divided into two main groups. The first group concerns the general (business) environment, for example, small domestic markets, lack of investments and investment culture, etc. – that assume corresponding actions from entrepreneurial and innovation policies. The second group relates to more sector-specific factors that call for action on the sectoral level, including the need for refocusing policies for health and AV media content and services.

As to the shortcomings of the general (business) environment, both Estonia and Denmark struggle with different types of market failures. On the one hand, the interviewees highlighted the problem of the small domestic market, which does not provide enough of a take-off platform for new ideas. Gaining the needed critical mass of customers is complicated. The interviewed project manager of a Danish sectoral umbrella organisation saw that as a considerable obstacle:

> A huge problem in Denmark and a lot of small countries is […] what is possible for example in Germany or France or the United States or UK, is not the same as what's possible if you look at

> the business cases in Denmark or other small countries, because there are not enough customers for some products here.

Estonian companies explained the problem of the small domestic market from the limited development opportunities point of view. As the health sector is rather differently regulated in different countries, the opportunities to transfer solutions (to scale up the services and products) from one country to another are also limited. As described by the CEO of an Estonian digital health services company:

> […] healthcare is different in each country and the Estonian market is so small that it immediately creates the problem how to develop a product that is scalable internationally […] would have a real market potential […], but would also help people in Estonia.

The market failure problem was also discussed from the perspective of a mismatch between the long-term research and development need versus the limited availability of investment in the market. The interviewees argued that the market for novel AV-intense solutions tends to be project based and opportunities to find long-term investment is limited. The lack of investment becomes even more challenging, as, especially in the case of Aarhus, innovation is hindered arguably due to the modest investment, entrepreneurship and risk-taking culture in Denmark in general. Several interviewees argued that risk capital investments are rather underdeveloped: investment activity in general is low and the capacity to attract investment is poor. Therefore, companies are not able to get the necessary funding for their development activities. Quoting the interviewees:

> Denmark is a very small country when it comes to investing. We don't have it like in the US, we don't have a culture of investment or risk taking. We're very much [a] culture of employed people. […] There's not that much funding to be hand in the sector.
>
> (CEO of a Danish digital audio-visual company)

> I would point out that risk capital and the accessibility of risk capital in Denmark is too low. […] So many private business angels do not have the experience yet because this is also a new business area. They do not have the experience to invest in this area and they tend to focus on more industrially focused investments.
>
> (Vice President of a Danish producers' sector organisation)

Although we may conclude that the market for health-oriented interactive and AV services is in general at an early stage, there is rapidly emerging competition between the product and service providers. This can be seen as a manifestation of the globalising health industry trend where the amount of (global) health platforms and apps have increasingly emerged (Lupton, 2014; Lupton & Jutel, 2015; van Dijck, Poell, & de Waal, 2018). The competition was highlighted by several Danish

companies which argued that recently there has been an emergence of new companies that provide VR, AR and related solutions to the health sector. This has resulted in a situation where there are several companies after rather small amounts of money.

As to the sector-specific challenges, these are predominantly related to the health sector. The central keywords here are the lack of a comprehensive approach and system point of view. This was discussed by a majority of the interviewed companies, representatives of public institutions and sectoral umbrella organisations and public institutions in Estonia and the Aarhus, although from different points of views.

The Danish interviewees stressed that the main problem lies in the regional health care system, which means that every region has its own information system with its own rules and separate budgets, all of which hinders collaboration within the health sector. But it also makes the development processes for the sector much more expensive as a single system or solution could not be applied across all health sector institutions. The CEO of a Danish digital AV company discussed this as follows:

> The problem is that we have a saying that they suffer from 'not developed here' syndrome. Meaning that every region wants to develop their own system and that system is, then, 'naturally much better than whatever they've done it in other regions'. Which means that none of these regions have any data interoperability on the practical level. So even though all these systems can talk to each other and exchange data on the official level in practise, it doesn't work. […] And each of these regions have probably around 1000 to 2500 different systems developed for specific areas that are not necessarily communicating with each other also. So […] usually if you move from one region to another and sometimes even between hospitals within the region, they would simply re-do the tests. So it's in their own system.

Although in Estonia with its advanced e-governance infrastructures the information systems of public services are built to be interoperable and data exchange between health care institutions works notably better than in Denmark, the interviewees highlighted the lack of technological support for developing an additional layer of services on top of existing data exchange infrastructures. Quoting the Estonian health sector umbrella organisation's innovation manager:

> In Estonia, it can be said that the great success of e-health is more like a success story for the IT infrastructure. But now, in order that all sorts of different apps are on that IT infrastructure […] this layer is completely missing today.

The shortcomings in terms of the lack of a systemic viewpoint came up among Estonia's interviews through the following three aspects. First, the lack of connection between primary care and specialist care/ambulance services, but

also the lack of a systemic approach to rehabilitation and social services. This may lead to situations where, as Estonian health sector policy representative described it: 'The patient falls between so-to-say different walls […] and the system does not work together on behalf of the patient.'

Second, the challenging issue for cross-sectoral cooperation in Estonia is the lack of a holistic viewpoint in the treatment process, and the lack of patient focus therein. As described by the Estonian health sector umbrella organisation's innovation manager:

> For example, if heart disease patients get out of the expensive treatment at the hospital and go home, in fact we do not monitor whether he/she actually recovered, whether his/her quality of life has been restored. So if we bought the service that the person's quality of life is actually restored, that his/her work capability is restored, then the hospital would become interested in all kinds of rehabilitation services, home-monitoring services and applications whose sensors would let us know: yes, he/she is alright, that there is no deviation from the trend, that would alarm us that he/she is about to come back to the hospital right away. We could proactively do something. Well, let's say that a patient who had a stroke is discharged from the hospital and he/she has a prescription to walk 10,000 steps per day and not to eat these things and to eat other things. But nobody checks that […] Today, the person should be the manager of his/her own health, but people are not so literate in healthcare so that they can be their own health managers. This is a bigger systemic problem.

Third, the interviewees argued that the Estonian, but also the Danish, health sector lacks outcome-oriented thinking. The dominance of process orientation prevents the overall health care system from being innovative as the goal is not overall improvement (e.g. patient healing and quality of life), but the focus is set on single improvements in different parts of the system. Quoting the Estonian health sector umbrella organisation's innovation manager:

> purchasing of service episodes instead of purchasing outcomes inhibits innovation. [Today] everyone's goal is to show volume. It is counted how many service elements you have provided, but it does not matter if the person has been healed. And yes, this is the fundamental obstacle to innovation in health, actually. So, if the Estonian Health Insurance Fund [*Haigekassa*] starts buying the outcomes instead of pieces, then the need for innovation would emerge in the system. Today nobody asks for this innovation in the healthcare system and does not demand it.

Thus, the challenge for policy makers concerns the question how to encourage the publicly funded health system to re-conceptualise their whole societal function

and the range of services they need to offer. This would, then, also justify it co-innovating more with other sectors, including the screen media industries.

Another group of sector-specific policy challenges relates to the lack of financing possibilities. The results of the interviews enable to conclude that there is a deficiency of financial support measures for both the AV and health sectors, and this is the case both in Estonia as well as in Aarhus. The main discussion revolved around the problem of expensive technology (VR and AR solutions) and the questionable readiness of the market to cover the development costs. As the technology is still too expensive, it is not accessible to a large group of users. This can be interpreted also from an innovation diffusion (Rogers, 2003) point of view: as the technology is still used mainly by early adopters and expert users, the developments are hindered due to the expensiveness of the innovation process and that again hinders the development of the usability of these technologies and solutions. Quoting the associate professor from the Danish health science institute:

> They cannot really ask for the money that they put in. I understand them very well. So it's a lot of development work and you have funding for one to two years and the market does not pay what it costs, it's simply not possible to get a few thousand euro for a simple VR device.

With regard to expectations as to how policy makers should respond to these challenges, the results of the interviews derived rather logically from the current institutional landscapes described above. This means that as the support for sectoral cooperation in Estonia has been rather modest compared to Denmark, expectations of policy support was much higher in Estonia than in Denmark. To quote a CEO of a Danish digital AV media company:

> I don't think the state necessarily needs to do anything there. There are a lot of private organisations doing that. […] I think government should try to focus less on supporting […] certain initiatives and, instead, simply setting the stage for companies and people to do it themselves.

The position expressed by Estonian companies and public sector organisations was that in the case of sectors with a strong state role, for example health, the public sector has to have a more active role in supporting cross-innovations – the state has to be actively involved in the innovation process. Estonian policy makers in turn emphasised the need for health institutions to become more accessible test-grounds for experimenting. Direct support for experiments was highlighted by companies in both sectors. Interviewees highlighted also the importance of a risk-taking attitude and the tolerance for failures. They also stressed the need to run special venture capital funds: innovation funds, risk funds, etc., to support riskier projects and prototyping (developing new solutions is very expensive in both the health and AV sectors).

However, one of the key challenges to support cross-innovation, stressed by both Estonian and Danish public sector representatives, was the importance of facilitating networking in various ways, including, joint events, matchmaking events, etc. This fits well with the conceptual postulates of innovation systems thinking (see Chapter 2) that cross-innovation relies on all kinds of interaction, including cross-sectoral dialogues, cross-boundary learning, etc. The key here is rising mutual awareness between the sectors and, therefore, all kinds of networking measures should work as central intervention mechanisms. Yet, company representatives in both countries did not see the relevance of networking and were rather critical about the efficiency of those kinds of events. As to Estonia, this explains well the common understanding, especially among the more mature AV sector companies, that innovation is mainly an intra-sectoral thing. The low readiness to enter into cross-sectoral dialogues would, however, limit the opportunities for cross-innovation. This highlights the continuing need to support awareness raising on the policy level.

Conclusion

We finish the chapter with three concluding observations.

First, the study enables to conclude that cross-sectoral cooperation and co-innovation processes between the health and AV sectors have changed over time. Cooperation has intensified and, as the new converged practices have not eradicated old practices, the forms of cross-sectoral cooperation have also diversified. In case of the health and AV sectors, we were able to identify fully converged practices – new companies based on new rules and identities. Both sectors are heavily influenced by digitisation and other technology developments and this has also brought the two sectors closer together. The different modes of cross-sectoral dialogues demonstrated that the importance of the IT component increases the closer the dialogues between the sectors get – thus, at least partly, cross-sectoral dialogue is mediated by a third sector.

Still, if we do not take into account telemedicine that throughout its long history has been mostly about health and ICT sector cooperation, we can only observe first examples of full converged cross-innovation practices. The manifestation of, as it were, identity crises of the new convergent fields also indicates that the cross-sectoral dialogue and the emergence a new convergent domain is still in its very early stage where the central question is whether the new rules are attractive enough for others to adopt, as discussed by Ibrus in Chapter 2.

Second, the main challenges for more intense cross-sectoral cooperation between the health and AV sectors have had a path-dependent character. The 'easy' conclusion is that these sectors are not used to cooperate and that is why they are still learning to know each other: their languages, needs and practices. Still, in the case of the health sector, the 'club-mentality' or the very strong 'usness' of the sector is an important hindering factor for cross-boundary communication. In addition, co-innovation with the health sector presumes also coping with peculiar limiting factors: for example data security, user involvement,

hygiene requirements, which often make the cooperation more expensive and time-consuming. As to the AV sector, the main challenge is how to overcome their approach to innovation as intra-sectoral phenomenon (that particularly applies to the Estonian case) where innovation is predominantly understood as a new AV product, film, video game, etc.

Third, the exploration of Estonian and Aarhus region cases explicitly demonstrates the importance of creating systemic support to facilitate cross-innovation processes. As evidenced above, in Denmark the authorities in the public and private sector have over the years developed several targeted programmes that support cooperation and co-innovation between the two sectors. In Estonia, these types of intervention practices have been rare and the existing measures tend not to work. Based on the Aarhus case, we may argue that at least one of the reasons for that is the low readiness of the Estonian AV sector to enter into dialogues with other sectors. The second reason is that sectoral educational and research institutions have not been given roles in the potential cross-innovation system. Higher education institutions have a central role in Aarhus regional cross-innovation systems and this may explain why in Aarhus there is more cooperation and higher convergence – joint R&D and educational activities provide further motivation for cooperation. The new converged solutions tend to be knowledge-intensive.

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Chapter 10

Micro-trajectories: Small Firm Strategies at Boundaries between Audiovisual and Health Care Sectors

Mikhail Fiadotau, Külliki Tafel-Viia and Alessandro Nanì

Abstract

This chapter focuses on the micro-contexts of cross-innovation between digital audiovisual media and the health care sector by examining two cases, both start-ups working on virtual reality-assisted rehabilitation solutions. Through a discussion of the two cases, this chapter aims to elucidate the broader dynamics of digital health care as experienced by innovators seeking to contribute to it. It addresses the challenges faced by innovators, including the lengthy and costly nature of medical licensing, the inflexibility and fragmentation of pertinent regulations, and health care institutions' and insurers' resistance to change. It also highlights the importance of networking and the emergence of digital health care as a distinct and increasingly visible epistemic community, while touching upon the tensions between the public and the private sectors as a target market for innovators.

Keywords: Digital health; e-healthcare; rehabilitation; virtual reality; telemedicine; cross-innovation

Introduction

Public and academic interest in the potentialities of screen media being used in health care has grown in recent years. At the same time, integrating digital and media-based solutions with the daily realities of health care still poses numerous technological, legal, and institutional challenges (Farahani et al., 2018; Schweiger,

Sunyaev, Leimeister, & Krcmar, 2007). While much of the research into digital health care (including Chapter 9 in this volume) has focused on its regional, national, and institutional dimensions, this chapter aims instead to shed light on the micro-level: the experiences of actual innovators who develop digital health care solutions and attempt to deploy them. To that end, it will focus on two cases, both covering virtual reality (VR)-based rehabilitation solutions that received seed funding through the Cross Motion project. The data for the cases have been collected through a series of interviews with two members of each team, spanning approximately seven months in each case. The concluding section at the end of the chapter will identify the differences and commonalities in the two cases and discuss their significance for the wider landscape of digital health care.

Case 1: Virtual Reality Rehabilitation in Elderly Care

Ming came to Finland to study Computer Science. Impressed by the country's wealth of opportunities for start-ups and innovative projects, she started attending various hackathons and conferences on innovation. It was during one of these events that an idea for her own project occurred to her. She learned that a friend's grandmother was having health problems and required regular exercise to recover. As a software engineer, Ming envisioned a technology-driven solution: a product that would help elderly people, especially those with limited mobility, exercise physically and mentally while immersed in relaxing VR environments. This would allow them to enjoy a more active lifestyle with lower risk of health complications. It would also keep track of users' performance and progress. This product, Ming thought, could be sold to nursing homes, while services such as training and consulting could make for additional income. Such a product might also have an appeal in Ming's native China, where millions of senior citizens are faced with the challenge of keeping fit and nursing homes are willing to adopt new technology to improve their effectiveness.

After pitching her idea at several events, Ming was approached by a doctor in a local hospital who was willing to help her test her product on elderly patients undergoing rehabilitation. At another hackathon in Helsinki where Ming presented her idea, she met Hanna, a marketing and sales specialist. Hanna was intrigued by the project, as she had an elderly relative of her own who she thought would benefit from it. She also had a long-standing interest in health care and felt that her then job in banking did not contribute to society in a meaningful enough way. Hanna also perceived a global pattern: while life expectancy across the globe was steadily increasing, there was still a shortage of good services for the elderly despite the rising demand. Ming's idea, in Hanna's view, could result in one such service. After several months of being in contact, Ming and Hanna decided to pursue the project full-time and founded a company to that end. They joined the Finnish VR Association and started user-testing and looking for funding opportunities, one of which happened to be Cross Motion.

Initial user-testing at a local hospital was encouraging, while also highlighting some considerations regarding content design. For example, elderly users seemed to respond better to 360-degree videos than they did to computer-generated 3D environments; they also preferred dimmer colors and less intense motion and activity. At the same time, Ming and Hanna worked with health care specialists to make sure the content was both useful and safe.

Soon, the company's business model began to take shape: as a small company with limited resources, they would focus on creating a platform, or an "ecosystem," rather than content. Individual exercise routines could be co-created together with third-party content providers and integrated with the ecosystem.

They would also seek to promote the product both in Finland and in China. This meant localization of the platform and the contents which went beyond mere translation, due to significant cultural differences between the intended users (it would also require additional user testing in China). While Hanna focused on talking to investors and clients in Finland (both because of her background and because she was a Finnish speaker), Ming would make trips to China and speak to interested parties there, trying to build connections, which are a prerequisite for market access there.

When I asked Ming and Hanna about the challenges they faced when working on the project, both mentioned cultural and linguistic differences within their own team. Ming felt that the duo's different cultural backgrounds sometimes made communication more difficult, while Hanna acknowledged that language issues could at times slow things down. While investors generally spoke English, many other partners in Finland preferred to communicate in Finnish, leaving Ming out of the conversation (although Hanna would provide summaries and translations afterwards). Conversely, having a native Finnish and a native Chinese speaker was also an advantage, enabling easier access to local markets, especially in China where it would be difficult for a foreigner to advance an idea without having relevant connections.

Other cultural factors were at play too. For example, Ming discovered that the personnel in Chinese nursing homes often had a fear of losing their jobs to technology, which made it difficult to discuss VR solutions with them. Another concern was that of information protection: Ming made sure to deal only with trusted partners, for fear of her idea being hijacked by copycats, which is a common issue in the region.

Working with elderly people presented its own set of challenges. Many test users had little experience with technology and needed training in using VR gear. This also meant it took many iterations of user testing to arrive at the level of usability and intuitiveness that would make the technology accessible to senior users. As Hanna pointed out, elderly people did not know what they wanted, so it was her and Ming's job to come up with ideas for them. This also meant that, in addition to the arguments used to promote the solution to nursing homes and clinics, a separate set of arguments needed to be developed in order to convince the elderly patients themselves of the benefits of the technology.

The limited resources at the team's disposal made it difficult to plan for the long term, due to the need to continuously look for funding. At the same time, the company needed to constantly monitor their competition, as VR and AR solutions for health care were emerging at an ever-faster rate.

It also became increasingly evident that Finland, or even Scandinavia, was too small to be a viable first-choice market (especially given that each of the Nordic countries has its own language and legislation, resulting in barriers to rapid expansion). The team thus decided to refocus on the Chinese market as their primary target.

When asked about the role of start-up incubators and projects like Cross Motion in the development of their product, Ming and Hanna stressed that apart from the funding, the importance of these events was as opportunities for networking. Connections to researchers, medical practitioners, potential investors, and other start-ups had been vital to their project's survival. While some of the training they had received had focused on such useful aspects as legislation and negotiation, Ming wished there had been more team-building exercises and match-making opportunities. She also felt that there was not enough discussion about how innovative projects such as theirs could enter "traditional" markets such as health care, where people and institutions remained hesitant to adopt new solutions.

Ultimately, after running out of funding, Ming and Hanna's project stalled, despite promising negotiations with potential partners and investors. The duo fell apart, with Hanna moving to a different job, also related to technology and health care. The company's social media accounts stopped being updated, and the website went down. While there is still hope for a reversal in fortunes (there does exist a functional prototype and more than one market to pitch it), the current plight of the project seems to typify the trajectory that many a promising start-up follows, undermined by a shortage of funding, staff volatility, and intense competition.

Case 2: Sports Rehabilitation Using Virtual Reality Technology

At about the same time as Ming and Hanna were busy honing their prototype and talking to investors, Taher, a recent medical school graduate in Germany, was conceptualizing his own VR rehabilitation solution.

Coming from a family of computer scientists, Taher had a long-standing interest in technology, which he wanted to use to improve people's lives. As a student in medical school, he felt that innovative technology could offer many improvements to both medical training and health care itself, but he also felt that the sector was not particularly quick to innovate. This perception deepened during a six-month stint at a local hospital following graduation, throughout which Taher tried to promote innovation in treatment to his superiors. The response he received did not, however, match his own enthusiasm, leading him to abandon his effort and, soon after, the hospital itself.

"I worked up to 60 hours a week and had little time for self-development," Taher explained. "And in any case, I felt I was an average doctor in conventional medicine. But I could be great at lifestyle medicine and alternative medicine."

Following his departure, Taher briefly tried running an acupuncture business (he had studied acupuncture for one year while working towards his conventional medical degree). While that undertaking did not pan out, it did help him learn some practicalities of business planning.

Ultimately, Taher decided to refocus his attention on a start-up idea that he had been conceptualizing for several years and that was inspired by his personal experience. When Taher was 16, he ruptured his knee tendon during a football game, leading to a short spell in rehabilitation. It then transpired that his insurance only covered a few weeks of rehabilitation sessions in the hospital, which was a much shorter span of time than what was needed for a full recovery. When his insurance coverage ran out, Taher had to continue to exercise and train without much supervision, at the risk of overexerting and aggravating his injury, until eventually he reached full recovery. This experience was what sparked his interest in medicine in the first place, and sports medicine in particular. During his studies, Taher even undertook an internship at a famous knee clinic in Switzerland.

Now, as a free agent, Taher wanted to create a solution to improve patients' rehabilitation experience by tracking their progress, providing guidance, and compiling data on their performance. The solution would use VR and track the user's body position and movement, offering a set of exercises with real-time feedback on key factors ranging from body balance to whether the exercise is performed correctly. Importantly, the solution could be used at home and would involve no operating costs. This, Taher believed, could help ease the burden on both hospitals and insurance companies.

Confident in his idea and buoyed by his existing project experience (he had worked on two student projects, one focusing on reducing anxiety associated with public speaking and the other offering free health checks to the homeless), Taher set about finding partners who could help the project. He attended numerous start-up events. At one of them he met a recent university graduate with a background in business, who agreed to come on board as a co-founder and business, consultant. At another event he approached the representatives of a technology company with experience in VR development, who expressed their interest in collaborating on the project. His networking efforts paid off further when he met the chief doctor of a major German football club, who had been looking into ways to optimize footballers' post-injury rehabilitation. The doctor was immediately intrigued by Taher's project and introduced him to the club's medical facilities. Through this encounter, Taher found both another co-founder and a potential customer.

As his team was taking shape, Taher also managed to procure funding for initial development, offered by the Hamburg Film Fund as part of Cross Motion. Following their moderately successful experience with an AR application focused on film tourism (as described in Chapter 14), the Fund began looking to extend their sphere of influence beyond cinema – a trend started by a few

other German film funds – and Taher's project seemed sufficiently innovative, promising, and local for the Fund to offer its support.

Taher, in the meantime, continued to promote his idea at various events and reached out to clinics in the area, several of which agreed to cooperate on clinical studies of the product. He also managed to recruit a former Microsoft executive and a renowned professor to the advisory board of the project. The project also landed a top three spot at the Hamburg Innovation Awards, although Taher was quick to play down the competitive dimension of his work.

While Taher's experience in general seems to have been smoother than that of Ming and Hanna, it was not without its challenges and stumbling blocks. Halfway through discussions with hospitals and the football club, the co-founder of the project announced his departure, choosing to pursue a graduate degree abroad. This meant Taher had little time for adjustment and was thrust into learning to deal with the business aspects that he had previously relied on his co-founder's expertise for.

Bringing the project's vision to life also hinged on the team being able to overcome several challenges posed by the innovative nature of the project's use of VR. It was crucial that the app's tracking of the user's movements was highly accurate, and its feedback was easily comprehensible: if either condition were not fulfilled, the patient could end up aggravating their injury instead of healing. Due to the scarcity of existing expertise in the field, there was no other way to accomplish that than through a thoughtful collaboration of a heterogeneous team of medical professionals, designers, and developers, supported by multiple iterations of user testing.

A longer-term problem was obtaining the medical certification necessary to operate in the German health care market and gain recognition from insurance companies. Even after conducting the clinical studies, the certification normally takes two to three years and is very costly, especially for a start-up with limited funding. At one point, the challenges involved in the certification process nearly led the project to drop out of Cross Motion and dissolve. However, the timely encounter with the football club doctor helped Taher realize there was another business model and another target audience to pursue. Instead of a business-to-customer model aimed at the general public or a business-to-business model focusing on hospitals or insurance companies, Taher decided (at least initially) to target professional sports clubs and gyms and expand the focus of the product to preventive care. Not only would the changed focus help work around the challenge of obtaining certification, but it could also help the solution expand beyond the German market, which would otherwise be difficult due to the different regulatory and legislative frameworks even within the European Union. And such international expansion was part of Taher's future vision, since, as he put it "everyone loves German products."

Operating in a fast-developing and competitive industry produced an additional pressure to keep the scope limited and focus on going to market as soon as possible. "Speed is king," summarized Taher, reflecting on both the need to be ahead of the competition and the limited resources, including time, that a recently conceived start-up has at its disposal. At the same time, Taher was eager to emphasize that competition is not necessarily a bad thing and can be constructive for the parties involved, pushing them to deliver more innovative and functional products faster.

Conclusion

For all the differences in the two projects' circumstances, Ming and Hanna's story also shares many commonalities with Taher's experience. Despite being an "insider" to the health care sector by virtue of his training and work experience, Taher, much like Ming, perceived the sector's institutional resistance to change. Promoting innovative audiovisual (AV) technology, at least at the level of individual hospitals was, in his experience, a challenging endeavor. This mirrors existing research on implementing technological advancements in health care, which has indicated that such endeavors are necessarily long-term projects whose success hinges on an accompanying "technology legitimation project that addresses the new technology's legitimacy with different project stakeholder groups" (Bitektine, 2008, p. 28). This challenge can be exacerbated, as discussed in Chapter 9, by the "club mentality" of large institutions and players, which makes it difficult for an up-and-coming start-up to approach and negotiate with them. A further challenge arises when the innovative technology is likely to lead to a change in the existing professional roles, putting it at odds with existing "scripts" and thus leading to suspicion (Margulies, 1992), which is what Ming experienced first-hand when observing Chinese nurses' fear of media technology overtaking their jobs.

The difficulty of promoting digital and screen media-based innovative solutions in health care underscores the importance of interpersonal and interorganizational networks, which provide access points to institutions and connect innovators to resources and pools of talent necessary to accomplish their projects (Barnett, Vasileiou, Djemil, Brooks, & Young, 2011; Pittaway, Robertson, Munir, Denyer, & Neely, 2004). Ming, Hanna, and Taher all emphasized the importance of networking with health care professionals, investors, and fellow innovators. Opportunities to interact with a diverse body of peers are crucial, as access to heterogeneous knowledge networks leads to increased possibility of recombination, which can result in further innovation (Hargadon & Sutton, 1997; Simard & West, 2006); at the same time, it provides an opportunity to keep an eye on the competition (Pittaway et al., 2004).

A major sector-specific challenge lies in the lengthy and often costly process of medical certification and licensing, which can significantly slow down a product's path to market, which is already slower than in other sectors due to the need for clinical studies. In the ultra-competitive, rapidly evolving and volatile market for technological innovation, the years it takes to bring a product to market could prove the greatest hurdle in the way of health care-orientated solutions.

In addition, despite the increased legal recognition of digital apps and media-based solutions apps as medical devices (Boulos, Brewer, Karimkhani, Buller, & Dellavalle, 2014), the regulatory frameworks surrounding medical technology are still often perceived by innovators as restrictive (Cresswell, Cunningham-Burley, & Sheikh, 2017). Furthermore, regulations pertaining to medical technology and health products are different across nations, and even in economic blocs that harmonise medical technology approval such as the European Union, the member nations' health care systems function independently and display considerable specificity (Legido-Quigley et al., 2008), making it difficult to

rapidly expand into international markets. While this is particularly problematic for smaller markets such as Finland, where it may lead innovators to target bigger markets (as happened in Ming's case), larger countries such as Germany can pose their own challenges due to the varying regional regulations and practices.

At the same time, the health care sector has become increasingly receptive to innovation. This can manifest in different ways: from companies pitching their innovative solutions to medical institutions, as in the cases described above; to health care institutions themselves approaching the information and communication technology and media sectors (see, e.g., the discussion of the Estonian case in Chapter 9). The proliferation of health care-related innovation has also led to the emergence of a distinct epistemic community around it, whose members expressly identify as working at the intersection of health care and digital/AV technologies, particularly VR. Building on the existing history of telemedicine, this community is increasingly institutionalised and culturally visible, as evidenced by the numerous events dedicated to VR in health care, growing media coverage, and even the emergence of academic journals such as *Digital Health* and degree programs, such as the BSc in Healthcare Technology Engineering offered by Aarhus University in Denmark.

As previous research (e.g., DePasse, Chen, Sawyer, Jethwani, & Sim, 2014) indicates, several medical centres around the globe have sought to engage with the digital health community, paving the way for its further integration into the landscape of institutional health care. Taher clearly identified as a member of that community, seeking to establish a presence in it and contribute to its activities. Hanna and Ming, on the other hand, seemed to identify more with the wider VR scene, being indeed members of the Finnish VR Association. They did not appear to be aware of a larger digital health organisation in Finland, pointing to a possibility that in smaller nations such a community has not yet taken root.

Importantly, despite the growing importance of digital health solutions, there are no global, universally adopted platforms on the market at the moment. Unlike other sectors such as tourism, where major digital platforms such as Airbnb and TripAdvisor have consolidated a large part of the market, digital health, perhaps by virtue of the very challenges outlined above (and the inherent complexity and diversity of the field itself), has remained segmented and open to new solutions, offering opportunities for the likes of Ming, Hanna and Taher to realise their own visions. Yet, increasingly, the top global platforms are also investing in health media and analytics, and innovators and innovation systems in small countries need to prepare for this prospect.

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Chapter 11

Conclusions: Cross-innovations between Audiovisual and Health Sectors

Indrek Ibrus and Külliki Tafel-Viia

Abstract

This chapter concludes the section on cross-innovation practices between audiovisual (AV) media industries and the health care sector. It suggests that the main case studies discussed in this section – Estonia in general and Aarhus Region in Denmark – tell of two different trajectories on how the emergence of cross-innovation systems can be facilitated by policies. Local policymakers in Aarhus have worked systematically to raise awareness and facilitate contacts between AV media and other sectors and this has resulted in an active start-up scene at the intersection between the media and the health care industries. Estonia, which is focusing on traditional cultural policymaking, has not recognised similar dynamics. Yet, Estonia may be still better prepared for the (global) platformisation of e-health services with its national e-governance systems, while Denmark's health-related e-services remain fragmented and ripe for platformisation by multinationals, potentially undermining local cross-innovation systems.

Keywords: Cross-innovation; convergence; audiovisual industries; health care sector; platformisation; virtual reality

The Forms

What did we learn from the previous three chapters? First, that the road to current experimentation with new mediated forms of medical care has been evolutionary. Newspapers have always written about health, including giving guidelines for healthy life and self-care. Yet, it was 40 years ago that Crawford

(1980) recognised the emergence of 'healthism' – effectively another expression of the then expanding individualism. As Crawford saw it, the explosive 'proliferation of popular health magazines, and the appearance with amazing frequency of health themes in newspapers, magazines, and advertisements' at the time was due to a perception, especially among the middle-class, that growing insecurities in the evolving market capitalism and the general failure of public health policies meant that responsibility for their health needed to lay with them as individuals. And so, it has evolved. In addition to health magazines, television programmes promoting health quickly started to develop (Long, 1978). Yet, while in mass media outlets the health-related content and genres have been growing in prevalence over the decades, this can be considered as mere cooperation between the sectors, since the media have mainly been used for health promotion. While 'healthism' may be seen as a form of mediatisation affecting the work of medical institutions, the classic mass media genres did not constitute notable innovations that directly involved both sectors and significantly affected their operational models.

Things gradually started to change with the emergence of telemedicine and social media. Telemedicine could be understood as 'substitution' in terms of Schulz's (2004) forms of mediatisation; mediation, forms, and techniques of media are used to substitute some of the functions of health care. While the early forms of telemedicine were used simply to monitor, diagnose, and counsel care, in the early 2010s, new interactive (mobile) applications started to emerge, gamifying rehabilitation, healthy living, and self-care. These applications could be understood as 'amalgamation' in terms of Schulz; media use is woven into the existing practice of health care such that the media's definition of reality merges with the realities of that practice, creating an entirely new form. With regard to further individualisation and self-care, the quickly advancing phenomenon was 'Doctor Google', YouTube, and other video-sharing platforms, which are used for showing, sharing, and looking up self-care solutions. While such searching and sharing practices are socially significant phenomena, they are not the focus of our study. However, they could be seen as being indicative for media and health industries, since more participative and interactive solutions found wider adoption.

At the time of our field research in 2017 and 2018, especially in Aarhus (Chapter 9), nearly all the examples of cross-innovation between audiovisual (AV) media and health care that we encountered had something to do with virtual reality (VR). This new technological platform for media content motivated new kinds of dialogues between the two sectors and created new opportunities. According to Dopfer and Potts (2008), the technology offered a potential for 'new rules' to emerge between the AV and health care sectors. As our respondents suggested, VR and augmented reality (AR) were seen as new possibilities, attracting interest from all sides. That these technologies are forming a foundation for new rules is evidenced by the fact that they attracted start-ups only; no established film, media, or video-gaming companies have got involved.

The Dialogues

Due to their nature and their effectiveness, these dialogues enabled the coordination of an emergent cross-innovation system. The two case studies – Estonia and the Aarhus Region in Denmark – which were discussed in Chapter 9, constitute a notable narrative. Denmark is well known internationally for its AV industries (see also the discussion in Chapter 3); the Dogme 95 school has won recognition and been copied internationally. Nordic noir as a television subgenre (*The Killing* and *The Bridge*) and other television series such as *Borgen* or *Anna Pihl* have earned international fame for Danish television professionals. Denmark is also one of the strongholds for animation. The latter aspect puts Aarhus, the second biggest city in Denmark, on the map. The country's main animation school is in Viborg, a town close to Aarhus. Aarhus itself hosts the country's main journalism school and a college that runs a programme on transmedia storytelling. The city also set up 15 years ago *Filmby Aarhus*, a hub of shooting studios that also includes rental places for AV media companies. *Filmby Aarhus* operates effectively as a set of programmes, incubation, acceleration, and networking initiatives, all aimed at finding new markets and operational models for the local AV industries.

As evidenced in Chapter 9, the policymakers in Aarhus recognised the accumulation of talent in AV storytelling in their region and in Denmark more widely, and facilitated their cooperation with other sectors to support new businesses. The two chosen sectors were tourism and health care. These inter-sector initiatives were preceded with notable local investment in cross-media and transmedia storytelling and via these experiments, an awareness grew of the potential of using storytelling skills, for instance, in health care (see, for a locally developed rehabilitation game, Dithmer et al., 2016). Subsequently, significant effort went into bringing the two sectors together to build mutual awareness and to facilitate learning about the needs, peculiarities and skills of each other. This has been happening via a series of workshops and networking events, and also via seed funding for various start-ups working in these specific cross-innovation areas. In terms of Lundvall (1992), this occurred through various publicly driven initiatives to enhance interactive learning between the sectors. The outcome of this, described in Chapter 9, was the eventual explosion of start-ups that experimented mostly with VR as a platform to offer services mainly related to primary care, rehabilitation, and simulation for use in medical training. These start-ups could be understood as 'true cross-innovations' or 'new rules' in terms of Dopfer and Potts (2008). These emerged as new rules since they were entirely new organisations and not extensions of pre-existing solutions or institutions. Their emergence, effectively as a small regional cross-innovation system, was facilitated by *Filmby Aarhus* and other local policymakers, and, in the initial phase, this has been a notable success for them.

In contrast, the situation in Estonia has been rather different. As a post-socialist country, it has been building up its own film industry since the early 1990s. This development was slow at the beginning but was boosted with the opening of the Baltic Film and Media School, a college of Tallinn

University, 13 years ago. Together with other measures and support institutions that were launched, Estonia's film sector has grown rather quickly in recent years. The relative success has been evidenced with a couple of foreign language Oscar and Golden Globe nominations. The policy focus has been firmly on the professionalisation and strengthening of the local film industry (Ibrus, 2015). For television, the only policy goal relevant here has been to secure funding for the public service broadcaster ERR, which also produces health-related programming and is known for experimenting with cross-media output (Ibrus & Merivee, 2014; Ibrus, Rohn, & Nanì, 2018; Nanì & Pruulmann-Vengerfeldt, 2017). Additionally, but with very little policy intervention, in the last 5 years there has been visible growth in the production of mobile casual games and the related clustering of their producers, usually small start-ups. However, the focus of the self-organising umbrella organisation IGDA Estonia is mainly on strengthening their bottom line through the production of mainstream, entertaining games.

Yet, unlike Aarhus, in Estonia the cooperation is driven by the health care sector. At least it tries to. In 2015, Estonia's health-tech cluster Connected Health was established. It has systematically looked for cooperation and mutual learning opportunities with the communications and media sector. While the broader communications sector has responded to these calls, the AV industry has not taken notice. As we saw in the interviews with Estonian filmmakers and television professionals, and even with policy-makers from the media and creative industries, the potential for working and innovating with other industries has not been realised. For filmmakers, the main motivator is their next film. In other words, the policy attention has been mostly elsewhere, on the (auto-communicative) codification of distinct creative industries (film, television, and mobile games), which has come at the expense of inter-sector dialogue, interactive learning, and the development of mutual awareness. As a result, there has been no comparable emergence of new start-ups working on finding convergence between the media and the health care sector.

Despite the differences between our case studies, there were also notable similarities and common threads in the inter-sector dialogues. For example, there were difficulties deriving from the distinctive culture of the medical community and its relative lack of openness. The professionals with a background in media or IT had difficulties selling or pitching their products to hospitals, as they did not speak the 'language'. Related was the aspect that was demonstrated in both Chapters 9 and 10: the tight regulation of the health care sector often limits the possibilities for quick interchanges, easy forms of learning, quick prototyping, and instant entry to consumer markets. Convergence in this area is hard and requires effort, as dialogues and co-innovation between these two sectors have had limited precedents and there is a lack of trust and mutual understanding. Thus, our interviews in Aarhus evidenced a new strategy among the new VR health companies: to include a health expert or a cooperation partner at the earliest phase of development.

Plurality and Fluidity of Innovations

As Tidd and Bessant (2009) have demonstrated, the first phase of every new solution or innovation is fluid. This is the time when innovations are motivated by either new technologies or new information (for instance, user needs). Many competing solutions may be entering the market, there is no standardisation and production processes are flexible and ineffective, often experimental. We recognised the same trends in Chapters 9 and 10. Many of the start-ups and their innovations were motivated by VR technology, but also by the possibilities of combining various kinds of expert knowledge. However, there was already a significant amount of competition from Denmark, Finland, and Germany. As all the innovators in this area were start-ups, their production processes were flexible, but also ineffective. There were recurrent significant changes in product features, and in business and operational models. Some enterprises were working on solutions for primary care, others on rehabilitation or medical education. Some aimed at end-user markets, some at hospital markets, and some found alternative business-to-business markets. However, overall, finding feasible business models in highly regulated, but also highly fragmented markets was a challenge. As we learned from Aarhus, all these newly emerging start-ups are competing for the small amount of mostly public seed funding. Clear success is still to be seen. This means that we could not identify forms of auto-communication for these kinds of enterprises. While in Estonia, for instance, a health-tech cluster has been set up, it was a top-down initiative and not much was articulated in their discourse on the necessary knowledge and skills of AV media professionals. A bounded VR health subsystem is still to emerge. However, the clustering of innovations and companies around VR technologies is still notable, suggesting that their affordances are suitable for use in health care and that there is, therefore, a potential for future trajectories.

Social Network Markets?

As was discussed in Chapter 2, in cross-innovation systems, much of the border crossing is expected to be carried out by agents whose belonging or status are unclear. They may be professionals in one or other sector, they may be semi-professionals, or they may be amateurs, users, or fans. What matters is that they form a social network that coordinates all phases of the innovation trajectory – origination, adoption, and retention (in terms of Dopfer & Potts, 2008). Their filtering, reuse, modification, and feedback practices across their networks constitutes a crucial innovation coordination mechanism. However, our study highlights that the nature of this coordination is, in practice, notably different between the origination and adoption phases and both are quite specific for health care. This cross-innovation area is mostly in the fluid origination phase. That is, in terms of end-user markets, only early adopters (mostly those in need and selected patients) are engaged, and most of the users are not operating with at least semi-familiar product or service categories. Therefore, the related social network market (Potts, Cunningham, Hartley, & Ormerod, 2008) is constituted

at this stage mostly of colleagues of innovators and of test patients. The colleagues, however, may have backgrounds in different sectors, as we have seen above. Patient safety is, of course, the ultimate goal in health care and, therefore, user testing is highly emphasised in regulations and was referenced in our interviews. Cleary visible in the early stage projects was the strong articulation of involving users as co-developers. Users were seen as active agents in the shaping of a project.

Such practices suggest that while for the developers in small northern European countries, for instance, the VR technology came as 'manna from heaven' – externally from outside the local system – it is now actively adapted and modified for locally relevant use cases. Yet, it remains to be seen if such social networks can be expanded such that they would help to facilitate the wider adoption of particular convergent solutions.

International Growth and Platformisation?

As we discussed above, the coordination of the new cross-innovation system in Aarhus emerged as an exemplary case. Yet, the future potential of the resulting applications and the companies that produced the applications were also questioned in Chapter 9. The doubts were due to the extreme fragmentation of the health care policies between different regions and countries, and also in terms of the heterogeneity of regulations, conventions, and other set-ups in different hospitals and, most importantly, the fragmentation of the IT systems and the data schemas used in these hospitals. This was the case in Aarhus and is the case in most of Scandinavia and other countries. Given such fragmentation, it is hard to build services that are easily scalable and that one could export and offer internationally. As evidenced in our interviews in Chapter 9, this affected the motivation of start-uppers in Denmark as well as that of the local policymakers funding their experiments and prototype development.

In this context, however, Estonia stood out. The country is known for its exceptional e-governance systems and its digitisation of most public services, which include national e-health services. This is what the government website says about these services[1]:

> Each person in Estonia who has visited a doctor has his/her own online e-Health story that can be tracked. Around 1.6 million people have documents in the central database. Health Information System integrates data from Estonia's different healthcare providers, creating a common record for each patient (since 2015, over 95% of data generated by hospitals and doctors has been digitised, 97% of hospital discharge letters are sent to the central database). This gives the doctors easy access to the patient's electronic records (test

[1]See further: https://e-estonia.com/wp-content/uploads/facts-a4-v02-e-health-2.pdf

> results, X-ray images, etc.). Patients have access to their own and to their under-aged children's records, and the records of persons who have given authorisation to them for seeing their medical data. By logging into the patient portal (ID-card/ m-ID), they can review past visits to the doctor, current prescriptions, and receive general health advice.

That is, there is a standardised and secure national data-exchange layer used by citizens and entitled medical institutions. Data are there, comprehensive and detailed, about each patient and ready for aggregation across the whole population. As we learned from the interviews in Chapter 9, all these data and the whole system are ripe for being used by innovative applications, especially for additional monitoring, analytics, and guidance, particularly in primary care and rehabilitation. Yet, as was discussed above, this potential has not been noticed among the makers of digital content, game developers, etc.

This difference between our main case studies – Denmark and Estonia – evokes a discussion on the possible platformisation of e-health services and what would that mean for the related (cross-)innovation systems in small countries. A fragmented system could be ripe for an external and standardised platform to take over patient-related services, providing further personalisation opportunities and interactivity. Moreover, such a platform could collect data on a population and sell it to interested third parties (e.g., consumer retail businesses or insurance companies). However, also the standardised Estonian national data could be used by the existing platforms, as it is simply available and there are no local developers of over-the-top (OTT) services.

Are such scenarios feasible? First, note that while the health care sector in European countries is generally driven by the public sector, the number of various kinds of public–private alliances is increasing. The health sector is chronically underfunded and needs resources for expensive technological and pharmaceutical innovations. Partnering with private partners has often helped to bring in necessary resources and the new promise may be tantalising for the same reasons. Yet, the risks are also apparent. As has been demonstrated by van Dijck, Poell, and de Waal (2018, p. 98), health platforms tend to use a peculiar double-edged logic in arguing for their benefits. On the one hand, they offer personalised data-driven services to their customers; on the other hand, they claim to serve an overarching public interest in medical research, the outcomes of which benefit everyone. What is at stake here is a conflict in the public values claimed: 'The concern for privacy versus the benefit of personalised medicine and the privatisation of data by corporate owners versus the accessibility of health data and knowledge to public research' (van Dijck et al., 2018, p. 98).

These are difficult conflicts and challenging dilemmas for all contemporary and future policymakers. One can also agree with van Dijck et al. (2018, p. 99) that while issues such as privacy, transparency, and accuracy may have become central in this discussion, they risk eclipsing other important issues, such as who will be able to access the health data and who will set the agenda for future

research. Should we trust the global platforms to guide much of health research in the future? Or, closer to the themes of this book, can we trust them to do the localisation well and can we trust them to contribute usefully to the national and regional innovation systems? As we discussed, based on Lundvall in Chapter 2, such positive contributions would be rather unprecedented. Therefore, while the Estonian-style national data exchange infrastructures are a prerequisite, the broader aim should be to keep health data accessible and reusable, not only for independent public research but also for cross-innovation – by local small and medium-sized enterprises able to contextualise the services in local cultures and able to provide new and relevant experiences. After all, as was also discussed in Chapter 2, the diversity of institutions and the diversity of their objectives and operational rationales are further prerequisites for a healthy innovation system.

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Chapter 12

Audiovisual Industries and Tourism: Forms of Convergence

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Abstract

This chapter discusses the various ways in which audiovisual (AV) media industries have cooperated with the tourism industry and explores the emergent areas for cross-innovation. It demonstrates the gradual mediatisation of tourism, but also how the added value from location tourism has started to affect, for instance, the operation of the film industry. It then discusses the emergence of tourism gamification that came about with the arrival of smartphones equipped with an ever-increasing variety of sensors relevant to location and mobility awareness. The chapter finishes by discussing the affordances and forms of augmented reality being used in the service of the cultural heritage sector and the broader tourism sector.

Keywords: Augmented reality; mixed reality; gamification; tourism; cross-innovation; audiovisual media industries

Film and TV Cooperation with Tourism

The history of audiovisual (AV) industries – more specifically film and television – cooperating with tourism is long. Tourism destinations have been advertised on TV since the earliest days of commercial television. Also, travel has been an established TV genre for decades, having historically emerged out of travel literature (Parsons, 2007), travel journalism and anthropological films (Waade, 2009). In the contemporary era, the evolving high visibility of the travel series as a genre could be linked to the growth of lifestyle programmes (Hill, 2007) that in turn could be associated with the broader evolution of the

experience economy. The genre as it stands could be seen to combine elements from TV ads, factual entertainment genres, documentary or ethnographic films, educational programming, cooking shows, talk shows and game shows. Such hybrid formats are increasingly developed by specialised international TV channels and production companies such as Travel Channel, Discovery Channel, Pilot Production and BBC Lifestyle. This suggests also the emerging economic importance of the genre. Related to it is the realisation that the format is hybrid not only in terms of combining genre elements, but also in relation to journalistic ethics. Such programmes, especially on smaller channels, often constitute forms of native marketing, co-produced or financed by tourism agencies of various kinds. That is, the evolution of the genre has resulted from steady cooperation between the TV and tourism industries.

Yet, what needs to be realised is that in the mass media era, it was the broadcasters who had the stronger hand in this cooperation. They controlled usually both the means of production and dissemination. In terms of 'media logic', it was their logic that the tourism industries needed to accommodate. In the digital media era, with the pluralisation of channels, platforms and communities, however, the balance has shifted, and it is the tourism industry that often commissions AV content and independently disseminates it on social media, video sharing platforms or elsewhere online.

The balance has been similarly shifting in cooperation between film and tourism industries. Filming locations have been used by tourism industries for providing services for fans since before the Second World War. Yet, this strategy has only emerged as an articulated cooperation strategy between film and tourism industries in many countries during the last couple of decades. Countries, cities or regions either pay or offer tax relief to film productions that produce in their countries or, even better, explicitly place the story in these countries. When James Bond dines in a picturesque Montenegrin town, it is expected to market the tourism experience in this country. As parts of the *Game of Thrones* are produced in Northern Ireland, the local tourism agencies have built an extensive strategy to capitalise on this. Similarly, several cities and towns in Scandinavia are building on the prominence they have acquired through various recent TV series (Ystad, Aarhus, Lillehammer and Malmö) (Dahlström, Hedin, & Olsen, 2010). Other countries such as the Baltic states are looking for similar opportunities as they are offering competitive cash rebates or tax relief systems for foreign productions. That is, much of the dynamics in contemporary film industries are immediately driven by the rationales and activities of the tourism industry.

Forms of Gamification in the Tourism Industry

The newest trend in cross-innovation between the screen industry and the tourism industry is the gamification of the tourism experience with the help of mobile devices. The modern history of gamification began with the loyalty programmes and sweepstakes of Sperry & Hutchinson Green Stamps in the United States in the 1930s. Stamps were sold to retailers, such as grocery stores and gas

stations. The retailers gave the stamps to their customers to reward them for their purchases. Such initiatives were precursors of present-day forms of gamification. The current usage of the term 'gamification' was coined by Nick Pelling in 2003. The British-born video game developer was the founder of the start-up Conundra Ltd. Gamification is the use of game-design elements in non-gaming systems to enhance the experience of users (Xu, Weber, & Buhalis, 2014). Since millennials consume gaming as a preferred form of entertainment, managers in many industries consider gamification to be a crucial strategy for future success (e.g. Zichermann & Cunningham, 2011). Gamification has been continuously incorporated in the domains of health care, sport, fitness and education, but not necessarily with immediate success (Gee, 2005). In the tourism industry, gamification has been a somewhat more slowly evolving trend that, perhaps notably, has roots in media – in various kinds of gamified travel and reality TV shows as described above. There has also been a growing trend in using video game scenery to promote tourism experiences in different countries (Dubois & Gibbs, 2018).

Yet, it was the diffusion and ubiquitous use of mobile devices in everyday life that brought the possibilities for applying gamification in tourism settings to a new level. Tourism organisations emphatically invested in implementing game elements in mobile device applications. Smartphones and tablet PCs involve fast-advancing technologies, altering the parameters of consumer behaviour and business prospects in tourism (Ritter, 2017). Mobile devices are portable micro-technological systems, consisting of a microprocessor and various sensors. Global Positioning Systems (GPS), magnetometer, accelerometer and gyroscope are default hardware elements in most mobile devices. The sensor convergence on mobile platforms has turned the smartphone and tablet (as well as smart glasses) into a form of sensory and situated media. The device 'knows' where it is, in which direction it is orientated, and how it is moved. This opens up potential for communication and exchange and renders possible the invention of novel expressive forms, which dramatically alter the significance of location and place in mediated communication (Liestøl & Morrison, 2015). The combination of mobile devices and location-tracking technologies has also prompted new understandings of space (de Souza e Silva & Frith, 2012), and concerns regarding surveillance (Humphreys, 2013) and privacy (Gazzard, 2011; Hjorth, Pink, & Horst, 2018).

Travel-themed applications aim to increase the motivation of visitors and deepen their engagement with tourist sites. Museums, cultural heritage sites, theme parks, architectural monuments and other tourist attractions can be experienced in new ways by eliciting information from the screens of mobile devices. This form of tourism gamification integrates the gameplay on its screen with the physical locations in tourist sites, transcending the divide between screen-framed and physical experience. Regarding such applications, notably, forms of AV content have had again a driving role – the previously mentioned forms of film tourism have been increasingly remediated and, in effect, innovated by new kinds of mobile applications. One can, for instance, discover the shooting locations of popular films using specifically designed mobile apps for orientation. Other games are about offering location-based

transmediatic extensions, discovering specific additional elements of the stories familiar from TV or films (Ferreira, 2015).

Such applications, for the most part, build increasingly on solutions known as augmented reality (AR). The combination of mobile devices, their location-awareness and AR technologies carries great potential to enhance how tourists experience their travel destinations. Technological advancements in computing, sensor technologies and wireless communication systems paved the way for the integration of AR technology into mobile devices. Although AR has been implemented in dedicated technologies and devices since the late 1990s, for example, as head-mounted displays and mobile laptops, it was the smartphones and tablets that brought this mode of digital technology to mass audiences.

In 2016, AR had its popular breakthrough with the global attention and dissemination of the *Pokémon Go* game, adapted from the popular card game, TV series and console games. *Pokémon Go* can, in principle, be played anywhere on the globe and it is still adapted to the local topography. However, its relationship to local environments is accidental, only conditioned by the algorithmic distribution of Pokémon characters and other inventory of the game universe, all embedded in a version of Google maps with terrain information. Consequently, for the tourist, the game has little information value; wherever you travel you will discover the same critters appearing with no relationship to the local place, its history, sights and experiences. Yet, *Pokémon Go* is the most successful AR game and it demonstrates the two dominant modes of AR representation: mixed reality (MR) and indirect AR. MR combines a live video feed with a 3D graphics layer. This is an attempted implementation of the early AR visions inspired by cyberpunk literature (Gibson, 1995). Nevertheless, in actual application development it has severe deficiencies since the lack of compatibility between 2D video and dynamic 3D graphics gives rise to visual paradoxes, for example, in relationships between foreground and background. The indirect AR mode, on the other hand, avoids this problem by allocating the full screen to the constructed 3D graphics environment and then refers the mixing of real and virtual to the physical frame of the device (Kounavis, Kasimati, & Zamani, 2012; Liestøl, 2011).

By pointing their devices in various directions, users can see an alternative digital version of the place they are in, for example, reconstructions of historical buildings at an ancient cultural heritage site where today only ruins remain. Such alternative perspectives provide digital simulations of the past, not just static buildings but animations presenting actions and events, giving enhanced user experiences of tourist sites. The device then serves as a mobile window to the past enabling individual and personalised explorations of a site's history.

Use of AR at cultural heritage sites aimed at tourism has been experimented with over the past two decades (Vlahakis et al., 2001). These forms usually demonstrate media and genre convergences between travel guides, human guiding, and location-based media. The documentary genre from film and TV also saw early adaptation in experiments with the hybrid form of 'situated documentary' (Höllerer, Feiner, & Pavlik, 1999), which more recently has been applied to AR storytelling recounting historical events on location. Although

such experimentations with (genre) prototypes have proved popular and promising in controlled testing (Liestøl, 2018a), it remains to be seen whether it will manage the critical leap from invention to innovation.

While cross-innovation in various media domains takes often place without explicit rational intent, invention might be achieved based on dedicated methods and techniques. As part of the Cross Motion EU Interreg project, we have experimented with genre mixing/convergence in the combinations of digitised AV-archives, AR and gamification. Our case study was the old town of Narva in Estonia that was destroyed during the final stages of the Second World War. Due to extensive photography of the old baroque town in the interwar period, it is possible to reconstruct parts of the urban structure in digital form. Our question was how may newly digitised historical photographs be combined in engaging ways with AR by means of gamification? In the Narva-project, we followed the techniques of classical rhetoric (*inventio*) to invent (find/discover) novel features and modes of representation, which again could be combined to form new digitally based user experiences on location (Liestøl, 2013). In this case, we explored the tradition of now-then photography or re-photography (which is closely related to the exploitation of AR in cultural heritage settings) and discovered that this practice of visual recording included many game-like features, particularly the re-photographer's urge to find the historical photo's vantage point, the place and orientation of the original photographer (Klett, 2012). Reflections on this activity of finding a position was related to analogue games sharing similar features. This methodological strategy eventually identified the Hot and Cold game and the jigsaw puzzle as relevant examples or 'blueprints' from which features could be extracted and adapted to form the gameplay elements in an AR application. In the current version of the application, the assignment to find the vantage point for six historical photos covering the old town hall square is, when successfully attained, rewarded with a dynamic AV reconstruction of everyday life on the square in the late 1930s, before the town's destruction. Testing this design solution with visitors on location proved unambiguously successful (Liestøl, 2018b). However, as Schumpeter (1939) explained, there is a fundamental difference between invention and innovation – the former does not necessarily lead to the latter, as will be demonstrated in Chapter 13 of this book. The actual success of the application depends on if the local city government, heritage institutions and tourism agencies coordinate its further development, promotion and usage (Figure 12.1).

Tourism Gamification in the Global Age

This chapter discussed the various ways in which tourism organisations have cooperated and co-innovated with AV media industries. As we learned, the most common areas of innovation are various kinds of AR and MR applications and gamification techniques. The combination of mobile devices and game thinking have fundamentally restructured the relationship between host and guest in tourist sites. The heritage industry is increasingly investing in mobile games and is open to integrating innovative solutions from the gaming industry to build on the brands, content and audience relationships cultivated by TV and film industries.

Figure 12.1. The *Old Narva* App in Use on Location. *Note*: The 'photo positioning puzzle' has just been completed and the reward of experiencing the reconstructed square as it was in the late 1930s is on display in indirect augmented reality mode.

On the one hand, the rise of travel and tourism apps has created new business opportunities for local gaming and content industries as well as for enterprises in the local tourism and cultural heritage sector. On the other hand, app stores for mobile devices have constituted global, multi-sited markets for both user data and for generic apps from global providers involving standardised maps, imagery and information on tourist attractions. As global online players are localising their services, it remains to be seen which players – global platforms or local experts – are better positioned to drive the emergent area of cross-innovation.

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Chapter 13

Meso-analysis of Cross-innovation between Tourism and Audiovisual Media: The Case of the Public Sector's Driving Role

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Abstract

This chapter focuses on clarifying the cooperation and convergence between tourism and audiovisual (AV) sectors in Hamburg and Riga. In light of increasingly easier and more accessible travel, the tourism sector is a growing trend in most countries and regions. To what extent does this affect cooperation with the AV sector? The chapter gives an overview of different types of cooperation in these regions and brings out the main obstacles for innovation. When describing the innovation systems, focus is put on institutional frameworks in these two regions. We end by arguing that raising the demand for innovation in the tourism sector is a real challenge and demonstrating that the public sector plays an important role in driving the cross-innovation processes between the observed sectors.

Keywords: Cross-innovation; tourism sector; plaformisation; Riga; Hamburg; innovation systems

Introduction

This chapter carries out a meso-level analysis on how two sectors – specifically audiovisual (AV) media and tourism sectors – cooperate, co-innovate and converge. By 'meso', we refer to a level between micro and macro – an analytic look at specific industries and economic sectors and their operations. To carry out such an analysis, we have carried out 34 interviews in two case cities – the

Hamburg region in Germany and the Riga Metropolitan area in Latvia. These two case studies were selected due to their notable differences, as well as their complementarities. The first one represents a Western city in a large country with long trading and business traditions; the second one is an Eastern European capital city of a small country, where the development of a trading centre was disrupted for 50 years by Soviet occupation.

Hamburg has long traditions as an important trading city in Germany and today, the city is dominated by the maritime industry. But the media industries also play a large role – Hamburg is called Germany's media capital. Besides the long-established publishing houses, such as Gruner + Jahr, Axel Springer, Spiegel, Die Zeit and dpa, Hamburg is also a major hub in the digital-media industry. The global players, such as Google, Facebook, Twitter and Yelp, have set up offices there. Also, the startup scene is vivid – a new booming branch is game development.

According to a representative of Hamburg Tourismus GmbH, the tourism sector in Hamburg is strong. Hamburg is one of the fastest growing tourism destinations in Europe. The tourism has grown from 10% to 12% per year for more than 10 years. The main drivers have been culture tourism, including people travelling to attend musical plays (recently boosted by the opening of the *Elbphilharmonie*); and cruise tourism, which has grown from 250,000 to 800,000 visitors per year within the last 10 years. However, international tourism is not developing as dynamically as domestic tourism; the largest numbers of visitors come from the rest of Germany, as well as Austria and Switzerland. Compared to Berlin or Munich, the number of international tourists is small.

Riga, on the contrary, is the main destination of international tourists travelling to Latvia. In 2017, more than 2 million foreigners visited Latvia, and the majority of them visited Riga.[1] The tourism has increased slowly, but steadily. Yet, in Riga, the development of the tourism industry is still considered to be in its early growth phase. But, more and more businesses see possibilities of attracting more tourists by offering them new kinds of services.

As for the AV media industries, Riga is the main centre for the companies in this sector within Latvia. The main TV channels (both public and private ones) and film companies are in Riga, as well as main publishing houses, advertising companies and the majority of the gaming companies.

Forms of Cooperation

The following section focuses on describing the forms of cooperation between AV and tourism sectors in our two case regions. The study identified several forms that we adapted for a classification of innovations via their objects – the results that the innovations will lead to (OECD, 2002; OECD/Eurostat, 2005).

[1]Latvia's population on the 1st of January 2018 was 1,934,000 – one-third of that population lives in Riga (the Central Statistical Bureau of Latvia).

Table 13.1. Cooperation Forms and Innovation Types.

Form of Cooperation	Type of Innovation
AV content for tourism products	Product innovation
AV tools for tourism product development	Product/service innovation
AV tools for tourism promotion and sales	Marketing innovation
Tourism added value to AV sector	Product/service innovation
Mutual knowledge and skills sharing	Organisational innovation

Most of these forms fall into product-and-service innovation categories and some fall into the marketing innovation category. In general, the tourism sector should benefit more from cooperation with AV sector (see Table 13.1).

AV media, more specifically film and TV productions, has a lot to offer for tourism product[2] development. Popular content has been used for decades to market tourist destinations, even sometimes accidentally – for example, the fake 'Baker Street' of Soviet 'Sherlock Holmes' movies, which were shot in Riga, increased the city's attraction to Soviet and Eastern Block tourists. The unintentional effects, however, proved the emergent trend. As described in Chapter 12, there are a lot of film- or TV-series-based tourism products available in Europe. This was also the case in Hamburg region, our other case study area. Also, next to Riga is the open-air Film Park 'Cinevilla'[3], which is used for shooting films, but is also open for tourists.

Information and communication technology (ICT) development has brought new tools for AV media production and new technical platforms for content distribution, including more recently the virtual reality (VR) and augmented reality (AR) technologies. These new technologies are starting to find their way into tourism products. Mainly, we can see these tools used for developing attractions – innovative stands at museums, AR solutions at historical sites, etc. For instance, *Riga Motormuseum*, after its recent renovation, had novel AV stands and exhibitions installed which used AR technology in innovative ways (for example, looking at a car through a tablet computer, one could see the activated motor and its movements) (Figure 13.1). In Hamburg, this type of example is an old historic site – Hammaburg, the first ring-shaped fortification of the eighth century. The city's business centre is brought back to life through the means of an innovative AR application (Figure 13.2). At the time of writing this chapter, this is an

[2]A 'tourism product' is generally understood as a complete travel stall that consists of a variety of different services, such as the physical environment, the atmosphere, the hospitality of workers, the local people and many other factors. Tourism services, in turn, are accommodation, catering, transport, travel-agency services and tour-guide services.

[3]See http://cinevilla.lv/?lang=en

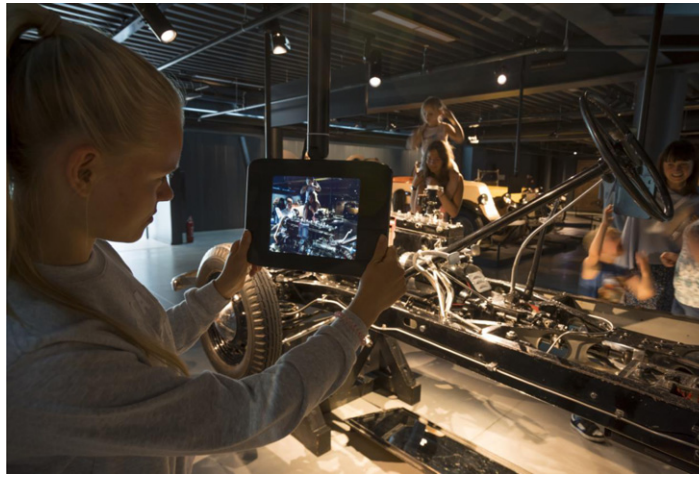

Figure 13.1. Riga Motormuseum – How the Engine Works.

Figure 13.2. Hamburg Today Meets the Eighth Century Hammaburg Fortress. *Source*: © Weiss (2018).

ongoing cooperation project between *Archäologisches Museum Hamburg, HafenCity University Hamburg* and ICT cluster *Hamburg@work* companies. A result of the previous thematic cooperation with Google, a virtual exhibition of the site, titled 'Hammaburg and the Beginnings of Hamburg', is already available as a bilingual app for Android smartphones. This experience shows that the institutions of the tourism sector that have collaborated with the AV media sector are trying to find opportunities for new

collaborative projects. A similar positive attitude was shared by the representatives of other memory institutions in both research areas.

VR and AR tools, together, with 360-degree videos are also increasingly used for tourism marketing purposes. Production of commercials and other marketing videos have been the main line of cooperation between tourism and AV companies for decades, but now new tools are being tried out. Both in Riga and Hamburg, the local tourism offices have commissioned 360-degree videos for their city and region's promotion. Also, bigger local hotels have some promotional material in this format, and even some tourism brochures or fliers have AR functionalities. The VR solutions have been used to a much smaller extent – for providing immersive examples used in tourism-trade fairs. Also, different social media channels are used for promotion, including blogs and vlogs.

The previous sections mainly described how the tourism sector can benefit from cooperation with the AV sector. But the opposite direction can be also recognised – the tourism sector can provide services that help to boost AV sector. For instance, in Hamburg, an initiative by Hamburg Film Commission together with the hotels, sought to develop the concept of film-friendly hotels. These specific hotels learned the special needs of film crews and can now offer suitable accommodation services. This way, the tourism sector attracts film or TV productions to Hamburg as a good location for shooting. This shooting-location promotion is also active in Riga (and in wider Latvia), but it is not yet acknowledged as a special form of tourism that needs special services. There are some other examples in world – for example, in Jamaica, where the film crews are considered as a special type of business tourism (Martens, 2018). In Europe, business tourism is mainly developed through conference locations, although the numbers of professionals traveling for AV content production may equal those of conference tourism. Film-location promotion is more often seen as serving the development of the local AV sector, and not so much as a development of the tourism sector yet.

When analysing the cooperation forms described by the respondents, one more type of innovation can be recognised in the tourism sector – organisational innovation. Cooperation in product development usually leads to interactive learning about each other's practices (Christensen & Lundvall, 2004). This has happened in our case's regions too – for example, Riga Tourism Promotion Agency created a new post for a marketing person, who deals with bloggers, vloggers and other social media influencers. Museums in Hamburg have changed their communication strategy with audiences due to online collections and exhibitions. Museums in Riga have changed their working methods because of cooperation with the AV sector – for example, they have instituted a new form of brainstorming meetings as the normal museum working method, which is a format that they adapted from their cooperation partner, an AV content production company. 'Cinevilla', a production company, in turn, had to learn how to deal with the tourists/visitors and make some organisational changes in their operational and business models. So, the cooperation with the other sector has opened new ways of doing things and enabled

companies/organisations to innovate their organisational structures and operations, not only their products and services.

In short, cross-innovation, as a practice, has spread and taken multiple forms in tourism marketing. Many tourism businesses and organisations have also embraced social-media-related tasks as part of the day-to-day work of their organisation. New products that combine AV tools and methods were noticed more in the tourism attraction's development than in core tourism subfields, such as tour operators and hotels.

Drivers and Barriers of (Cross-)Innovation

Next, we provide an overview of innovation drivers on the one hand and the obstacles that hinder the innovation activities on the other. The global trends, as described in Chapter 1 of this book, have certainly influenced the tourism sector. Personalisation of services have formed one of the rationales for tourism innovation. After digitisation conditioned the emergence of online-booking platforms as, in effect, a form of radical-process innovation for the tourism industry (both with regard to travelling and accommodation services), there has been a lot of discussion about the end of the tourism agencies' core-business lines. If people can find information on all services on their own and can also make all their decisions and bookings on their own, then the agencies' business may be threatened. Yet, as respondents suggested, these innovations have only changed the nature of the business:

> It is a bit similar as with the story with the internet and the books. So, now 20 years have past and books are still here, they have changed maybe their content and their purpose, but as such they are still here. And, I think it is similar with travel. There used to be the conversation, I don't know, 2003–2004, when the e-commerce started in tourism, that this is the end of the business, but, in reality, the curve has been that it has lead to customisation, as an opposite to the mass tourism.
>
> (Riga tourism company representative)

> All the companies have faced this change. So, they offer more individual Hamburg products. They offer more flexible ones, smaller packages, not the four days with three nights and whatever services. That would not work anymore. So, it is more about finding very individual approaches to the customers. And, that affects all of the industry, for sure.
>
> (Hamburg tourism agency representative)

In the study, we asked the interviewees what the main drivers were that push them to innovate. There were three main factors that were mentioned most often: demand, technology and competition.

Most of the respondents see the changes in demand. Today's tourists, especially the younger generation, use new technology to travel and, generally, represent a different type of consumption behaviour. They travel independently using different apps, which enables them to consume places and experience cities/countries in their own customised way. A respondent representing a tourism promotion agency described the change as follows:

> People change the ways they book and the ways they travel, and we have been feeling that change for years now […] We try to face the digital developments in providing an alternative Hamburg experience. So, all the apps and our 360-degree virtual projects are developing very nicely and are to become some of the core services we provide to visitors.
>
> (Hamburg tourism agency representative)

These changes in demand are enabled by development in digital technologies and by the general platformisation of services. The online-booking platforms have educated the people in how they can plan their trips themselves, just as they would like. In addition, different tourism apps are expected to further feed the demand for these opportunities by users. The AR technologies have been generally recognised by the industry as the tools that could have lot to offer for tourism-experience development. Still, the VR and AR technologies are seen among the tourist-service providers as not yet ready for mass production, as they are too expensive to develop and, for mass consumption today, there is a rather small audience. But, the digitisation has not only impacted tourist-product and tourist-service development; it has also changed the way of organising the work inside the companies and the cooperation between the companies and other stakeholders. The emergence of 'social network markets' as a form of market structuration, described by Potts, Cunningham, Hartley, and Ormerod (2008) and elaborated on in Chapter 2, is increasingly visible in tourism sector. It is quite vividly described by one Riga tourism promotion agency's representative:

> We do work a lot with Instagram influencers, since everybody, now, is [a] multimedia-content developer. Then, we actually have one position in marketing division, where one girl constantly works with bloggers and Instagrammers – how to get them here, how to get the best content out of them.

The 'word of mouth' marketing strategies have long been used by the tourism sector to recommend the best hotels and the most interesting sites to visit. But, with digitisation, these practices have changed and, with the rise of 'viral marketing strategies', its significance has increased rather notably. However, it means that every company should have the basic skills of online marketing, including the skills of visual and AV storytelling. Yet, this may appear as challenge, as we will be discussing below.

The third driver that was highlighted by respondents was competition. To keep a profitable market share in a very tense business area – especially if we take the core of the tourism business in of the case cities, Hamburg and Riga, such as hotels, restaurants and tourism agencies – one has to be better than competitors, and this forces companies to seek new solutions for customising their services or to provide additional services or solutions. This competition drives hotel businesses to find new ways for marketing – for example, 360-degree videos.

Further, we identified that some innovations in the field are policy or public-sector driven. In the case of Riga, the public sector's support for tourism development takes the form of the supply of creative digital tools and trainings (web design, content development in web, etc.) aimed at improving the skills of digital-content production by the tourism companies, the quality of their content and their visibility in the web. These kinds of activities lead to cross-innovation in the form of spill over. According to Raven and Verbong (2007), spill over is a kind of intersectoral interaction that involves the transfer of rules (in this case, skills and knowledge) from one sector to another.

The role of the public sector in driving innovation is very much visible in Riga. In recent years, the innovation of cultural objects and creative industries (including the AV sector) has been influenced by several major events of national significance, such as the European Capital of Culture 2014, Latvian Presidency of the Council of European Union in 2015 and the Republic of Latvia Centenary celebrations in 2018. Such major projects have brought additional resources to the creative industries sector. Several museums have been renovated and found innovative solutions in partnership with digital-media companies. The reopened Latvian National Museum of Art offered visitors a mobile-interactive guide to the museum's exhibitions. Riga Motor Museum changed the whole concept of presenting their objects – new solutions include storyboards, interactive screens and AR applications.

In Hamburg cross-innovation processes have similarly been driven by a different kind of public-sector institutions – those working with the AV sector, such as the local Film Foundation. They have initiated cooperation with hotels to compile the above-mentioned list of film-friendly hotels in Hamburg. Film Foundation has also initiated cooperation projects with TV-series producers to develop tourism products, such as mobile apps for fans that enable them to discover locations in Hamburg where well-known films have been shot (described in detail in Chapter 14). So, we can see that the public sector in both regions has had an important role in facilitating sectoral cooperation and knowledge spill over from one sector to another.

On the other hand, the study revealed several interrelated and amplifying obstacles, which are described in the following paragraphs. Interviews suggested that our chosen sectors are different when it comes to their readiness for innovation and cooperation. Tourism sector representatives pointed out the need for new developments and new approaches in business development and new tools to be used in developing products and services (e.g. more mobile-based services, etc.). They pointed to several cooperation projects and developments, together, with the AV sector. Still, they admit that sector is not very eager to innovate.

Also, the AV sector interviewees suggested that the tourism sector has not come along fast enough and that it is rather modest and not ready to take risks and try out new things.

One obstacle that became apparent was a lack of coordination of informational resources that are needed to develop convergence applications. An example of this was the perceptions on the availability of necessary data resources. Professionals who were engaged with games or mobile-app development argued that there is not enough suitable data for developing, for instance, a location-based mobile application for promoting film-related sites as tourism attractions. Their argument was that this information is not systemised, if there is any data at all. Yet, the respondents in the tourism sector saw that there is, instead, a lot of unused databases with data on travelling, accommodations, tour registrations, etc. Therefore, figuring out how to collect, systemise and share relevant data between sectors, and develop new open data protocols for such sharing, would be necessary to undo the existing obstacles for cooperation and cross-innovation.

A similar obstacle suffering from the lack of communication are intellectual property rights. With new kinds of convergent solutions, many of the exchange relationships, including the exchange of rights, are unsettled. In the process of developing various kinds of AR applications, questions on the ownership of copyrights and their settlement are common. Who owns the rights of films' 'making-of' pictures? What is the appropriate settlement fee when film clippings are used in an AR app? How should these clippings be used to avoid undermining the author's original intent? Who owns the data collected on tour bookings? Who owns the photos and videos shot at museum premises by museum visitors and, then, uploaded to museum's Facebook wall or museum's web page? How can these data and materials be used? Such questions are a delicate matter. Especially in instances when popular film and TV productions have been cooperating with local tourism agencies, the settlements of relevant agreements have taken time as there are no established ways to do things – also, the value production in the process is unclear and, therefore, especially TV and film industries see a risk to their brand value and to their established ways to exploit their rights.

Yet, the main obstacle of the innovation in tourism sector is classical small and medium-sized enterprise (SME)-innovation bottleneck – resource scarcity. While there are, of course, several multinational travel agencies, as well as platforms/intermediaries servicing the sector, still, most local tourism sector companies are small. These small companies do not have enough resources to invest in innovation. They lack both financial and human resources. The financial resources could be applied from different national or local innovation support programmes, but usually, these programmes finance only very technology-intensive projects – something that the tourism innovation projects rarely are. These programmes, usually also mean a lot of bureaucracy for a company, for which they, again, do not have resources. The lack in human resources means a lack of people to carry out all the necessary tasks, and also a lack of skills inside the company. Very often, the small tourism companies do not have relevant digital competences. Even if they have managed to publish a web page, they

may not have the skills or they do not find time to update it regularly, as described by one tourism policy development representative:

> If you look from the perspective of businesses and small enterprises, then sometimes even the web page is terrible. And, they don't even have a web presence for example. So, if you want to find a location of the guesthouse, they have this terrible web page with a few pictures from 2007. And, no matter how you say that, it is important to be [consistent], maybe just one picture a month telling that you are alive and look good […] But, it still doesn't work in many, many cases.

Another major obstacle to innovation that the interviewees mentioned is technology. Although the technological development is an important driver of cross-innovation between other sectors, it can also challenge the most innovative product developments at the same time. The newest hardware is expensive and new platforms, in general, are quite expensive to develop. Technologies are also necessitating constant investments by updating. As they age too quickly, it is difficult to earn back the investments, as described by one development officer at museum:

> This app is nearly […] we started 2009. So, the iPhone 3 was on a market and we thought what can we do with all our ideas? A good friend of mine works in the IT scene as a developer. We had an illustrator who made these comic figures. It was really [emphasising] expensive and we had lot of time to develop this app and, now, we have the problem – it's too old for the next generation. Next, we have to work with companies because the maintenance of these problems. It's too expensive for us and we don't have the competence to develop the next generation of this app.

That is, both media and tourism sector SMEs a facing investment or development decisions where a promising technology is expensive and, therefore, not used much. It is, thus, risky to develop new solutions and products for these technologies as people are not used to consuming them. The problem is explained by one interviewee as follows:

> The biggest bottleneck of augmented reality is actually technology. Like the phones […] actually the phone is just like the same as computer. But, it's still not enough for augmented reality, and that's the biggest bottleneck. You see, you have like this iPhone X with ultra-mega cameras in front of it, we were waiting for that like for four years. […] the bottleneck is technology, we need better cameras, we need more cameras, we need bigger processing power, we need everything stronger, bigger and etc. So, that augmented reality could be in good quality that people can use it. But, the biggest turning point will be in five to ten years. When, and I really believe

> in this, we are going to change phones to something wearable. Like wearable augmented-reality glasses or something like that, and that's going to be the biggest changing point. Because, then, people are going to start to using them more, and it's going to be just natural. So, I think, for AR to fully go mainstream, 10 years.
>
> (CEO of an AV-media company)

The reason for tourism sector being quite static and slow in developments could also be the fact that the first wave of digitalisation has already created online-booking systems, web pages and web 2.0 solutions – social networks of various kinds. With all the global web infrastructure and platforms available, local SMEs tend not to see the necessity or demand for additional digital developments, especially if we think about hotels, restaurants, tour operators, etc. The perceived low demand could also be a generational issue – contemporary customers are happy with available solutions, as described by one tourism company representative:

> I think that the tourism itself, in the backbone, still remains [a] fairly conservative industry, and I always admire the fact that the most used promotion material in [the] tourism industry are still the printed brochures. We still print them! Because the end-consumer still demands it. And, there are a lot of initiatives to replace it with something intangible, but the situation shows that the companies who stop doing that [will] lose the business.

Another explanation of low demand might lie in the nature of tourism, vividly described by a tourism company representative:

> You need to dig a bit into [the] origins of tourism, where it all started. Because tourism started at the moment when you wanted to escape your daily routine, including [a] physical place. You wanted to move. […] If the existing form of tourism could be completely replaced, I'm not so sure about it. Just for that reason – that it is a bit more than just a sense, these measurable senses (touching, seeing). It is that something [more] is happening […] to you once you travel.

Being a tourist means experiencing new and different places, and not just seeing them on screens. This explanation does not apply to the providers of attractions, such as museums, because their collections are often not touchable and, therefore, different interactive screens and solutions enable visitors to get a more immersive experience and develop a better understanding of the objects or phenomena.

To conclude, the study suggests that the main drivers for cross-innovations between the AV media and tourism sectors are the changing expectations of tourists that relate to further personalisation and customisation of their tourism experiences. The main bottlenecks were described eloquently by a university representative:

> Main bottlenecks seem to be the company cultures in established companies and a lack of venture capital for new companies. Also,

> legacy media, as well as established tourism companies, still earn enough revenue from their traditional business models, making it expensive, in terms of cost to invest in new and uncertain ventures.

That is, in terms of business rationales, the perceived low demand and resource scarcities hinder cross-innovation processes between these two sectors.

Institutional Landscape Supporting Cross-innovations

In the following section, we will discuss, in more detail, the specificities of the tourism sector that affect its cooperation with the AV sector in our case cities. We will give also an overview of the institutional system that is shaping the processes of (cross-)innovation.

When talking about the tourism sector, everyone thinks about hospitality (e.g. accommodation and restaurants), transportation (e.g. airlines and car rental), travel facilitation and information (e.g. tour operators, travel agents and tourist information centres). These are the core subfields that first come to people's minds, including the respondents of this study. But the tourism sector also includes attractions and entertainment (e.g. heritage sites and theme, national and wildlife parks), which operate quite differently from the core fields – mainly because they are often public institutions and are cultural objects/institutions, and only then are tourist attractions. Therefore, the innovation patterns of these two halves of the tourism sector are quite different. The core subfields are foremost driven by business logic – the operations of cultural institutions depend on public-policy rationales and decisions. In addition, the broader public sector often has a central role in coordinating and driving place (country, city and region) marketing. And this, too, has direct implications for the tourism sector in general.

The tourism sector is growing in both case regions, as already described above. The private core subfields favour day-to-day incremental product development. Potentially disruptive co-innovation endeavours tend to stay in the background, according to the interviewees. If we look at attraction sites, theme parks or museums, then these institutions are more open to developing novel products. As cultural institutions, they do not compete only as tourist destinations or attractions, but also in the local market for cultural entertainment and education. However, museums are very often the 'poor' public institutions, who cannot afford expensive developments. That is, they need to apply for extra public funding every time they want to develop something new.

Comparing the two case study regions – Riga and Hamburg – we might say that, in both regions, the AV media sector is a bit more active in seeking cooperation with the tourism sector than other way round. Especially, digital-media agencies are interested in cooperation with the cultural institutions, as museums have a lot of interesting content which enables the agencies to work on attractive novel solutions on how to communicate and present all the content. The exceptions to the general trend are public tourism promotion offices that seek to use

new AV solutions for promoting tourism attractions and, therefore, to have good relations with the AV sector companies. But, these public offices are foremost concerned with developing new forms of place marketing and not with motivating the sectoral companies to innovate their products or services.

> We do general country marketing activities. We post, we share, we produce and, mostly, it is audio-visual content and we have the country's tourism web page. We run the country's Instagram profile, we run several Facebook profiles. Of course, we organise Instatrips that [gather] the influencers together and make […] several videos and for every region of a country. […] we […] only work in larger or semi-large scale. So, we do produce audio-visual content and marketing content for the country itself or we do produce that for the regions.
>
> (Riga tourism policy representative)

As already discussed above, they also provide media-related training and tools for tourism companies to develop marketing for their products. But, on the other hand, they act as forerunners in the tourism sector. In both case regions, the public tourism departments (public–private enterprise in the case of Hamburg) are eager to use new digital and technological formats, such as different social media platforms, 360-degree videos and VR/AR solutions for promotion.

> To be honest, I think we are one of the best clients [that] media agencies could have, because we are really open minded and, if they would come with their really crazy ideas, we would probably [do them] […] If it's actually good and we like it, we would say yes. […] We are just trying to follow the newest trends, and it is getting more people satisfied, and we are pretty open about it.
>
> (Riga tourism policy representative)

These kinds of activities correlate with the emerging function of the public-service media institutions, as has been suggested by Ibrus (2016) – that these institutions can operate as important coordinators of innovation systems, as they invest in activities to create public value, which is potentially also used by private players. In the tourism sector, these public agencies promote alternative forms of tourism promotion – experimenting with new kinds of content formats. These are usually high-risk activities or product/service formats without immediate commercial value. The question, however, is if all the activities are still designed according to the real circumstances of the sector and to best support its development – occasionally their usage or maintenance may be too challenging for tourism companies. Let us keep in mind that most companies in the tourism sector are very small – often, they do not have enough resources for adopting these innovations.

Other than that, there is not much public support for the development of tourism products and services, and neither region has specific funds or programmes available for co-innovations between the AV media and the tourism

sector. So, the main sectoral policy is provided with demand-side policy measures. As the proper demand was one of the main obstacles for innovation, this seems justified. According to Edler (2007), demand-side innovation policy is 'a set of public measures to increase the demand for innovations, to improve the conditions for the uptake of innovations or to improve the articulation of demand in order to spur innovations and allow their diffusion'. In addition to sectoral policies, there are also general innovation support measures[4], which are open to all the companies, whatever the sector. Regarding the tourism sector, these could be seen, however, as supply-side measures. For instance, tourism firms might get some development funds from general innovation and entrepreneurship schemes – for starting a business (incubation and consultancy schemes), innovation support schemes (innovation vouchers), sectoral development (cluster programmes) or export support (visiting fairs and producing marketing materials). So, several funds and support schemes are available for innovation and business startups, but not specifically for the tourism sector.

As the AV media sector is generally understood to fall under the creative industries umbrella policies, there is a special incubator for creative industries in Riga and there is special funding programme ran by Hamburg *Kreative Gesellshaft*[5] for boosting creative industries' cooperation with other sectors. In recent years, neither of these have hosted/financed novel solutions between the AV media and tourism industries. Tourism-related, location-based solutions have come from the business incubators/accelerators, but the boom of tourism-related startups came with such platforms as booking.com and Airbnb.com about seven years ago in Riga and is argued to be over. According to the manager of a Riga co-working space, recently, the new startups are focusing on other themes, such as block-chain, cybersecurity and education.

Sectoral funds are also available for the AV sector in the format of financing by public TV channels and film funds. But, as one respondent put it: 'the national financing is a bit, how shall I say, a bit […] not so flexible right now, because it is government financing' (Riga Film Foundation representative). The film funds are, generally, not eager to finance new film formats (such as VR films), and the support for cross-sectoral projects is largely missing. Let us quote Hamburg AV sector organisation representative: 'We also co-finance series for different distribution formats, but that's about it as far as innovation goes within

[4]According to Aho, Cornu, Georghiou, and Subira (2006) and Edler & Georghiou (2007), the supply-side innovation measures are, for example: equity support and provision, tax reductions and incentives, support for public research, funding of training and mobility, funding of industrial R&D and non-financial support services. The demand-side innovation measures are, for example: system development, transparent regulations, supportive standards, public procurement, intellectual property, facilitation of private demand for innovations, innovative culture and implicit support.

[5]Hamburg Kreative Gesellschaft – platform for interdisciplinary cooperation and space for creatives to start their business and other projects. See https://kreativgesellschaft.org/

the Film Fund'. Hamburg city also has a small programme to support VR-sector development ran by a media cluster organisation.

Funding possibilities is only one side of innovation support. As the innovation process is also the learning process, then knowledge sharing/spreading is crucial for cross-innovations to emerge. Cluster organisations can facilitate this. Enterprises in clusters exchange and create knowledge through face-to-face interactions and with the creation of common languages and institutions. Interfirm communication and interactive learning play decisive roles in innovation and growth (Maskell & Malmberg, 1999). Therefore, clusters could be a reduced national innovation system (OECD, 2001). When compared to Hamburg and Riga, Hamburg companies are more likely to be included in clusters of different fields, and the cluster policy is active. Media cluster developments have been coordinated by an initiative called 'Next Media'[6], which is a public–private cooperation to boost digital and media industries, as well as media-related innovations both inside and outside the media sector. There is no media cluster in Riga, but a similar smaller scale initiative is taking place as a cooperation between Microsoft and the University of Riga – the Microsoft Innovation Centre, which has a main responsibility to build synergies between the digital technologies and other sectors.

In tourism sector, there is no cluster formed in either case city. In Latvia, the effects of the cluster policy on tourism sector can be seen outside the metropolitan area, where regional companies cooperate to attract more tourists into their regions. Although tourism companies are concentrated in industry associations, the associations are more concerned about representing their members' rights and are less engaged in coordinating their respective sectoral innovation systems. Still, what such organisations do is organise conferences, seminars and networking events, where people who are active in the field can share their knowledge and learn from each other. These events bring together the sectoral value networks. These events are not open only for institutional participants, but also for individual professionals. These open formats are important as, according to holistic approaches to innovation systems, much of the knowledge transfer across the sectoral boundaries is carried out by individuals (Chaminade, Lundvall, & Haneef, 2018). The kind of networking events and formats that bring together people with different competences were also highly appreciated by most of our respondents:

> I'm part of some networks which are initiated by the city of Hamburg, and these networks, somehow, bring together new agencies and startups, like us, and more established businesses, like publishers or Hamburg's larger tourism institutions, or other larger companies. And, it's organised every two months. Sometimes, we have breakfast together and, sometimes, we meet

[6]See http://www.nextmedia-hamburg.de/en/initiative/about-us/

> for drinks in the evening. And it's just, I don't know, 30 to 40 people, just having a bit quality time together and, for networking […] I think this is something.
>
> (Hamburg audio-visual company CEO)

In addition to networking events, there is a variety of incubators, accelerators and co-working places, where interactive learning can take place. In both case regions, these entities are often managed with public money or as public–private partnerships. Again, these places are appreciated by their ability to share knowledge, especially tacit knowledge. Tacit knowledge is highly personal and difficult to formulise, as it is based on experience, know-how, ideas, feelings, etc. Tacit knowledge can be acquired through frequent face-to-face interactions (Polanyi, 1958) and these above-mentioned institutions are specialised for this through mentoring programmes, informal events and even open-office spaces. This kind of knowledge acquisition is especially relevant for young entrepreneurs and startups. Although neither region had tourism-specialised incubators or accelerators, and only Hamburg has the media accelerator, all the so-called general startup infrastructure is available in both regions. The hackathon format has been, sometimes, used to bring together the creative and tourism sectors. But, on these instances, the initiative has come from the digital-media sector – their interest is to cooperate with different sectors, and the tourism sector is one of the several. This suggests that the AV media sector is not considering the tourism sector among their first options to become a cooperation partner.

Higher-education institutions (HEI) are also often seen as the first initiators of inter-sector cooperation. Both regions have several schools where AV content production and media studies are taught. Also, tourism education is available. A representative of a tourism university in Riga described very good connections with sectoral enterprises and professionals, but they started a course on social-media marketing only recently – as a first step towards applying digital-media skills in the tourism sector. The AV media students have more possibilities for cross-sectoral projects during their studies. Yet, the major problem is lack of teachers and professors with new digital AV competences: as the sector is developing at high speed, the HEIs have difficulty engaging up-to-date educated people.

Summarising the institutional landscape in case regions, they can be considered quite similar with one big difference. Hamburg has a very strong media cluster, which is very interested in developing cooperation between AV media and other sectors. Yet, the tourism sector is not their priority partner. In Riga, the different associations and development organisations are more scattered between different subfields both in tourism sector and the AV sector. Therefore, there are no strong coordinating players on both sides who are fostering the development of the sectors and interrelations between them.

General innovation policy measures have a rather low impact to the observed sectors. As described above, the prevailing measures that could foster cross-innovations to emerge belong to demand-side, sectoral policy measures. The most important one was public procurement of (experimental) tourism marketing solutions or novel digital attractions. Important were also the measures for

raising innovative culture (through creative incubators etc) and the provision of online tools to develop tourism products and place marketing. From supply-side measures, mainly non-financial support was given in the format of facilitating information sharing and networking, and some funds were given for training and export activities. The mix of policy measures, perhaps, tend to bend towards demand-side policy measures and the variety has not been very large – also an explicit focus on innovation is largely missing.

Challenges for Policymakers

In the following section, we will discuss the main challenges for public-sector policymakers in facilitating the innovation and cooperation processes between AV media and the tourism sector. The first question that policymakers, in these two regions, have is this: why should they intervene in the cooperation between the concerned sectors? Public intervention should be considered when private enterprises are unable or unwilling (because of high risks or the inability to benefit from the innovation) to achieve the policy objectives (Finnish Ministry of Employment and the Economy, 2009). In both regions, the tourism sector is growing and creative industries, including AV media, are having an upward trend. So, the growth objective gives no reason to intervene. But, to return to arguments in Chapter 2, it is the diversity within a system that must be an objective. Dialogues and interchanges across not only sectoral boundaries, but also between public and private enterprises, facilitate that a diversity of rationales and objectives are at play, and this, in turn, is expected to facilitate the emergence of a diversity in new ideas and businesses – all necessary for the healthy development of a system. As our study demonstrated, the public sector can coordinate the system, facilitate matchmaking events, hackathons, meet-ups, etc., between different sectors. It can also set examples and facilitate the demand for innovations, by commissioning novel and benchmarking projects.

Yet, there are also specific challenges when it comes to the public coordination of a potential cross-innovation system that links the two industries. First, public-development policies for tourism and the AV media sectors are under different policy streams – tourism policy and cultural/media policies. Second, the development of the tourism sector, as a whole, has been subdivided under two policy development areas. The privately-held, core tourism subfields (travel agencies, hotels, tour operators, etc.) are coordinated by ministries of economic affairs. Cultural organisations that constitute attractions for tourists (museums, heritage sites, national parks, concert halls, etc.) are the domain of the cultural policy. The AV media industry is, to an extent, also divided between two policy streams, as the business development side sometimes belongs to the economic policy area.

The general tourism policy is the task for either ministries of economic affairs or economic departments of cities, but these departments or ministries do not tend to intervene in the development in museums and heritage sites. So, the development of a large share of tourism attractions is not coordinated under

tourism policy. At the same time, the coordination of interactions between museums and the AV sector is the responsibility of the makers of cultural or creative industries policies. Therefore, the convergence of these two is likely to be conditioned by these policies and is, generally, not understood within the framework of cross-innovation with the tourism sector. These two policy streams – cultural policies and tourism policies – use quite different measures to foster the development. The public-policy interventions are much deeper on the cultural policy side (funding for museums, subsidies or tax breaks for film production, etc.) than in economic policy side. If the culture-policy measures manage to innovate the museums and heritage sites, etc., does it automatically raise the innovativeness of the tourism sector? The paradox is that it does. When, say, the film industry and heritage sector are cooperating to create an AR application to introduce classic film scenes in environments where they were shot (see Chapter 14), then, indeed, these can be considered as interesting cultural innovations. But, as they could also attract fans of these films from other countries to visit the particular city or country and could provide them innovative tourism experiences, then such applications would also constitute notable innovations for the tourism industry. And, as we saw at the beginning of this chapter, there are several examples of such innovations that are crossing the more-or-less formal boundaries between different sectors and industries. The challenge for the policymakers is, therefore, to find ways to overcome the existing formal and institutionalised boundaries and work towards facilitating cross-innovation systems that match real value chains and can produce meaningful experiences that are responsive to actual cultural milieus.

Conclusions

The study revealed that the cooperation between AV media and the tourism sectors is rather traditional for most companies in these fields. The main reason is that the core nature of tourism has not changed much. Although there has been a growth in global platforms that enable customer-centric travelling opportunities, the travelling itself and the reasons for that have broadly remained the same. If the contemporary trend of increasing access (e.g. cheap flights) continues, the tourism sector faces no notable demand for disruptive innovations. It is for this reason that they are not eagerly seeking cross-industry cooperation or building new kinds of cross-innovation systems.

A notable long-term co-innovation area between tourism and AV media has been in marketing and communication. In this area, we can see a linear trajectory between classical travel-series formats on TV and contemporary social-media influencers or vloggers who are posting about their experiences on social-media platforms – all to get an understanding of the destination before making travel decisions. Another area for innovative forms of convergence, for true *amalgamations* in terms of Schulz's (2004) approach to mediatisation, is augmenting tourism attractions – cities, heritage sites, museum exhibitions, etc. As was discussed in Chapter 12, the arrival of AR as a technology and platform has been an

important enabler for this. In terms of formal categorisations, this could often be considered as intra-industry convergence in creative and cultural industries. As a result of this, heritage institutions, such as museums, are increasingly moving into the field of (educational) entertainment and are competing for the free time of consumers, next to theatre, cinema and television. Yet, as these innovations could be seen to motivate new kinds of tourist activities and could affect the tourism industry operations and value chains, they have a potential to also drive the development of a new cross-innovation system.

The public sector, as the owner of different cultural institutions, such as museums and heritage sites, finances the digitalisation of heritage and new solutions to present or augment it. However, public tourism promotion offices are forerunners as procurers of new AV solutions for place marketing and using social media tools and channels. So, the cross-innovations between tourism and AV media sectors are largely driven by the public sector. It is understood that these actions – experiments, prototypes and benchmarking examples – are expected to set examples, provide experiences, create demand and demonstrate potentials in the risky market. Yet, the question remains, to what extent is the private sector convinced and is ready to follow? We realised that private tourism industries rarely look for truly innovative solutions and that, for instance, while Hamburg's strong media cluster is fostering cooperation with other sectors, the tourism sector is not among their priority partners. Therefore, in the case of these sectors, the public sector has a central role in facilitating further dialogues between sectors.

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Chapter 14

Micro-trajectories between the Audiovisual and Tourism Sectors: Small Firms Working with the Public Sector

Mikhail Fiadotau and Silja Lassur

Abstract

The chapter takes a micro-level view to investigate cross-innovation between the audiovisual media and tourism sectors. It provides a narrativised account of the creation and development of two location-based film tourism apps, one developed in Hamburg, Germany and another in Malmö, Sweden. In doing so, it aims to elucidate the dynamics of innovation at the boundaries of industries, as experienced by individuals and small groups engaged in the process. The conclusion of the chapter focuses on the broader issue of the relative slowness of innovation in the tourism industry, as well as the shortage of private sector-driven initiatives that address this issue. It also touches upon the critical issue of the platformisation of tourism industries and its potential effects on cross-innovation.

Keywords: Smart tourism; location-based app; augmented reality; virtual reality; film tourism; cross-innovation

Introduction

Much of the discussion on the future of tourism currently revolves around the notion of 'smart tourism' whereupon 'the physical and governance dimensions of tourism are entering the digital playing field, […] and the ways in which tourism experiences are created, exchanged, consumed and shared are fundamentally different' (Gretzel, Sigala, Xiang, & Koo, 2015). Smart tourism builds on a

variety of technologies, including social media, ticket and hotel reservation platforms, geolocation and big data analytics. Most recently, the emergence of augmented reality (AR) has been a particularly conspicuous development (Chung, Han, & Joun, 2015), promising further innovation in the tourism sector – one directly involving the storytelling expertise, skills and often also the social capita of the audiovisual (AV) media industries.

But how does innovation in tourism work on a micro-level? Who is it that innovates, what drives them and what challenges do they face? This chapter aims to address these questions through the lens of a narrativised account, based on two cases, both location-based tourism apps funded through Cross Motion. The cases are informed by a series of interviews with stakeholders involved in the development of the apps, conducted over a period of a year in Tallinn, Hamburg and Malmö. The conclusion of the chapter will use the cases to illustrate some of the dynamics and challenges of innovation in the tourism sector.

Cases 1 and 2: Location-based Apps to Promote Film Tourism

Alexandra and Julia had been discussing the idea for months: a location-based application that would offer tours of Hamburg, focusing on places connected with popular movies and television series set or shot in the city. The application, they believed, would promote Hamburg as a destination for film tourism, building on the existing cooperation between the Hamburg Film Fund (where the two of them worked) and the city's tourism board. It would also help extend the Film Fund's range of activities beyond cinema proper, to include other digital media and technologies. This was, after all, the way to go in a world where the boundaries of individual media and creative industries are increasingly blurred. In fact, several film funds in other German cities, such as Munich and Leipzig, had already begun to explore the convergence of film, tourism and mobile technology by developing their own location-based apps.

The challenge for Julia and Alexandra, however, was that the Film Fund did not have the in-house staff with the competences and resources needed to produce the application they were contemplating. Nor did the Fund have the budget to outsource the project to a contractor: the Fund's general interest in digital convergence was not, at the time, supported by its operational model, which focused almost exclusively on conventional cinema. Instead, Alexandra and Julia resolved to wait for an opportunity to bring their vision to life, and such an opportunity presented itself when the Film Fund became a Cross Motion partner.

Unlike some of the other Cross Motion project partners, the Film Fund opted against soliciting new ideas via a hackathon-type event, choosing instead to find a contractor for their existing idea. The idea itself, however, remained fairly vague, due to the Fund's lack of prior expertise in the field. As such, the contractor would have significant creative autonomy when developing the application, while the Fund would act in more of a supervisory, rather than directorial, capacity. With this in mind, the Fund announced a call for bids, soliciting proposals for what was tentatively called Movie Map App. In addition to a cost

estimate (a crucial criterion due to the limited resources at the Fund's disposal), the Film Fund asked bidders to detail the specific functional and design features they would implement. According to Alexandra, they were looking for proposals from young and innovative developers who, however, had some experience and were preferably local (a promising bid from Munich was rejected in favour of local proposals). After receiving eight bids, they eventually settled on the proposal submitted by a young Hamburg native called Simon, whose vision was well thought-out and included a number of innovative features (such as using AR to superimpose film scenes onto real-life locations), but was also reasonably priced due to Simon's willingness to undertake most of the work alone.

Simon had returned to Hamburg after completing a degree in Computer Science at a university in the UK, where his graduation project was an AR-assisted virtual guided tour. Following his return, he was working as a freelance Android developer and collaborated with a number of start-ups, from a ride-sharing app to a logistics solution. When he came across the call for bids, he saw it as a chance to capitalise on his existing expertise. Like much of his other work, he considered Movie Map App as an opportunity to build his portfolio and enhance his skillset, edging closer to his dream of future independence and entrepreneurship ('It runs in the family,' Simon and his brother Max told me, pointing out that their mother owned a company and their father was an architect). The appeal of this particular project was also that Simon would be able to start from scratch and not take over from someone else (a common scenario in the ever-changing start-up scene), getting to devise the project design and own the intellectual property rights to it.

However, the limited financing and time frame also meant that Simon would have to keep the project small-scale and do most of the work himself. That being said, he did rely on others' help when it was needed, utilising his existing social network to receive support in areas ranging from technical implementation of AR to designing user engagement. He also made use of the existing infrastructure for start-ups and entrepreneurs, such as the Betahaus co-working environment for tech projects in Hamburg. At the same time, Simon found some of the infrastructural support available to him in the form of idea incubators and various training (including those of Cross Motion) to be of limited utility: contrary to the basic assumption of many of these events, he was not developing his own start-up but rather doing commissioned work as a contractor, and for a non-profit, public sector project at that, which entailed a very different mindset and operational model from what these events seemed to be oriented towards.

From the beginning, Simon accepted that the project, as he would hand it over by the deadline, would likely be incomplete, and there was no certainty regarding its future after that. Keeping that in mind, Simon adopted an agile development methodology, focusing on available resources and time rather than a predetermined set of features (his project proposal listed an ambitious set of features, many of which would likely have to wait for a future release).

Despite this pragmatic approach to development, Simon still found some aspects of the process frustrating. Interaction with the Film Fund was somewhat sporadic, resulting in development progressing in bursts rather than small

increments as he had originally hoped. Most problematically, he had to repeatedly ask for actual content to integrate in the application, as the Fund had difficulty negotiating the use of film content with copyright holders – despite having committed to doing so in the contract. Eventually, only two of the six companies contacted by the Fund responded and provided some content (movie clips and stills, behind the scenes images and trivia), and only one of the two submitted enough material to create an actual technology-assisted tour. Even that material had to be processed and, even though Simon's role was supposed to be that of the developer, he ended up doing extra work, such as cutting out video clips (the Fund did, however, provide the text content for the tour).

The Fund's lack of a coherent vision was another source of frustration, with Simon often feeling like he had to make decisions that should have been up to his clients. He was particularly concerned about the lack of clarity regarding the future of the project and was unsure of his involvement beyond the concluding Cross Motion event. While he seemed to take pride in the outcomes of his work and acknowledged his professional development over the course of the project, Simon was not willing to contribute for free after the funding ran out, and acutely felt that a sustainable business model or a financing plan was lacking.

The Fund, on the other hand, seemed more optimistic in its evaluation of the project outcomes. Alexandra acknowledged that delivering content for the application was at times challenging, but did not perceive it as a major obstacle. She found that Julia and herself were 'almost always in agreement' with Simon, stating that for them, participation in the project was 'almost too easy' due to Simon's readiness to take the initiative. Regarding the future of the project, Alexandra pinned her hopes on the tourism board's willingness to get involved and invest in the development of a fully fledged product, which would likely necessitate a bigger team. To that end, representatives of the tourism board were invited to attend the project's presentation in Aarhus, Denmark, where Simon demonstrated his work and outlined future directions and prospects.

Ultimately, despite the challenges involved, Simon ended up exceeding his own expectations and was able to showcase some features that had originally been slated for a hypothetical future release. The prototype included a location-based scavenger hunt game, information about movies relevant to the tour (and their trailers), Facebook integration and the highlight of his initial application: an AR feature which could overlay a movie still onto the input of the phone camera. The app also provided an easy way of creating new tours and was designed as a platform which could be used in other locations.

Impressive as this outcome was, it did not immediately secure the future of Movie Map App. Negotiations with the tourism board would remain ongoing even half a year after the event in Aarhus and, though the Film Fund remained optimistic, it was obvious that the future of the project was taking considerable time to take shape. Simon stayed in the picture, hoping to see the project through, although, if the necessary resources were procured, he would do so as part of a bigger team.

What Movie Map App did accomplish even before its release was to help the Film Fund fully embrace digital innovation as part of its sphere of interest.

Work on the project was both a catalyst for and proof of the feasibility of going beyond film proper, and soon the Fund found itself engaging in a variety of other digital media projects and initiatives. In the aftermath of the presentation in Aarhus, the Fund organised a virtual reality (VR)-enabled international teleconference on innovation in Hamburg; soon after, it co-sponsored a conference on animation and digital technology. In the second round of Cross Motion, the Fund chose to solicit ideas from the bottom up, awarding funding to a VR rehabilitation solution – a dramatic extension of what had once been seen as the Film Fund's area of activity.

On a wider scale, the case of Movie Map App appears in many ways indicative of the dynamics of cross-innovation in the tourism sector. Unlike the healthcare and education sectors, many projects in the sector appear to originate from the public institutions themselves, rather than from the bottom up, relying on contractors to implement preconceived ideas rather than start-ups to produce their own innovative solutions. Many of these projects are also similar conceptually, with location-based applications being the most conspicuous trend in the sector.

Simon's experience with Movie Map App also resonates with that of other contractors working on tourism-related projects commissioned by public organisations. Andrea, a product manager at a digital design studio in Malmö, reported a similar lack of clarity on the client's part when the local municipality commissioned a film noir-themed location-based app for tourists from the studio. While not an issue in and of itself, as conceptual design fell well within the studio's area of expertise, this also meant that whoever continued the development of the app past the initial prototype stage (which was what the funding and the time frame allowed), would inherit a project largely shaped by the studio's early-stage decisions. This lack of a long-term vision due to the short-term and often opportunistic nature of the funding was, based on Andrea's experience, a tendency in the public sector.

Another aspect Andrea, like Simon, found problematic was communication between the various parties involved. She felt that, unlike the private sector, whose modus operandi is largely informed by the need to make profit, the public sector has less pressure to be efficient. This could lead to unclear organisation of work and division of responsibilities. In Andrea's case, the project involved several bureaus of the municipality and, on a number of occasions, she found herself acting as a mediator between them to facilitate more efficient communication.

As such, the experience of an established studio proved more similar than different to that of a freelance contractor.

Conclusion

The two cases discussed above share a crucial commonality: both projects started as commissions by public entities, with private actors' involvement being limited to the role of contractors. In fact, none of the tourism-related projects funded through Cross Motion were implemented by start-ups or established companies specifically focusing on the tourism sector. Instead, these were largely

one-off collaborations between AV and digital media companies on the one hand and tourism boards, municipalities and museums on the other. Unlike in healthcare and education, the private sector showed little interest in developing its own innovative solutions for tourism, while the public sector struggled to maintain a sustained effort to innovate.

This is not to say, of course, that tourism is not capable of innovation in principle. Sustainable tourism and ecotourism were seen as an innovative paradigm in the 1990s and a potential driver for further innovation in the field (Hjalager, 1996). With the advent of Web 2.0, the emergence of such platforms as TripAdvisor, Airbnb and Skyscanner constituted an innovation in its own right, reflecting a shift towards more personalised services and greater agency on the tourist's part (Buhalis & Law, 2008). Yet, as emphasised by van Dijck, Poell, and de Waal (2018), this kind of 'platformisation' has at times resulted in unsustainable costs and widened inequalities in major tourist destinations. Furthermore, as discussed below, the global platforms may also present an obstacle for small and medium-sized enterprises (SMEs) seeking to innovate. Overall, compared to education and especially healthcare, the tourism sector remains slow to innovate at all levels: SMEs 'demonstrate an inclination to free-ride and be late and safe adopters' (Hjalager, 2010, p. 9), while large-scale national projects aiming to promote tourism innovation have had limited success at best (Mei, Arcodia, & Ruhanen, 2015).

There are a few factors at play here. Since platforms such as TripAdvisor and Airbnb have a firmly established presence in the tourism market and do not directly charge users for their services, developing business-to-customer services is an exceedingly challenging undertaking for potential innovators in the private sector, given that tourists are not used to having to pay for information. Tourism is also a sector largely comprised of small enterprises, which simply do not have the necessary resources to innovate (Hjalager, 2002, p. 473). A parallel can be drawn here between the challenges faced by the tourism sector and those experienced by the media sector due to the platformisation and datafication of the field, where tools for all kinds of users are often provided for free in exchange for data and the monopolisation of access to consumers (Bilton, 2017).

Next to this, public actors, as both Simon's and Andrea's accounts demonstrate, often lack a clear vision and understanding of innovation, thus potentially inadvertently inhibiting innovation instead of promoting it; they also tend to suffer from an institutional resistance to change and organisational challenges (Mei et al., 2015). These circumstances can lead to something of a vicious circle: in the absence of clear monetisation options, 'smart tourism' (Gretzel et al., 2015) is often funded by public institutions, but the institutions themselves lack the competences to sustain properly innovative development; at the same time, their persistent involvement further perpetuates the idea that 'smart tourism' solutions are free of charge for the end user, meaning that the business-to-customer financing models are not seen as viable by private enterprises. The meso-level policy makers also tend to ignore the

structural imbalances that derive from the global platformisation to local-level tourism innovators.

It thus appears that, while 'smart tourism' has become a buzzword and inspired public tourism institutions to seek to innovate their practices, it has not yet triggered large-scale bottom-up innovative practices in the Baltic Sea region; neither has it forged a distinct epistemic community wherein operating at the intersection of tourism and digital media would be internalised as the principal professional identity. However, continued effort and self-reflection on the part of the public sector, coupled with increased engagement of private enterprises, continued technological development as well as forms of 'interactive learning' (Lundvall, 1992) between tourism and AV media sectors, may help deliver on the promise of more systematic, substantial and meaningful cross-innovation in tourism.

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Chapter 15

Conclusions: Cross-innovations between Audiovisual and Tourism Sectors

Indrek Ibrus and Silja Lassur

Abstract

This chapter summarises all the results of the section that studied cross-innovation processes between audiovisual media and tourism sectors. It relies first on the review of existing forms of cooperation and cross-innovation between sectors. Second, on the meso-level analysis of structural aspects that shape innovation processes in these sectors. Third, on a micro-level ethnography of a start-up company innovating at the intersections between the film and tourism industries. We learn that there are two core 'rules' that motivate sectoral cooperation – first, the broader platformisation of tourism and second, the emergence of augmented reality as a technique to augment experiences at locations. Regarding the second rule especially, we learned that the main innovator and innovation motivator in this area is currently the public sector, driven also by cultural policy goals. But local tourism sector small and medium-sized enterprises appear to not be particularly driven by innovation-orientated cooperation with other sectors.

Keywords: Cross-innovation; platformisation; tourism; innovation system; post-tourism; augmented reality

Two Rules

The stories and studies presented in this section direct us to somewhat different conclusions than the other two case-studies of this book: education (Section II) and health care (Section III). To put it bluntly, it is not clear that our initial hypothesis was correct, at least not currently. Our hypothesis was that

audiovisual (AV) media industries in fact are co-innovating systematically with tourism industries and that it may be leading to the emergence of a new convergent industry, for example, the one of augmented reality (AR) storytelling. Having admitted the doubt, let us first take a step back and ask: What, if anything, could be the new 'rule' emerging out of the encounters between the two industries in terms of evolutionary theory by Dopfer and Potts (2008), described in Chapter 2?

Our suggestion is that there are two main rules. The first one has been gradually evolving since the 1980s and was originally called 'post-tourism' (Feifer, 1985). As tools of visual media (making) and tourism became more available to the middle-classes at that time, Maxine Feifer together with Lash and Urry (1987, 1994) started to point to the transformation of tourism. The boundaries of tourism with other areas of social life were getting blurrier, enabling the emergence of various kinds of niche markets and personalised forms of tourism. Feifer's 'post-tourism' referred to a playfully mediatised form of travelling – where the tourism experience was not about the search for authenticity anymore, but along the lines of Eco's writings on 'travels in hyperreality' (Eco, 1986) – it was about reflexive, often ironic mediatised performances – especially in the form of travel photography and videography. Also, as Lash and Urry (1994) suggested, tourism as an authentic experience was substituted with people's everyday involvement in virtual travel through media consumption. The evolution of the Internet together with the explosion of mobile photography, social media platforms and their location-based versions could be seen to have only further facilitated this trend. Jansson (2018) has recently suggested that the 'post-tourism' term could be recycled to also include the contemporary media-enabled fragmentation of tourism practices and its convergence with other social realms. Tourists, he emphasises.

> are to an increasing extent (co-)producers of media texts that can be spread and discussed far beyond the close circles of traditional family albums. Instagram images, for example, can be geo-tagged and immediately commented upon, which in turn contributes to the cultural (re)coding of tourism places and practices.
>
> (Jansson, 2018, p. 102),

He also suggests that while this behaviour could be interpreted as a middle-class method to seemingly individualise the forms of mass-tourism, paradoxically, it could be seen to contribute to generalisation of tourism experiences in different, mediatised ways.

In this context, what needs to be highlighted is the role of platforms and their promise, on the one hand for personalisation of experience and, on the other hand, for interlinking market participants. Travel planning and booking accommodation and transportation has been, broadly, platformised with most of the platforms capitalising on 'free labour' (Terranova, 2000) by their users in the form of user-generated content and ratings. The best example of this is TripAdvisor, a hybrid between social media and a tourism platform. TripAdvisor, Booking.com

or Airbnb (among others) as platforms could be all defined, as we did in Chapter 2, as facilitators of 'social network markets' (Potts, Cunningham, Hartley, & Ormerod, 2008): constellations of enterprises, consumers, professionals and amateurs that constitute complex value and trust networks with the core purpose to use each other's reputation and profiles in making decisions in markets where value is often uncertain. Yet, as van Dijck, Poell, and de Waal (2018, p. 2) demonstrate, while Airbnb may offer some individuals an opportunity to make some money on a spare room and others to stay in relatively cheap accommodation, there are also collective costs, often undermining wellbeing, power balances and public value provision in cities. What this highlights is again the question that we have been addressing throughout this book: How do global platforms affect life in localities, and especially how do they affect the local (cross-)innovation systems?

In our interviews with stakeholders (see Chapter 13), we saw that local tourism agencies had 'digested' the platformisation of their markets and did not see the associated personalisation promise as a threat. Perhaps paradoxically their strategic response was one emphasising further customisation and personalisation. Furthermore, local tourism boards did not only provide training on social media and video-production tools to local tourism firms but were also building on the brand-power of travel bloggers and 'social media influencers' as they were cooperating with them to market their cities as destinations. No tourism policy maker mentioned TV travel series as a marketing tool anymore. The (social-)mediatisation of the tourism industry, especially its marketing, is a reality. Yet, another finding that emerged both in Chapters 13 and 14 was that the tourism industry in general and especially the small and medium-sized enterprises (SMEs) in small markets cannot be considered very innovative. It emerged in the interviews that to an extent this was due to platforms already providing them with the essential tools to carry out their business and there was, therefore, no need to push (with their limited resources and limited capacities) for something extra. That is, the SMEs cannot ignore the network externalities that the large platforms capitalise on, especially as their affordances come in handy. It is easy to describe one's services, to upload photos or videos, to utilise Google maps or use platform's communications utilities for keeping in touch with customers.

The first corollary that we could draw from this is that the first 'rule' in terms of Dopfer and Potts (2008) channelling (or limiting) cross-innovation between tourism and AV media is its mediatisation by global platforms. In terms of Schulz's (2004) categories of mediatisation, this could be understood as *accommodation* – the tourism industry has had to fully accommodate the role of platforms that may also have conditioned their relatively limited own initiatives towards digitisation and innovations with regard to digitisation. This may be evidence for Lundvall's (2010) suspicion that multinationals may not contribute positively to the health of local innovation systems.

The second potential rule was the promise of AR to emerge as a true form of cross-innovation between AV industries and tourism. AR could include forms of AV narration and present eloquent opportunities for augmenting experiences at tourism sites. Depending on the nature of these new forms and their operational models they could be qualified as either *extensions* or *amalgamations* in terms of

Schulz's (2004) forms of mediatisation. That is, if the mobile device is used to provide some additional information about the space it could be understood as a mediatised extension. But if it is used to fully guide the experience, maybe to connect the place to a transmedially unravelling world or to a database for further digging into the topic, then the mediatised experience could be understood as a new amalgamation – a convergent form to the development of which both tourism/heritage institutions as well as AV media/videogaming industries are contributing. Yet, despite the prevalent discourse – that *Pokémon Go* proved popular and that Apple is pushing AR with this iOS platform – our Chapter 13 gave evidence that AR used in tourism has not caught the attention of local start-up scenes or media industries. Thus, media start-ups are not considering tourism as their primary partners for cross-innovation.

Dialogues

Yet, dialogues exist. We learned in Chapter 13 that, for instance in Hamburg, the local media cluster organises meetups and networking events with tourism industries rather regularly. And it is still the media industry that is pushing for cross-boundary awareness development – the initiative comes from them and not from the tourism industry, which is clearly less organised and cooperative. What was, however, one of the core findings of Chapters 13 and 14 was that this cross-innovation area is in both countries still mainly coordinated by the public sector. The local tourism boards provide training to SMEs as we saw above, but they are also commissioning experimental projects and prototypes, finance solutions that should set examples and function as a benchmarks for others. These experimental projects have the potential to establish initial dialogues between industries that on their own raise awareness of each other's specifics and needs. The projects could also give their executioners necessary experience and provide opportunities to build the portfolios necessary to undertake further work in this area. This was, for instance, Simon's strategy, whose story was told in Chapter 14.

The public sector has taken the coordinator role for a variety of reasons. First, while locally the specifics of the tourism industry are more cooperative than competitive (once a tourist has arrived, all service providers gain from cooperation in their servicing and value chains are multi-linear), it is at the level of cities and countries as destinations where the competition is played out. Therefore, it is also the job of public authorities to improve value propositions of the whole of the local tourism services system. Second, as we saw, the SMEs of the local tourism industry are not ready to take this role. Third, innovation in tourism is different to education and health care as it is a much less socially sensitive topic. Its contribution to public value generation locally is limited and, hence, it is generally not a concern for public authorities. Relatedly, there is not much funding given to universities to conduct research and development, nor to provide higher education in this area. And so, the coordination of digital innovation in tourism cannot come from universities either. Lastly, as was posited in Chapter 13, authorities fund the development of innovative digital services by,

for instance, heritage institutions due to their multidimensional usage functionalities and target groups, that is they are not used only by tourists, but also local citizens who may use the novel functionalities or applications out of their educational needs or cultural interests. Yet, as these institutions also have tourists as a significant target group and as they are part of local tourism value chains, these novel developments also qualify as tourism innovations.

While we can conclude that it is the public sector that is investing in experiments and is coordinating information exchange between parties that could constitute the potential cross-innovation system in this area, there are also questions regarding how sustainable this role can be. Johnson (2010) was quoted in Chapter 2 that institutional diversity in an innovation system (that is inclusion of both public and private institutions) is necessary as it also brings about a diversity in objectives and this in turn is good for the general productivity and sustainability of the system. Chapter 14 demonstrated, however, that public sector leadership and its often unclear objectives could also be a challenge for market participants – especially those from whom the authorities commission the work. Frustrations relate to unclear goals as well as to the questionable afterlife of the produced applications, which are often developed without a sustainable operational model. Therefore, for the future of this cross-innovation area, especially for location-based and AR-related solutions, it is important that feasible business models and incentives for the local private industries are found. If not, this area, too, could be picked up by global standardised platforms with limited room for innovation by local players.

Conclusion

The case study of tourism as a cross-innovation area for AV media industries proved to be different than education and health care. While the latter two are closely related to public value creation and advancement of society and are therefore objects of public concern and are also well institutionalised, tourism lacks all of this. From the perspective of host countries tourism is, for the most part, seen only as another service market, a source of income. It is also a market that has shown relative growth, providing stable income and therefore has not been a subject of concern, especially in the Baltic Sea Region. It is perhaps due to its relative wellbeing and lack of strong public interest that it has emerged as somewhat uncooperative for digital AV industries. Furthermore, the sector has had to accommodate the platformisation of their market, which especially for the SMEs in small countries has meant that they get some of the necessary tools for free, but at the same time lose direct access to their customers (and data about them). And this, too, seems to have had a demotivating effect on their own innovation activities. Altogether, the potential for their convergence is there, the dialogues are also there, but in contrast to education and health care, we could not identify an emergence of an auto-communicatively functioning new convergent industry sub-section. Not yet, at least.

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Chapter 16

Cross-innovation, Is It a Thing?

Indrek Ibrus and Alessandro Nanì

Abstract

This chapter concludes the book on cross-innovation between audiovisual media industries and three other sectors – education, health care and tourism. It emphasises, first, the importance of platformisation as a socio-economic and technological process in framing all cross-innovation processes. It highlights how the rather full platformisation of tourism has negatively affected the interest of the tourism industry small and medium-sized enterprises to cooperate with local media and gaming industries in search of new solutions. Relatedly it proposes a generic conflict between platformisation of specific fields and the health of thematic local cross-innovation systems involving media and creative sectors. It then discusses that the inherent fragmentation of the health and education sectors has not allowed their international platformisation, but constitutes challenges to innovators interested in international scalability. It also discusses the reasons why two publicly coordinated cross-innovation processes – one involving the use of virtual reality in health care and another using augmented reality – have given different results – one a relative success and the other not as of yet. At the end of the chapter final definitions of cross-innovation are offered and the operationalisation of the term and the associated conceptual approach are assessed.

Keywords: Cross-innovation; platformisation; mediatisation; media innovation; platforms; innovation systems

Platformisation

This book is about cross-innovation. It is here to propose the term and a new conceptual approach that combines in specific ways, on the one hand, evolutionary economics and innovation systems theory and, on the other, various approaches in media studies and cultural theory – cultural semiotics, cultural science, mediatisation theory, media industries studies, media convergence and transmedia studies, etc. We expected to cover and investigate multi-linear dialogic processes between industries, various forms of co-innovation and convergence. And so we did. The empirical chapters in this volume give evidence of many such examples. Yet, what also emerged during our study is that what we should really talk about is platformisation.

Platformisation is a process that pervades all walks of our digital social lives as well as economy – nearly all sectors, industries and markets (van Dijck, Poell, & de Waal, 2018). Platformisation is effectively a form of mediatisation (Hepp, 2013; Hjarvard, 2013; Lundby, 2009) or a cultural form of mediation of everything (Silverstone, 1999) – a new phase of digitisation that interrelates different sectors and industries. But as this book demonstrated, it interrelates and affects different sectors in diverse, often complex and open-ended ways. The four sectors we discussed in this book were audiovisual (AV) media, education, health care and tourism. We were interested in how, in the convergence era, the first of these works and converges with others.

In Chapter 3, therefore, we first asked about the starting points for the media industries when embarking on such cross-innovation processes. It needs to be highlighted that almost all of our case countries or regions in this book are small or very small countries or are located in them – the Nordic and Baltic countries around the Baltic Sea. Our review of the latest developments, market data and statistics on the AV media industries in these countries indicated, however, that one of the major contemporary challenges for them is platformisation, especially the global dominance of search, advertising and social networking platforms such as Google/Alphabet and Facebook. What is at play with these platforms are their globally relevant network externalities; they draw further popularity the more popular and widely used they are (Evens & Donders, 2018; Ibrus & Rohn, 2016). They have global scale and reach and, based on this, they also monopolise access to Internet users. As they do that they also control data about those users, keeping media industries, especially those in smaller countries, at bay.

As was discussed in Chapter 1, knowledge of audiences, a keen interest to stay in contact with them, is the one 'media logic' generally brought to all co-innovation processes. Yet, in the era of global platforms, the media are often denied this. Furthermore, as was demonstrated in Chapter 3, not only are they losing contact with audiences, but relatedly also much of advertising income is leaving to those large platforms. Despite the fact that, owing to policy support, domestic media in the Nordic countries is strong, still, their positions are weakening owing to the new competition with global platform giants. The same is true in even smaller and poorer countries – the Baltic states. However, our closer look at one of the countries – Estonia – suggested an emergent trend. This

is media firms entering into new kinds of cooperation relationships – for instance cooperating with the education sector and publishing digital learning materials; also organising conferences and cultural events, working with partners from multiple sectors to develop new forms of native advertising, etc. While the latter, native advertising, may be a controversial issue from the perspective of classical journalism ethics, from another perspective this and the related activities could also be understood as forms of cross-innovation, new kinds of locally relevant cooperation relationships aimed at opening up new kinds of revenue streams, uncorrupted and unreachable by global platformisation. These new forms are based on local/national 'social network markets' (Potts, Cunningham, Hartley, & Ormerod, 2008) and their inherent interactive learning (Lundvall, 1992) capabilities. That is, developing and building on new kinds of cross-innovation systems could be the strategy against global platformisation that media and gaming industries in small countries could pursue. This is, in effect, the potential that this book set out to explore.

When investigating their cooperation with our chosen other three sectors, we learned, however, that platformisation is a reality/potential/threat that is shaping these cooperation areas, too. It could be argued that platformisation is a new 'rule' in terms of Dopfer and Potts (2008) that often drives such cooperation. If we use Schulz's (2004) sub-forms of mediatisation, then platformisation is, in effect, *accommodation* – something that the other sectors largely just have to accommodate, somehow. Of this, the best example in the preceding chapters was our study of how AV media and tourism are co-innovating. We learned that the global platforms such as Airbnb, Booking.com and TripAdvisor have broadly taken over the coordination of tourism services markets. As these markets are literally about entering the unknown world for consumers, the role of these platforms is to facilitate trust where the value is uncertain. They do that by connecting the market participants, matching offers and demand and establishing their inherent reputation systems. Their affordances come across as unpretentious and they offer a range of free tools for both providers and consumers of services. Being global platforms and operating in markets that are by definition international, their network externalities are too strong and their tools too convenient to be ignored by tourism industries that especially in small countries consist mostly of resource-strapped small and medium-sized enterprises (SMEs). In this position they, however, dominate connection-making as a service, control access to customers for tourism industries and master the data about all market dynamics.

Yet, what they also seem to have done is to undermine tourism-innovation locally. Our study demonstrated that the tourism sectors in Hamburg and Riga are notably less innovation oriented and less interested in cooperation with AV industries than the education and health care sectors that, among other things, are also less platformised than tourism. Admittedly, there are also other factors at play that affect tourism's relative adversity to (cross-)innovation – it is a less socially sensitive topic and is relatedly also more weakly institutionalised; the sector has also been enjoying growth everywhere and is generally quite content. Nevertheless, our suggestion here is that tourism platformisation is problematic

not only owing to its relative social costs to cities as tourism destinations, as highlighted by van Dijck et al. (2018), but also for its undermining of the functioning of local-cross-innovation systems. This risk was originally described by Lundvall (2010) – multinational companies do not tend to participate in the coordination of national innovation systems, even if they have branches in these countries. Our study evidenced that platformisation seems to have a similar effect – they may not only contribute to innovation system coordination, but also undermine motivations for innovation and for 'interactive learning' across sectoral boundaries therein. As a result, the mediatisation of tourism is driven by global platforms and the role of local AV industries is broadly just to provide content for these platforms or innovate on top of those – as in the case of micro-bloggers, YouTubers or Instagrammers working on incremental textual innovations within the bounds of the affordances of the specific platforms. All this was evidenced, for instance, by the fact that the start-up scene in Riga stopped to work on tourism applications a few years ago and that the local policy makers are mainly working now with 'social media influencers' to promote their city on social media and travel platforms.

While tourism is fully platformised (in the 'retention' phase in the term of Dopfer and Potts, 2008), we learned that health care is not. Yet, this was a challenge for start-ups innovating in this area. While we learned in Chapter 13 that in Aarhus the local policy makers had coordinated the emergence of a new cluster of companies working on virtual reality (VR) solutions for health care, they saw their further growth as limited owing to the fragmentation in health information systems – every hospital and region has its own systems. The other country case study in this chapter was Estonia and, in this case, we learned that while there is no similar local cross-innovation system emerging, the national well-functioning and standardised health information system lacks over-the-top (OTT) consumer-oriented and value-adding systems that would, for instance, gamify the rehabilitation processes. We suggested in Chapter 11 that the Danish system is, in effect, ripe for being overtaken by international platforms owing to its fragmentation and that the Estonian standardised system risks the same owing to its lack of cross-innovation.

Studying cross-innovation between AV media and education we learned, first, that its fragmentation is similar to health care – different schools, municipalities (usually responsible for schools) and countries have different systems, standards and expectations. And, relatedly, this also presents challenges for potential innovators, especially in Europe's north – when domestic markets are too small and exporting and up-scaling opportunities are limited. Nevertheless, as we reported when studying our two case countries – Sweden and Finland – there has been a new 'boundary-subsector' emerging for a while – the EdTech sector. It operates at the boundaries between the (mostly public) education sector and the (mostly private) information and communication technology (ICT) and AV media sectors.

In EdTech as an inherently diverse cross-innovation system, multitudes of very different kinds of solutions have been developed, tested and left behind over the years. There was, for instance, the 'app fest', as one of our interviewees put it. Yet, as was reported in the Swedish case, the 'interactive learning' over

the years had its effect and more recently a more comprehensive and transmedial approach has started to emerge with public authorities becoming more experienced and knowledgeable commissioners of digital learning content. We related this in Chapter 11 to Perez's (2003) 'deployment phase' of innovations – where society starts realising the related risks and governments take charge, develop policies, build institutions and provide services that can render new ways of living more sustainably and inclusively. As an example of this and of a different kind of platformisation, we brought the example of Estonia and its government provided/financed platforms for hosting content related to national school curricula – *e-koolikott* and *opiq*. Of these, especially the first constitutes a government-facilitated 'social network market' that connects students, teachers and providers of educational content that also enables further development of content, remixes and modifications, that is, accumulation and evolution of content innovations via forms of interactive learning. Effectively, what we have in this case is a platform designed to provide public value locally. This value materialises in different ways, but one of these is coordination of a national education-related cross-innovation system involving the expertise of AV media professionals.

Nevertheless, even in the case of Estonian platforms, the question of international scalability remains – it would still be difficult for local educational content and service developers to expand and export their solutions internationally. Yet, this is what innovators in small countries effectively need, as was evidenced when studying both the education as well as the health care sectors. The related realisation that emerges when critical studies of platformisation are coupled with studies of innovation systems is that one cannot easily have both – or have the cake and eat it. Standardisation (even if unrealistic) of school curricula and educational ICT systems could potentially bring about exporting opportunities, but this newly international market is more likely to get platformised by a few global giants that have been itching to enter the educational markets properly for a long time. Alternatively, the aim of providing innovative culturally and socially relevant educational content could be achieved by coordinating the emergence of a thematic cross-innovation system. Yet, the resulting solutions are not expected to be easily exportable. This dilemma and its underlying conflict could be understood as characteristic of cross-innovation systems involving media and culture – while technological solutions prevail via standardisation, culture becomes meaningful via distinctions and (local) contexts to these distinctions. International exporting of mediatised services needs to address complex barriers and lacunae (Rohn, 2010).

Emergence of New Rules

Our study was not about platformisation only, however. Many of the phenomena we studied were emergent rules without wider adoption and, therefore, not platformised, yet. The most salient of these cases were the uses of VR in health care and augmented reality (AR) in tourism.

These cases were both similar and different. They were both driven by the public sector, but with different success rates. The 'VR health' cluster emerged in Aarhus (see Chapter 9) out of effective coordination work by the city's cultural policy makers, especially those responsible for the AV industries. This coordination mainly involved facilitating interactive learning and raising mutual awareness in a variety of ways. In the terms of Dopfer and Potts (2008), the new rule in this context was VR technology, but it was received by local innovators as a raw resource, a technology to be used to build new technologies and services. Typical for the early phase innovations, there was a diverse cluster of inventions the companies worked on, often very different and addressing alternative stages in health care value chains or operations – preventive care, treating phobias, rehabilitation, medical education, insurance, etc. Yet, they were all connected by VR as a specific technology, by using AV storytelling skills and by having relevance for health care. The cluster was diverse, but there was also learning taking place between the new enterprises and, as a whole, it started gradually to work auto-communicatively. That is, it was discursively establishing itself as a distinctive and bounded domain at the borderlines of existing industries, mainly health, ICT and AV. As expected, the cluster consisted mostly of new start-up companies who could also readily associate themselves with the new domain; older AV companies operating in other sections of AV services markets did not get involved. Their future was uncertain owing to the fragmentation of the health sector ICT systems (see the discussion above), but they were optimistic and were forming as a cluster/sub-sector.

The second case – use of AR in tourism – was also driven by the public sector. They did this mostly by commissioning prototypes of AR tours or exhibitions at heritage sites or museums. That is, they were mostly commissioned not by the local tourism boards, but by agencies responsible for cultural heritage. While tourists as a target group are usually part of the calculation in such investments, the cultural policy rationales emphasising public education tend to drive the agenda. It is doubtful if improvement of tourism experiences alone could be used to justify such public investments. That is, tourism is generally less of a public concern; it is relatedly less institutionalised and therefore also a disorganised partner in dialogic cross-innovation endeavours. Compared to this, health care is heavily institutionalised, it is a significant public concern and a cost item and it therefore receives a lot of attention and research funding for how to improve the quality and how to reduce these costs. In this context, cross-innovation attempts can also receive public funding and attention.

Further, as tourism is also enjoying relative growth globally and, owing to its general platformisation (see discussions above) and the limited capacities of its SMEs, to start to innovate by its own means, tourism came across as unmotivated for cross-innovation. In this context also AR, despite its promise, was seen by tourism as an unproven technological platform and was often associated by interviewees with many previous early-stage technologies that first attracted investments, but eventually were not adopted by wider populations. Therefore, while this cross-innovation area exists, and there are dialogues and some experimenting, it is not driven by commercial service markets. Instead, it is currently

the sphere of curiosities – experimentation driven by the public sector, especially by the agencies governing cultural and creative industries. The lack of interest on behalf of the tourism industries could be related to the relationship between mainstream videogaming industries and education. The videogaming industries, too, are enjoying growth of their own and dealing with the public sector appeared to them as too much of a hassle. Yet, as some demand was also there, a separate dialogic sub-sector emerged – the one of EdTech. This example suggests that, with the maturing of AR technologies and further coordination by the public sector, this cross-innovation area could reach the wider adoption phase, in the terms of Dopfer and Potts (2008). Alternatively, as the technology matures, this domain could be platformised by online giants or tourism platforms, leaving the local AV industries only the function to fill the platforms with standardised content. This, however, would again mean less diversity in local cross-innovation systems linking tourism, AV and heritage industries. As this in turn could result in less of cultural diversity in specific countries, the rationale to coordinate locally relevant cross-innovation systems could become a cultural policy objective.

Definitions

This book focused on meso-level analysis. That is, we analysed how industries of different sectors either co-innovated and converged or not. The cross-innovation cases we looked at were generally in the early origination phase, except tourism platformisation, which may already, by definition, be in the retention phase. For this reason, the empirical chapters in this volume did not much discuss the adoption of the discussed innovations by users/audiences. Nevertheless, when we asked our interviewees about their relationships with their users, most of them were quick to highlight their rather intimate work with users, even in the earliest phase of development. On the one hand, this indicates how user experience design has become one of the 'rules' (in terms of Dopfer and Potts, 2008) affecting all innovations aimed at end-user markets. On the other hand, this suggests that contemporary cross-innovation processes are preconditioned to engage with immediate social network markets – users in both (or more) sectors needing or benefitting from the innovative solution, as, for instance, with testing VR preventive care solutions with athletes, developing gamified digital textbooks with teachers or testing AR applications for representing lost cities with local tourism professionals. It became apparent from the interviews that cross-innovation involves professional insecurities and a strategy to overcome this is to include 'translators' – professionals with expertise from the other sector. As such, the particular start-up companies were typically inherently dialogical themselves, involving daily inter-disciplinary dialogues, but were as such also more agile, more responsive to different signals from their environment (relating to Küng's approach to 'interpretative strategies' – Küng, 2017).

It is, however, now time to ask, is cross-innovation a thing, is it operational as a concept and an analytical instrument? We believe that the empirical and analytical work in this volume evidences that it is. We showed how cross-

innovation processes are conditioned by a complex set of social trends; our empirical work especially highlighting the importance of individualisation as conditioning demand for increasingly personalised and entertaining services in education, health care or tourism. In all our case studies, we also demonstrated the true involvement of AV media professionals in working with other sectors. More often than not, they were, however, involved in start-up companies working in different cross-innovation areas. More established AV sector companies rarely got involved directly. Yet, the start-up companies, especially in the case of EdTech, often facilitated new kinds of value networks where, for instance, established game design companies contributed to multi-party projects.

It needs to be highlighted, however, that for the 'other' sectors distinguishing clearly between AV media/online service design/technology was often irrelevant. This could be related, first, to high mediatisation of online services and digital technology domains, but also to the fact that start-ups working, let's say, on early iterations of a medical education VR application have not had an opportunity, yet, to work with established AV media professionals. Nonetheless, involving experienced script writers, animators or game designers in developing transmedial educational 'worlds' has become a necessity – as in the case of Rovio's Angry Birds Playground concept. We believe that our initial aim to focus on the role of AV media industries in these new constellations has provided new information on the evolution and increasing fluidity of professional identities – perhaps also a product of cross-innovation processes.

Regarding the conceptual work this book does, we believe it contributes especially in combining and interlinking several of the currently dynamically evolving bodies of scholarship. While the broader innovation systems theory provides us with useful tools to understand the emergence of innovations in the economy and the importance of, for instance, interactive learning (Lundvall, 1992) therein, it is not well equipped to understand the role of culture and media in these broader processes. The works of Potts, Hartley, Cunningham and others (Cunningham, 2014; Hartley & Potts, 2014; Potts, 2011; Potts et al., 2008) within the 'cultural science' domain have combined innovation systems thinking with cultural theory, but what they have not systematically addressed is the dialogic practices across sectoral boundaries and the emergence of new structures at these boundaries. Based on an extensive empirical project, we have demonstrated the practical nature of such processes. More specifically, we showed how complex cultural dynamics and broader mediatisation processes shape contemporary innovation processes in different service sectors such that they cannot be ignored anymore by the broader innovation systems studies. That is, we combined innovation systems studies with the dynamically evolving mediatisation studies, critical platformisation studies and transmedia/cross-media/media convergence studies in order to fully understand these processes.

By doing this, we demonstrated that contemporary cross-innovation processes are not only about clusters of start-ups, professionals or early adopters/audiences carrying out multi-linear dialogic processes across sectoral boundaries and therein self-organising; very often, these processes are isomorphic – happening on different scales. That is, these are often also pursued by various international and global platforms, both everywhere as well as at different localities. Cross-innovation, therefore,

is paradoxically, at the same time, both a global and a local process. If the mediatisation of a service sector means that it needs to accommodate the coordinating role of a global platform, it is expected that locally this particular cross-innovation system is then framed by that platform, reducing its inherent freedoms, dynamics and diversity. Yet, inherent diversity is the most important prerequisite for innovation systems – as diversity produces diversity. Reduction of diversity within systems could therefore be understood as a risk. This is a risk that should be realised by the coordinators of national or regional cross-innovation systems. This book gave a few examples of how such systems could be coordinated successfully.

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