

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 policy-makers. 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



© 2019, Mervi Rajahonka. Published by Emerald Publishing Limited. This chapter is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this chapter (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>

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)

¹See <https://www.neogames.fi/2015-tekes-10-years-of-funding-and-networks/>

²See <https://cphdox.dk/en/propellor/>

³For 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

⁴However, 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).

⁵See <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

⁶Triple 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.

⁷See <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 curriculum⁸.

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

⁸See 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 led 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 PISA⁹ 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

⁹The 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 (life-long) 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.

¹⁰EdTech 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>

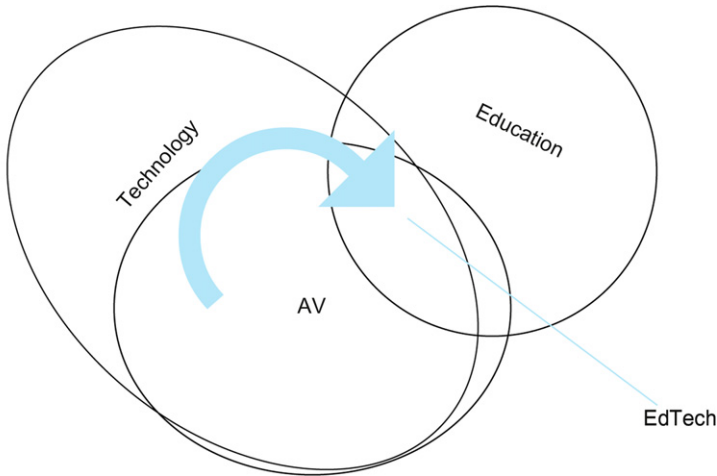


Figure 5.1. The Competences of the Audiovisual Media Sector Are Mediated to the Education Sector Through Technology Competences and Platforms.

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](#).

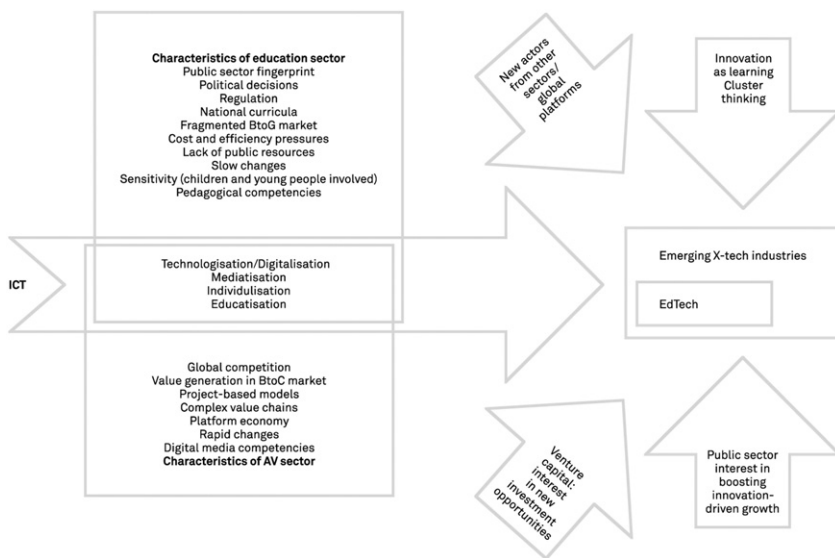


Figure 5.2. Characteristics of Education and Audiovisual Media Sectors and Trends Stimulating the Emergence of the EdTech Sector.

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 Finland¹¹ 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

¹¹Team 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 policy-makers 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.