DIGITAL TRANSFORMATION IN FINNISH HIGHER EDUCATION: A PERSPECTIVE FROM A UNIVERSITY OF APPLIED SCIENCES

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ABSTRACT

This paper describes digital transformation in Finland from the perspective of a mid-sized university of applied sciences in western Finland, outside the capital city area. Higher education institutions (HEIs) compete amongst themselves, both locally and globally, in terms of student and staff recruitment, government funding, and research funding. In addition, networking with companies and other organizations is a key part of HEIs' strategies and actions. We consider the steps that HEIs have taken toward digital transformation, the drivers behind digital transformation, and the factors that affect HEIs' management strategies. Although the digital transformation process started over 30 years ago, the COVID-19 pandemic has become a major driver of digital transformation in Finnish HEIs. The results of our case study show that an HEI's funding is of critical importance and provides the ground for setting the performance indicators in HEI management. Finally, climate change and sustainability are factors that will further affect the higher education system.

KEYWORDS

Digital Transformation, Digivision 2030, Management, Funding, Change.

1. INTRODUCTION

The Finnish higher education (HE) system employs a dual model with two types of higher education institutions (HEIs), namely universities and universities of applied sciences. Universities provide bachelor's, master's and doctoral degrees and conduct both basic and applied research. Universities of applied sciences provide bachelor's and master's degrees and conduct applied research and development in close collaboration with companies and organizations in their geographical regions. The Finnish Ministry of Education and Culture steers HEIs' activities. The HE system is primarily funded by the government and involves no tuition fees (except for non-EU students). For research grants, HEIs apply for funding from multiple sources, including the private sector.

In many industry and service sectors in Finland, the need for a skilled workforce is growing, especially in technology-related fields as well as the social and health sectors. In terms of long-term projections, the decreasing birth rate suggests that Finland's population will begin to decline in 2034 (YLE News, 2021). HEIs are expected to respond to the need for more workforce by providing degree studies and continuing education.

Moreover, due to technological development and the rapid changes in our societies, jobs are constantly changing. For many jobs, workers' skills and knowledge need to be updated systematically. It is not enough to simply have a degree; rather, one must possess the latest knowledge and skills. In addition to job-specific skills, students are expected to learn the so-called future skills (see, e.g., Bakhshi et al., 2017; Ehlers & Kellermann, 2019), such as problem-solving skills, creativity, the ability to act in a self-organized manner, cooperation skills, and social and communication skills, all of which are important in today's changing work life.

The contemporary adoption of technologies in HEIs reflects a paradigm shift, whereby technology is seen as facilitating the management of complex learning environments and digital learning (Benavides et al., 2020). This paradigm shift is known as digital transformation (DT). According to Benavides et al. (2020, p. 1), "digital transformation (DT) has become a priority for higher education institutions (HEIs) in this second decade of the

21st century, and this is a natural and necessary process for organizations that claim to be leaders of change and be highly competitive in their domain."

According to Abad-Segura et al. (2020, p. 2), "digital transformation (DT) must be established according to the axioms of connectivism, to unify its commitment to meeting the expectations of the different interest groups in the economic, social, and environmental dimensions." Scholars have argued that digital learning promotes student-centered learning (Abad-Segura et al., 2020), partly because technology enables rich learning experiences. Brooks and McCormic (2020, p. 5) defined DT as "a series of deep and coordinated culture, workforce, and technology shifts that enable new educational and operating models and transform an institution's business model, strategic directions, and value proposition." The core element of DT is change (Rodrigues, 2017). An important part of DT is the "modification of business processes, procedures, capabilities and policies to take advantage of the changes and opportunities presented by new digital technologies, as well as the impact they have on society" (Sandhu, 2018).

Based on these definitions, it is clear that DT has a significant impact on HEIs' strategies, teaching, infrastructure, curricula, administration, research, business processes, human resources, and marketing.

Connectivism is a learning theory that emphasizes social learning in a networked environment. Downes (2007) described connectivism as follows: "Knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks" (para. 1). In connectivism, "learning is a process of connecting specialized nodes or information sources (Siemens, 2005). Moreover, in connectivism, knowledge is constructed via social contexts and networks. Connectivism was developed because previous learning theories emerged before the growth of educational technology (Siemens, 2005). According to Siemens (2005), "the capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in our knowledge economy."

In this paper, we discuss DT in Finnish HEIs. As a case study, we discuss the experiences of a mid-sized Finnish university of applied sciences in relation to its strategy and management decisions.

2. DIGIVISION 2030

2.1 Digital Transformation in Finnish HEIs

Digivision 2030 is a joint development program for all Finnish HEIs aimed at establishing Finland as a model country for flexible learning and a global pioneer in HE. Finnish HEIs have formed a consortium that receives external funding to implement a common model for DT in Finnish HE. According to Digivision 2030 (2021), the aims are as follows:

- Learners are provided with data on their own learning in a secure manner, enabling and supporting their learning throughout their lives.
- In 2030, Finland has an open and recognized learning ecosystem that offers quality, diversity, flexibility, efficiency, and suitability for the life situation and needs, thus generating better learning results.
- The learning ecosystem also provides a platform for research and innovation activities, benefiting society and working life extensively.
- In 2030, the scientific and educational activities of HEIs are key factors in securing the high level of competence of the adult population, national competitiveness, and international impact.

Currently, all HEI's in Finland have their own information technology (IT) infrastructures and systems, and students need separate credentials to access the services provided by different HEIs. Digivision 2030 aims to establish one identity for all users for accessing all services. For the Digivision 2030 national platform, a common interface needs to be implemented to guarantee the compatibility of the existing digital services provided by HEIs.

DT will have consequences for student guidance and counseling. HEIs should support students regardless of time and place—for example, by using artificial intelligence (AI) solutions (Higher Education Institutes' Digivision 2030, 2021). However, it is not clear how best to support students studying in a complex, networked HEI. According to Edyburn (2021, p. 115), "there is an urgent need to determine how to support students that have underdeveloped self-regulation skills." More research is needed to identify students' needs and design

student-centered guiding and counseling practices. Digivision 2030 represents a major DT that cannot happen without proper change management.

Digivision 2030 is a continuation of HEIs' collective and individual transformations. Digivision 2030 entails a comprehensive change in HEIs' organizational culture and thus requires knowledge of managing systemic transformations. Although an organization's subsystems strive to fulfill their own functions, only the unity of the subsystems enables the organization to achieve its goals. Therefore, management should consider the requirements and effects of change on all parts of the system as well as the relationships and dependencies between the parts (Mattila et al., 2021, pp. 171–172). In sum, Digivision 2030 is a new stage in the transformation that universities of applied sciences have been undergoing for many years (Auvinen, 2004; Nenonen, 2020).

2.2 Digital Transformation in Satakunta University of Applied Sciences

Satakunta University of Applied Sciences (SAMK) is a mid-sized university of applied sciences in western Finland. SAMK has over 410 staff members and over 6,000 students across 40 bachelor's and master's programs. The students represent over 60 nationalities, and 14 of the degree programs are in English. SAMK has more than 500 partner companies that participate in various research and development projects with SAMK's research centers. SAMK's vision is that all its students should find employment. The economic and industrial structure of the region where SAMK is located requires SAMK to be capable of offering extensive education and research opportunities in the fields of industry, health care and social services, business administration, and technology.

For as long as universities of applied sciences have existed (i.e., 30 years), they have been implementing changes related to the objectives of Digivision 2030. In SAMK, the transformation process has consisted of the following partly overlapping steps:

1) **Fostering enthusiasm for digitality.** Building an online learning environment to improve learning, teaching, and guidance and implementing the first steps of a digital library. In SAMK, a learning environment called Virtualia was implemented in the late 1990s.
2) **Preparing for digital learning.** Treating digital learning as part of SAMK's functions by recruiting an individual responsible for online pedagogy and the technical support assistant for teachers. At the same time, each new teacher was obliged to complete a course in online pedagogy. Since 2000, this step continued for just over 10 years and moved to step five in the early part of the 2010s.
3) **Transforming a degree program into online learning.** The next step began in the early 2000s and involved transforming one-degree program and one of the campuses into a digital campus to serve the needs of students who worked and studied at the same time. Together with multinational actors, SAMK developed an e-learning environment that enabled participation in related education and tutoring activities. Systemic change began when the administration (communication, ICT, student services, library), pedagogical solutions (teacher competence), and management realized that when constructing a digital campus, a change in one area requires modifications in all other areas to meet the learning needs of digital campus customers.
4) **Expanding digital services**. The digitality of services needs to be comprehensive. There, SAMK decided to convert all services to digital ones and to introduce the Bring Your Own Device (BYOD) concept. The systematic implementation of this change started in mid-2010 and is still ongoing.
5) **Initiating pedagogical changes**. In the fifth step of the change process, the pedagogical change became the central component of the business. The pedagogical change was fundamental and involved defining, for example, the common pedagogical starting points of the HEI and establishing the frameworks for the identification and evaluation of competences. Skill pools were established for ongoing dialogue between teachers and the administration. In response to the changes demanded by Digivision 2030, a digital leaders' group was established to develop the pedagogical framework of the future.

DT and educational organization performance require continuous development and responsivity in a changing operating environment. Digivision 2030 challenges HEIs in a new way. SAMK has responded to this challenge in an organized and proactive manner.

ISBN: 978-989-8704-39-9 © 2022

2.3 The Drivers of Digital Transformation

What are the major drivers of Digivision? We have already discussed DT and will also present climate change and sustainability as factors influencing Digivision 2030. Bakhshi et al. (2017, 12) proposed that the following trends "determine the big picture of work": environmental sustainability, urbanization, increasing inequality, political uncertainty, technological change, globalization, and demographic changes. Most of these key trends also affect Digivision 2030. However, in this paper, we study the following trends in more detail: competition for the best students, faculty, and researchers, changing work life and skills, DT caused by COVID-19, and new technological developments.

In some countries, universities are competing intensely for the best students, faculty, and researchers (Benavides et al., 2020). This is also the case in Finland. The industry and the health and service sectors need more workforce, but finding new skilled workers is not easy. The demand for professionals is greater than the number of professionals that HEIs can train; at the same time, the number of young people is decreasing. The solution to this challenge is to bring students from abroad to study in Finland and, after their graduation, to convince them to stay. Helping immigrants feel at home and develop their lives in a new culture is a well-known social challenge. It is not only HEIs' responsibility to help students settle down in Finland; rather, the community should also be strongly involved in this process by providing work, housing, health care, and safe environments for immigrants to build their careers and lives.

In addition, jobs are changing rapidly, and people need new skills to succeed. Therefore, there is a need for just-in-time courses using which people can update their skills. Online learning is one possible answer to this challenge.

In Finland, the working population is educated extensively during work life. A significant proportion of the Finnish working-age population already re-educate themselves while working. This is necessary from an individual's perspective to maintain the competence required in the work life. Changes in work and technology mean that some jobs will be lost, and new ones will emerge. Therefore, new forms of HE are required for those already employed.

The *Education Policy Report*, issued by the government and approved by parliament, states that in the future, opportunities for studying will be improved by opening up existing education institutions and creating new, flexibly targeted education programs (Finnish Government, 2021, p. 45). The solution provided by Digivision 2030 is a common learning platform for HE, using which educational opportunities can be created by third parties as well. The technical solution is the single study identity for all students, which will allow them to access this platform and will facilitate continuous learning.

The debate regarding real breakthroughs in competence building in relation to degrees is just beginning. In new areas of digital business, the importance of competence has already increased beyond formal education. However, this has not yet been the case in more traditional industries, such as health care and shipping.

Online teaching has been criticized for being a degree mill (Simonson et al., 2015, p. 18). However, quality learning means learning what is needed for a successful work life. The most important future skills in the work life include interaction skills, emotional intelligence and empathy, the ability to recognize and develop one's own competences, and networking ability. The challenge is the quality of learning and the understanding that learning takes place within a community. It remains to be seen how these requirements can be fulfilled in Digivision 2030 digital learning environments.

In Finland, universities of applied sciences have responded to these challenges by determining the shared competencies in relation to the European Qualifications Framework (EQF) competency basis, by developing competence-based evaluations, and by defining quality criteria for digital courses. Shared competences are common competence areas for different programs and degrees, and they create the foundation for operating in a workplace, cooperation and the development of expertise (Auvinen et al., 2022, p. 4). It is possible to implement all the needed work-life skills in online learning environments. In SAMK, students are encouraged to work together in a variety of ways, such as online consultations, joint tasks, discussions, presentations, peer evaluation, and the like (Kallama et al., 2019).

The DT caused by the COVID-19 pandemic can also be seen as a driver of Digivision 2030. We also know that COVID-19 has caused mental health problems for students due to long periods of university closures.

Of course, massive online open courses (MOOCs) have been around since at least 2008 (McAuley et al., 2010) and have already transformed online learning. At the same time, social media has expanded rapidly, and

young people are heavy users of social media. Their use of technology reflects what they expect from their learning environments.

Finally, the development of AI can make it possible to create AI-based learning services. In many cases, AI-based tutors could guide students through the learning process and support students with underdeveloped self-regulation skills.

2.4 Sustainability

The Finnish Ministry of Education has introduced a sustainable development policy (Finnish Ministry of Education, 2020), and all universities of applied sciences have adopted the goal of becoming carbon neutral by 2030 (The Rectors' Conference of Finnish Universities of Applied Sciences Arene, 2020). The largest sources of CO2 emissions in HEIs are buildings and transport. In Finland, we need to heat our buildings for most of the year. In addition, buildings use energy for cooling, lights, and so on. Faculty and research staff often travel to scientific conferences or project meetings, and although video conferencing is growing, there is still a need to meet face to face. In addition, staff and students commute to campuses, and restaurants and cafeterias on campuses produce waste.

Most HEIs in Finland have taken the strategic decision to not compensate for the CO2 emissions that they produce. Instead, they aim to decrease the emissions—for example, by limiting work-related travel and using green energy. However, the biggest contribution that an HEI can make is to fight climate change in every curriculum so that when students graduate, they can use their sustainability and climate-change skills wherever they work. This is known as the carbon handprint, or positive climate impact.

3. STRATEGY AND MANAGEMENT ISSUES

All HEIs in Finland are currently involved in Digivision 2030. At the same time, HEIs are both jointly making decisions on how to proceed with Digivision 2030 and implementing their own strategies and competing against other HEIs.

It is quite easy to build a management system that is based on HEI's strategy and related key success factors and measure key success factors using items derived from the funding model (see Fig. 1). But managing change itself is very challenging, while changing the operating culture takes a long time. Previous funding models for Finnish HEIs have focused on the number of incoming students. Previously, an HEIs funding was based mainly on the number of students enrolled in an HEI. In negotiations with the Ministry of Education, the HEIs' goal was to secure as many student enrollment positions as possible. The enrollment brought funding, which enabled HEIs to organize their activities. In the current model, the funding is based on the output—that is, on the number of graduating students—which has been a major paradigm shift.

The current funding model puts lifelong learning at the center, together with degrees and R&D funding. The effects of this paradigm shift on teachers' work have been significant. More specifically, student groups have become larger and more heterogeneous, students' learning goals have become more diverse, and students' approach to learning and credits has changed.

When it comes to HEIs' management, perspectives are divided according to the priorities of the different groups, with performance indicators being of primary interest to management, the clarity and functionality of processes being the most important elements from an administrative perspective, and the autonomous role of teachers being seen as the most important aspects by the teachers (Auvinen, 2004, 360). These three perspectives co-exist in HEIs. Handling all three requires a strong effort on behalf of the management. When it comes to goals, it is simple to manage set metric goals and monitor their implementation. But how does one build processes, competencies, and evaluations to support the implementation of a university's strategy, and how can leadership enable teachers' pedagogical competencies to support these goals? This involves the whole organizational culture and its change. Management and supervisors must build a new culture by setting a consistent example in terms of what the management pays attention to, what they emphasize, evaluate, and control, how they react to critical events, how resources are allocated, who is rewarded, and what behavior is punished. At SAMK, the strategy, the goals, and the desired quality targets are regularly communicated via discussions with the personnel, and operations are defined and measured according to the established goals. Teachers' pedagogical freedom is guided by emphasizing competencies, such as e-learning skills, learning guidance skills, and assessment skills, and by providing training and support that lead to the successful implementation of the strategy.

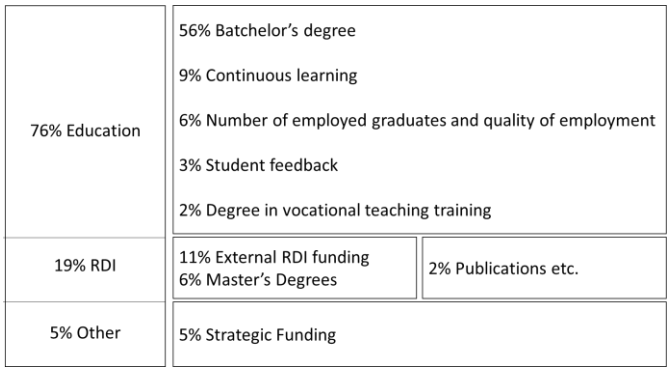

Figure 1. The Finnish universities of applied sciences funding model. The government funding is allocated to the universities of applied sciences based on the performance of previous three years (Ministry of Education and Culture, 2021)

According to previous research, the steering effect of a funding model on HE is considerable. Universities of applied science focus specifically on the functions highlighted by the funding model, in particular the issues related to key financial indicators (Nenonen, 2020, 29). This is what has happened at SAMK: the major indicators have all been adopted directly from the funding model. To give an example, SAMK has succeeded in implementing continuous learning, a major measure in the funding model. The number of ECTS completed in continuous learning and cooperation between universities has increased more than 100 times since 2012 and tripled between 2019 and 2021.

For HEIs not located in the biggest cities, major decisions are related to student recruitment. The constant flow of students entering an HEI and graduating on time are the most important elements in the Finnish HEI funding model. In the Finnish system, students can apply to HEIs after completing upper secondary school or vocational school. Although there are entrance exams in HEIs, entrance exams are not the only way to enter HE.

A faster transition toward HE is one of the goals of Finland's education policy. Students with high school diplomas or vocational school certificates may not yet know where they would like to work, which means that HEI enrollment should be flexible. However, after enrolling in a degree program, one should graduate from it. It is not easy to switch to another program. The idea is that one can update one's skills and learn new areas after graduation via continuous-learning opportunities. Student selection in Finnish universities is based on high school or vocational school success or entrance examinations. The universities of applied sciences have a joint entrance examination. In fact, joint entrance examinations measure the general university readiness for a specific field—that is, the same competencies as those studied during secondary education. Previous academic success thus has a major impact on whether one can enter the desired institution. Therefore, HEIs have built products that are designed to provide opportunities for demonstrating one's competency in a desired degree field by completing degree-related studies and thus earning a place to study. This option is known as pathway studies. The idea is that by completing a sufficient number of degree courses, one automatically gets degree-student status and the right to complete degree studies in the same field. According to SAMK's experience, the students chosen for degree programs after completing pathway studies often graduate on time and are satisfied with their studies. To give an example, in 2014, pathways were introduced as an experiment in one degree program. At the time, dropout rates were over 40% per class, and graduation was very rare (< 20%). Today, few students drop out, and almost 80% of them graduate on time. At SAMK, about 20% of all students start their studies through various pathways.

The goal of the government's education policy is to triple the number of international students by 2030. and to have 75% of graduates be employed in Finland. Common platforms for international HEIs, improvements in student entry and integration, co-operation in streamlining application processes, and the strengthening of foreign students' Finnish and Swedish language skills are seen as tools for achieving the employment goal. There is also a strong will to do this work together (Ministry of Education and Culture, 2022, pp. 16–17). The Ministry of Education has directed strategic funding to HEIs for joint pathway studies for foreign students. The joint pathway is an opportunity for students to see the various opportunities that Finnish HEIs have to offer. In addition to the joint pathways, Finnish HEIs have co-operated with commercial actors to recruit international students.

These tools aim to ensure that when international students arrive in Finland, they are ready for university studies, know Finnish culture, and can succeed in studies in English. There is still a lot of work to be done to make the integration of an international student a success. To give an example, SAMK presented the youragent.fi service to enable students and companies to find each other and to foster internship opportunities.

What would be the pros and cons of a national platform for common courses for all HEIs? Should HEIs open the platform to commercial players as well? It is unlikely that HEI funding will grow in the coming years. Therefore, cooperation is needed not only between educational organizations but also with commercial pedagogical operators. HEIs should accept the responsibility for the content and quality of HE.

We have already stated that the funding model is a strong tool for guiding HEIs' operations. The additional funding (research grants) comes from multiple sources and guides what kind of research is supported. For example, European Union funding emphasizes the digital and green transitions and aims to make Europe a leader in digital and climate actions. Such policies (either national or international) strongly impact HEIs' research and development.

4. CONCLUSION

DT is changing how HEIs operate. In this paper, we have discussed the DT of Finnish HEIs and presented a case study of the decisions and experiences of a mid-sized university of applied sciences in Finland.

Based on our case study, the DT process can be conceptualized as a five-tier process consisting of the following steps: (1) fostering enthusiasm for digitality, (2) preparing for digital learning, (3) transforming a degree program to online learning, (4) expanding digital services, and (5) initiating pedagogical changes. The process has been going on for over 30 years already.

We have identified and presented six drivers behind the DT of Finnish HEIs: (1) climate change and sustainability; (2) competition for the best students, faculty, and researchers; (3) competences and the need to organize just-in-time courses for updating skills; (4) the COVID-19 pandemic; (5) younger generations' expectations (social media and MOOCs); and (6) technological development, especially that of AI.

The factors affecting HEIs' management strategies are as follows: (1) the guidance from the ministry, especially through the funding model and the setting of performance indicators for HEIs; (2) the definition of quality in HEIs processes; (3) the interaction and balance between performance indicators, processes, and teacher autonomy; (4) student recruitment, both nationally and internationally; (5) faster transition from secondary to HE via pathway studies; and (6) the increasing number of enrolled students. Based on our case study, the funding of an HEI is a core means for guiding an HEI and provides the ground for setting performance indicators for HEI management.

There are open questions related to DT and its management in the future. First, climate change and sustainability will affect all functions in HEIs. Second, what would be the best way for HEIs to collaborate with private education service providers? Third, how can education quality be ensured in digital environments?

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