

## **DIGITAL TRANSFORMATION FOR INCREASING THE COMPETITIVENESS AND EXPORTABILITY IN THE ENTERPRISES OF THE FISHERIES SECTOR**

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**Abstract.** This study evaluates the possibilities of introduction of digitalization solutions for enterprises of the fisheries sector of Kurzeme region in Latvia and their impact on the improvement of business operations. The study describes the nature of digitalization, digitalization of the fisheries sector and the theoretical aspects of business models. The characteristics of the fisheries sector in the EU, Latvia and Kurzeme region. Empiric part is based on the individual interviews with business owners in 4 fisheries and a survey of their employees. This paper aims to assess the progress in digital transformation in the fisheries sector and elaborate scenarios for further digital transformation of the sector. The results are summarized in a SWOT analysis, which identified the advantages and disadvantages for digital transformation in the fisheries sector resulting in elaboration of three development scenarios: 1) non-compliance of SMEs in the fisheries sector with the digital transformation; 2) efficient management of the fisheries sector through the expansion of sales networks; 3) implementation of digitalisation tools in all stages of production. Considering obtained results and overall trends in the fisheries sector, implementation of digitalisation tools in all stages of production as suggested by scenario No 3 is the most advisable path to significantly increase the competitiveness of the companies and their exportability.

**Keywords:** digitalisation, fisheries, business models, digital transformation, digital marketing.

**JEL code:** O13

### **Introduction**

Recently, the digital transformation has been a way to enhance advantages and competitiveness between companies. However, it is not known what they are the consequences of digitalization implementation processes for the future performance of companies. The goal of modern technology is not just to help people search and automate time-consuming and repetitive processes, but also to obtain new data on the company's operations rational decision-making by improving the company's operations. The fisheries sector incorporates the elements of the industrial and business system involved -fishing, fish processing and farming, fisheries' conservation, production aid services, research and education, thus it is necessary to use digital technologies and opportunities.

The fisheries sector in Latvia has three main spheres of activity - fishing, fish processing and aquaculture. Currently, there are 87 fish processing companies in Latvia, from of which 37 micro-enterprises (with less than 10 employees), 25 small enterprises (with 10 to 49 employees), 19 medium-sized enterprises (with 50 to 249 employees) and 4 large enterprises (with more than 250 employees), as well as 79 aquaculture enterprises, of which 30% of employees are women.

The contribution to Latvia's gross domestic product from 2014 to 2019 was in the range of 0.7–0.8%. Fish products account for 1.8–2.4% of Latvia's total exports in this period. The foreign trade balance has always been positive and in 2019 amounted to 28.6 million euro. The produced amount of aquaculture products in 2020 equalled 4.1 million tons.

The development of the fisheries sector is of special importance to the coastal regions of Latvia, where most of the fishing companies are located. Companies in the fisheries sector are no longer able to work fully with traditional and obsolete technology, equipment and complexity, implementation of digitization solutions in both manufacturing and business management; and marketing is necessary to improve the performance of these companies, successful competition market and increase export capacity.

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This paper aims to assess the progress in digital transformation in the fisheries sector and elaborate scenarios for further digital transformation of the sector. The main tasks include the review of the related literature about digital transformation and business model shifts; analysis of the results of surveys and interviews; elaboration of the SWOT analysis and the scenarios for digital transformation of the fisheries sector.

### **Materials and methods**

For this study, the authors have applied qualitative and quantitative research methods, general research methods (logical-constructive, graphical and monographic methods), sociological research methods (interviews and questionnaires), SWOT analysis were performed and scenarios were developed. The survey and interviews were carried out in 2021 in the enterprises of the fisheries sector of Kurzeme region in Latvia. There were 560 respondents for the survey and 7 managers of companies in the fisheries sector of Kurzeme region from JSC Banga, Ltd Kaltenes zivis, Ltd Vergi, Agricultural Holding Irbe, Association KZRO, Ltd Venta FM and Agricultural Holding Karli were interviewed. The surveyed and interviewed companies were selected based on their business performance and ongoing digitalisation initiatives.

### **Research results and discussion**

Digitization is the process by which information, communication, processes and services are connected in a single network through digital platforms. It also includes automation, optimization processes etc. In today's business world, digitalisation is very important because it promotes constant change and opens up new development opportunities, thus the work environment is constantly changing and it has become much more flexible and organized (Joao J.M. et al.,2019). Digitization as an innovation, attracting the interest of researchers and practitioners, has contributed to economic development in the business sector. In the scientific literature, the digital sector is considered as a strategic tool not only for the creation of innovations, but also for the development of knowledge and technology (Tether and Tajar, 2008). If the company's internal processes are digitized, new market opportunities open up for companies, which allow them to develop and implement innovations within the company (Heirman, Clarysse, 2007).

Ratchingner et al. (Ratchingner et al., 2018) portray digitization through digital technologies that aim to transform business models, products, and services from analog to digital. In order for a company to be competitive and productive, it is necessary to provide the company with technical support for employees to increase the efficiency of the company. This can be achieved through a variety of digitization tools: governance, finance, recruitment, market and supplier sourcing, and internal and external company communication tools (Daniela et al.,2019). Several studies have found that with the introduction of digitization in a company, its degree of modernization is increasing, thus also leading to a number of economic indicators - an increase in productivity and exports in the company (Rüßmann et al.,2015).

New technologies have rapidly affected the current highly competitive business environment. Mobile technologies have also transformed and consumers are rapidly exchanging information with each other. Although digitalisation is not a new phenomenon, this process continues to evolve and create new impacts in the business world (Davis, et al., 2015). The introduction of technology increases productivity, the level of industry and economic growth, which is an essential condition for gaining a competitive advantage in the global market and at the same time in the current economic development (Parida, 2019). In addition, the companies that innovate the most in their products or services outperform the companies with the highest turnover (Fernandes, Ferreira et al.,2014), thus giving companies greater performance and competitiveness.

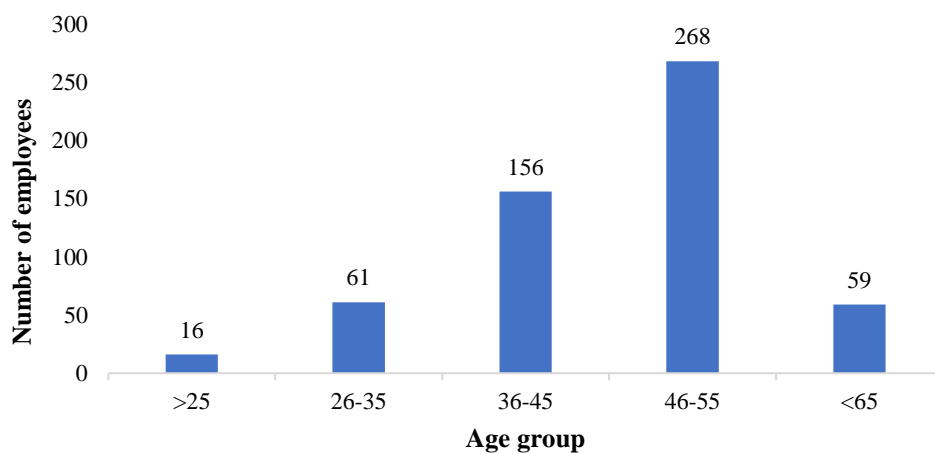
A business model is a process in which management adapts to business changes in a variety of circumstances. These can be changes in the customer base, technological changes, competition etc. (Markides, 2006). The business model also shows how the company creates and offers added value to customers and other stakeholders, thus ensuring the company's short-term and long-term competitiveness in the market. One of the most important components of business models is the customer segment, as customers are the basis of each business model (Achenthagen et al., 2013). The important customer segment in fisheries is based on the users of fish and fish products, so it is important that customers are profitable and that the companies' existence can be sustainable. In fisheries, too, business models are grouped into specific segments with common needs and similar behaviours, thus allowing them to understand which customers are a priority but which remain in the background. Customer segmentation can be both a mass market in which customer groups are not specifically segmented, a niche market in which the company focuses on specific customers and seeks to tailor its products, and a segmented market in which the company focuses on slightly different needs and challenges (Lindroos, 2017).

An important part of business models is the company's resources, as they greatly affect the company's business model. They identify the most important assets to keep business models running. The most important resources are physical resources (factories, equipment, buildings, distribution channels), intellectual resources (trademarks, brand, customer databases, knowledge) and human resources (employee competences, knowledge and creativity), as well as financial resources determine the business model (Kagermann, 2015). Adapting the business model can also create some uncertainty about the outcome, given the organizational skills and the uncertainty of the outcome, and it is unlikely that companies will be able to change their business model unless they have a strong incentive to do so. Even when the need for adaptation seems obvious, a company's strategic orientation and associated dependencies can hinder the process of adapting an existing business model to new market requirements or competitive threats (Santos et al., 2015).

To obtain data about the digitalization processes in the fisheries in Latvia, individual interviews were conducted with entrepreneurs of the fisheries sector of Kurzeme region, and questionnaires were conducted for the employees of these companies. A total of 560 respondents from companies in the fisheries sector of Kurzeme region were surveyed. All surveyed companies are located in Kurzeme region in cities of Roja, Kaltene, Alsunga, Poprags, Ventspils and Saldus. The companies are divided into two categories - small companies (Ltd Kaltenes zivis, Ltd Venta FM, Association KZRO, Agricultural Holding Karli) with the number of employees up to 50; and medium-sized companies (JSC Banga, Ltd Vergi, Agricultural Holding Irbe) with the number of employees from 50-250. The company JSC Banga has the largest turnover, but the company Ltd Vergi is close to it. The number of employees in JSC Banga is almost half as small as in Ltd Vergi, but the turnover level is slightly higher. This could be described by the JSC Banga positioning in production of premium fish products, that are widely exported to more than 24 countries, as well as the fact that almost a third of Ltd Vergi employees are employed in fishing, but JSC Banga is not engaged in fishing, but only in fish processing. All employees of the fisheries sector surveyed in Kurzeme region are engaged in such fishing activities as fishing and fish farming, production of canned fish, production of preserves, processing of fish by-products into fishmeal and fish oil. In Kurzeme region, the fishing industry is represented in all types of fish processing. When interviewing employees of fishing companies in Kurzeme region, it was found that a total of 560 employees work in the sector in various areas of the main fishing activity.

The employment structure of respondents (n=560) of the fisheries sector employed in Kurzeme region was as follows: entrepreneurs (1%), employees of management level (8%), employees of the sales sector (3%) and employees in administration (2%), the largest share of respondents was occupied in production,

working in different stages of the product manufacturing process. Also, 6% of employees work in the primary activity of the fishing sector - fishermen, ship captains, trawlers, drivers, etc. The survey results indicate, that one of the obstacles to the introduction of digitalisation in the fisheries sector of Kurzeme region is the age of employees, as many of them are in the 50+ age group (Fig. 2). Almost half of the surveyed employees of fisheries companies are in the age group of 46-55 years (268 employees), as well as a large proportion of employees are in the age group of 36-45 years (156 employees). This indicates that it may be difficult to implement digital solutions in companies in the fisheries sector due to the relatively large number of employees over the age of 45. The lowest number of employees is in the age group under 25 - only 16 employees. As the graph shows, the number of young people employed is relatively small. This could be linked to the location of businesses in rural areas, as young people tend to live in larger cities, as well as to a lack of qualifications in the fisheries sector to work in it. Also, low wages in the fishing industry is one of the contributing factors.



**Source: author's creation based on questionnaire data of Kurzeme region fishing companies**

**Fig. 1. Distribution of age groups of the representatives from fisheries sector surveyed in Kurzeme region, Latvia, 2021, n=560**

7 managers of companies in the fisheries sector of Kurzeme region from JSC Banga, Ltd Kaltenes zivis, Ltd Vergi, Agricultural Holding Irbe, Association KZRO, Ltd Venta FM and Agricultural Holding Karli were interviewed. The companies were selected based on their business performance and current digitalisation initiatives. The interviews presented differed views on the introduction of digital transformation in companies in the fisheries sector, which could be characterized by the financial resources of the companies, physically available resources, as well as non-material resources (skills and competences of employees, psychological readiness for digital transformation etc). These resources also affect the change of business models as well as the exposure to digital transformation. Almost all interviewed companies use digitization tools in the course of their work.

The company JSC Banga uses both accounting and logistics services programs, and the company has introduced a robot that facilitates manual work. It is planned to introduce a few more robots of this kind in the future, because, according to the entrepreneur, the age of employees is increasing rapidly. The company Ltd Vergi works similarly with digitization tools, but in parallel with the processing of fish products, it is also engaged in fishing. The vessels have been modernized, the fish processing lines have been digitized – all initiatives are leaning towards digital transformation. The Agricultural Holding Irbe is also engaged in fishing and production of preserves. The association Kurzeme Fisheries Producers' Organization (KZRO)

and the company Ltd Venta FM are engaged in the production of fishmeal and oil, which also uses digitization tools - technologically equipped production lines with the data arranged in joint system.

The interviewed companies also implement marketing tools. The company JSC Banga annually participates in 5-7 exhibitions of international food producers, which have taken place in China, Germany, Spain etc. Stands are made for exhibitions, where the company's products are advertised. With the current COVID-19 situation, online exhibitions are being held where customers can connect remotely. The company also has a website where you can buy products online. Agricultural Holding Irbe has a special product catalogue, as well as a Facebook page and a website. Ltd Vergi does not use booklets or stands, but the company together with the Latvian Fishermen's Association takes part in 5-7 exhibitions a year, where it represents fish processing companies. Ltd Vergi claims that it is on its way to creating digital marketing solutions, but it is not so easy and fast. Ltd Kaltenes fish has created a company website, as well as a page on the social network Facebook. The company admits that many of the company's products are marketed through the website and Facebook, and in this way it is possible to introduce new products to customers faster. The companies Ltd Venta FM, Association KZRO and Agricultural Holding Karli do not use any marketing or digital marketing tools, as they do not feel the need for them at the moment.

In total, 4 out of 7 companies in the fishing industry of Kurzeme region or 71% export, but 3 out of 7 companies or 29% do not export their produced goods. It is possible that exports could be boosted by the introduction of digitalization in companies, in particular in the stages of distribution to consumers, as well as the introduction of new technologies that would increase production. The JSC Banga mentions that digital solutions do not directly affect the increase of competitiveness and export capacity, but it does affect the processing time for economic data - less time is required to process the data and the cost of the products can be predicted more rapidly.

In terms of the obstacles and challenges faced by companies in implementing digital solutions, companies mostly faced challenges with a lack of time, lack of qualified ICT professionals, lack of legislation, and lack of financial resources. But despite the issues, the companies evaluate the development of the fishing industry positively - the Ltd Vergi wants to expand production facilities, as well as increase production volumes, improve existing products, but admits that they are afraid of possible restrictions for the fishing sector. JSC Banga claims that one of the main issues in the implementation of digitalization in the fisheries sector is the lack of specific software developed for the fisheries sector. As well as lack of time, as all data have to be entered by a certain deadline. JSC Banga evaluates the fishing industry positively, as the demand for fish products is higher than the production volumes, some of the employees will replace manual labour with robots, and they want fewer employees, who are qualified to be able to provide sufficient remuneration. The companies Ltd Venta FM and the association KZRO see the fishmeal industry very positively, because fishmeal and oil are in high demand in the world, and there are wide trade opportunities. The Agricultural Holding Irbe evaluates the development of the company and the overall development of the industry positively, because the fishing industry is growing. Ltd Kaltenes fish assessed the fishing industry as a fast-growing and competitive bioeconomy industry. They see their company much more developed in the future than right now, as they are ready to adapt the company's business model to changes brought by digital transformation.

Table 1

**SWOT analysis for the digital transformation in fisheries in Latvia**

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• Latvia has a sufficient fishing fleet that is being modernized</li> <li>• Support programs are available for digitalisation in fisheries</li> <li>• Successful project writing collaboration with fishermen</li> <li>• Some companies support digitalisation implementation processes</li> <li>• New trade and export opportunities, that can be boosted by digital solutions in distribution and marketing</li> <li>• The introduction of digital marketing increases the company's competitiveness</li> </ul>	<ul style="list-style-type: none"> <li>• The age of fishing workers is increasing</li> <li>• Low productivity and gross value added in fisheries</li> <li>• Manual work in fish processing companies</li> <li>• Insufficient use of funding from state support programs</li> <li>• Low income, remuneration in fishing</li> <li>• Lack of time, skills and motivation to implement digital solutions</li> </ul>
<b>Options</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• Development of cooperation at all stages of the supply chain</li> <li>• Increase in demand for fishery products inc. in the export markets that would drive the need for digitalisation to enter new markets/ follow the customer demand for digital distribution channels</li> <li>• Evolvement of digital products tailored for the fisheries sector that would allow to obtain qualitative and more comprehensive data</li> </ul>	<ul style="list-style-type: none"> <li>• Application of new technologies in the aquaculture sector that would increase competition</li> <li>• Limited, unpredictable fishing opportunities, possible changes in fishing regulations</li> <li>• Deterioration of fish stocks</li> <li>• Lack of qualified specialists in fisheries, lack of digital skills of the employees</li> </ul>

**Source: author's creation based on the data of questionnaires (n=560) and interviews (n=7) of fishing companies of Kurzeme region**

The SWOT analysis was developed by the data from interviews with entrepreneurs of the fisheries in Kurzeme region and data from their employees' questionnaires on the importance of digitization for increasing competitiveness and export capacity. The results indicate, that fishing companies are selected from various sub-sectors of the fishing industry, namely from fishing companies to fish waste processing companies engaged in the production of fish oil and fish meal. In order to understand the strengths and weaknesses of the surveyed companies, as well as the opportunities and threats, a SWOT analysis was constructed.

Among the strengths for the digital transformation of fisheries in Latvia, the Latvian fishing fleet, which has been modernized and is large enough to make full use of fishing opportunities in the Baltic Sea and the Gulf of Riga, is one of the biggest strengths of the sector and holds potential for further digitalisation. The fishing fleet is traceable and has the potential to obtain resources on a sustainable basis. In Latvia, digitization support programs are available to companies in the fisheries sector, which promote both the modernization of the company and provide consultations for their digital solution. Fishermen in Latvia have established successful cooperation, as well as jointly attract investments from the EU structural funds.

The biggest weakness for the digital transformation in Latvian fisheries is that the average age of employees in fisheries is growing rapidly, and the number of young employees is decreasing. Compared to the EU average, fisheries in Latvia have low productivity and gross value added. Another major weakness is the persistence of manual labour in fish processing companies that do not want to be modernized. Funding for fisheries and aquaculture is also underused. There is a lack of qualified specialists in the fisheries sector (also including in the management level), because compared to the EU average, Latvia has a low income and a high level of remuneration in the fisheries sector.

The development of cooperation in all stages of the fisheries supply chain, including the use of innovative products and methods and value-added products in the production process, would facilitate the digital transformation. The demand for fishery products exceeds the production that can be offered to customers, which is also because fish products are recognized to be a safe and healthy food choice. Public funding is available to modernize fisheries and it should be fully utilized. The introduction of digital solutions is leading to more and better data on marine fish. In aquaculture, sea fish farming can be introduced in a recirculation system and freshwater fish farming could be expanded by applying new technologies and contribute to increasing competition to marine fishing.

Fishing opportunities can become limited and unpredictable due to uncertainty about fishing opportunities and to the allocation of annual quotas. Fishing opportunities may be reduced due to climate change and other external factors as the state of fish stocks deteriorates, making it impossible for companies to produce fish products at full capacity. In the event of unforeseen crises, this would reduce funding to support digitization. There is also a lack of qualified professionals in the fisheries sector to install digitization equipment and the software needs to be adapted and tailored for the specific needs of the sector.

Based on the results of the interviews and questionnaires about the digital transformation in the fisheries sector in Kurzeme region, 3 scenarios were developed 1: non-compliance of SMEs in the fisheries sector with the digital transformation; 2: efficient management of the fisheries sector through the expansion of sales networks; 3: implementation of digitalisation tools in all stages of production. For each of the developed scenarios, the benefits and challenges to be faced in adopting the processes, as well as the available support for the implementation of the process, have been identified.

Form the 3 scenarios, the scenario No 3 is suggested for the development of the fisheries sector - implementation of digitalisation tools in all stages of production. Although the strengthening of the management and capacity of the fisheries sector comprehended by the scenario No 2 is also vital for the further development of the sector and ability to implement digital tools within the sector.

### **Conclusions, proposals, recommendations**

- 1) The most important digitalisation tools for companies in the fisheries sector are technological equipment, sensors for fishing vessels, catch systems, accounting and logistics service systems as well as warehouse management system. These tools go a long way to facilitate the existing manual labour in fish processing establishments and promotes production capacity; and increase in exports. Overall, companies of the fishing sector in Latvia have become more competitive in the market.
- 2) The results of the SWOT analysis for digital transformation in the fisheries sector indicate that the most significant positive factors for the digital transformation have been the fishing fleet that is being modernized; support programs available for digitalisation in fisheries; support for digitalisation processes by the companies of the sector; new trade and export opportunities, that can be boosted by digital solutions in distribution and marketing

3) Considering obtained results and overall trends in the fisheries sector, implementation of digitalisation tools in all stages of production as suggested by scenario No 3 is the most advisable path to significantly increase the competitiveness of the companies and their exportability.

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