

THE IMPACT OF DIGITAL TRANSFORMATION ON THE RETAIL FOOD BUSINESS¹

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Abstract

Accelerated evolution and continuous improvement of digital technologies challenge retail companies to change and restructure their business models. Digitalization becomes a concept which transforms societies, economies and ways of doing business, including the retail food business. The research on transformation of retail companies due to the impact of digitalization is a relatively new issue. More and more retail companies are looking for ways to understand and use the opportunities of digital transformation. Despite the potential of digital transformation to generate significant economic benefits, many businesses do not undergo successful digital transformation. The main goal of the study is to interpret the impact of the digital transformation on the retail food business, considering the change in consumer behavior, and on this basis to derive the emerging dependencies. The method of single linear regression and correlation is used to measure the manifested dependencies. The highlighted method is applied using IBM SPSS Statistics (Statistical Package for the Social Sciences). Respondents in the survey are individuals from the 27 Member States of the European Union. The data for their budgets refers to the period 2016-2021. Eurostat is used as the main information source of data as a statistical service of the European Union. The obtained results allow revealing the impact of the digital transformation on the business models of food retailers, as well as on the change of consumer behavior in the process of ordering and buying food. In the study, the approach of focusing on the costs of individuals for online food purchases is of particular importance. It is this approach that determines the relevance of the study.

Keywords: Retail food business, retailers, digital transformation, online food purchases by individuals.

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INTRODUCTION

Retail companies are increasingly looking to understand and implement a cost-effective digital transformation of their business with modern communication and computer technologies. Digital transformation has the potential to generate significant economic benefits for retailers' businesses.

The main goal of the present study is to interpret the impact of digital transformation on the grocery retail business, considering the change in consumer behavior, and on this basis to derive the emerging dependencies. To achieve the goal, the following research tasks are set: bringing and examining conceptual ideas and judgments about the impact of digital transformation on the grocery retail business; interpreting empirical aspects of the impact of digital transformation on the grocery retail business; formulation of more important conclusions and generalizations from the theoretical-empirical study.

The single linear regression and correlation method is used to measure the emerging dependencies. The highlighted method is implemented using IBM SPSS Statistics. Respondents in the survey are individuals from the 27-member states of the European Union. The data on their budgets refer to the period 2016-2021. The determined duration of the period ensures tracking of the dynamics and trends in the development of the phenomenon being studied. Eurostat as the statistical office of the European Union is used as the main data source. The obtained results allow revealing the impact of digital transformation on the business models of food retailers, as well as on the change in consumer behavior in the process of ordering and purchasing food. In the research, the approach of focusing on the expenditure of individuals for online food purchases is of particular importance. It is precisely this approach that determines the relevance of the study.

The transformation of the grocery retail market towards omnichannel, including offline and online ordering and purchasing, is a relatively recent phenomenon. Consumer preferences and attitudes towards ways of buying groceries are changing. Technological advances and the ability of retailers to invest in infrastructure for online shopping, storage and delivery of goods are helping to increase the speed and convenience of digital consumers.

DIGITAL TRANSFORMATION AND ITS IMPACT ON THE GROCERY RETAIL BUSINESS

Digital technologies are electronic tools, systems, devices and resources that generate, store or process data (Deloitte, 2019). These technologies are having a profound impact on businesses and their digital transformation capabilities. Digital transformation is changing consumer behavior and transforming the grocery retail landscape towards omnichannel or omnichannel. In the specialized literature, a number of authors devote their research efforts to reinventing innovation management in the digital world. A group of theorists including S. Nambisan, K. Lyytinen, A. Majchrzak and M. Song, define digital transformation as the creation and subsequent change of market offers, business processes or models that result from the use of digital technologies (Nambisan, et al., 2017). This necessitates, as confirmed by J. Brownlow, M. Zaki, A. Neely and F. Urmetzer, companies, including retail companies, to rethink the role and value of data in the business models they implement (Brownlow, et al., 2015).

At its core, digital transformation should be seen as much more than technology deployment. In most cases, according to S. Gupta, this type of transformation brings about a fundamental change in the basic mindset of retailers, approaches and tools to reposition parts or the entire business design (Gupta, 2018). Focusing only on the selection and implementation of appropriate digital technologies is not the only condition that leads to market success. Digital transformation involves changes in the organizational dynamics of business. Researchers led by G. Kane, D. Palmer, A. Philips, D. Kiron and N. Buckley, derive a multifaceted approach to representing the considered transformation. The cited authors emphasize that digital transformation encompasses leadership, talent development, culture, organization and the company's adopted strategy (Kane, et al., 2017).

Digital transformation is a significant change in the core business model of how a retail company creates value. According to the analyzes and evaluations of A. McAfee and E. Brynjolfsson data-driven companies are on average 5% more productive and 6% more profitable than other competitors in the market (McAfee & Brynjolfsson, 2012). The so-called digital masters are characterized by visionary management and digital capabilities that provide them with a 26% higher profit margin compared to their main competitors. Along with the highlighted economic benefits, digitally mature companies generate 9% higher value amounts of revenue from their physical assets (Westerman, et al., 2012).

Considering the potential of digital transformation to generate significant economic benefits, some retailers are not undergoing the type of change that

leads to market success. At the same time, in their developments, authors such as P. Mugge, H. Abbu, T. Michaelis, A. Kwiatkowski and G. Gudergan, bring out the following more important criteria for digital maturity: commitment, investment and leadership (Mugge, et al., 2020). In this regard, digital leaders should build trust and credibility by taking differentiated actions that distinguish them from other market participants (Abbu, et al., 2020). Along with this, as H. Abbu and P. Gopalakrishna point out, synergistic effects of implementing digital transformation and business internalization should be sought. In the context of retail companies that are involved in international markets, the relationship between the digital transformation models implemented in practice, the levels of internationalization and the reported market successes is important (Abbu & Gopalakrishna, 2019).

Retailers are powerful stakeholders in the food chain, using digital technologies and digital marketing strategies to make food supply chains safe, healthy, efficient and sustainable. Through the digital technologies used, product availability and pricing processes are controlled, sustainable consumption is improved and food losses and waste are reduced, and the range of healthy and affordable food choices is expanded (Pulker, et al., 2018).

However, many transnational food retailers market highly processed, cheap, and conveniently packaged foods and beverages purchased by high-, middle-, and low-income consumers. As a rule, energy-dense, nutrient-poor products contain excessive fat, added sugars, and sodium, which contribute to poor-quality diets associated with malnutrition, obesity, and consumer disease (Baker & Friel, 2016).

Consumers choose online grocery shopping for a variety of reasons. For example, a portion of consumers are more likely to use online services motivated by convenience, time savings, competitive pricing, enjoyment, and previous online shopping experience (Yeow, et al., 2017). There is research in the literature that online grocery shopping can increase unhealthy choices, as consumers buy mostly processed foods and are less likely to buy fresh fruits and vegetables online (Jilcott Pitts, et al., 2018).

Digital technologies are transforming the grocery retail environment by giving consumers choices in ordering and acquiring food in new ways based on their preferences, income and time constraints (Food Marketing Institute (FMI) & Salmon, 2017). In the omnichannel world, consumers can buy and consume food both in physical stores and online. In a number of high- and middle-income countries, such as Canada, China, Germany, India, the United Kingdom, transnational food retailers are digitizing the ordering and payment process to synchronize the experience of physical stores and online

transactions (Deloitte, 2019). Digital technologies provide an intuitive, easy and efficient online grocery shopping process where consumers can use digital touch screens to place an order (Barrett, 2019).

When tracking the status and changes in the digitalization of the grocery retail business, the issues related to highlighting the key factors having their impact occupy an important place. In this direction, the changing attitudes and behavior of consumers, technological progress and competitive pressure are identified as key factors predetermining digital transformation in the grocery retail business. Thus, the change in consumer behavior - price, convenience and speed, together with the advancement of technology, cloud computing, mobility systems and the analysis of large databases are determined as basic for the digital transformation of the grocery (Evins, 2017)retail business.

The main result of transforming to a digital business is the ability to engage and satisfy the consumer. It seeks to boost consumer loyalty, revenue and retailer profitability. An essential component of user satisfaction is a seamless and convenient mobile shopping application. This app should provide the expected online grocery ordering in individual product categories, the ability to save and reuse shopping lists, and pre-schedule food deliveries. Therefore, the reasoning thus given shows that it is the digital consumer who is defined as one of the centers in the food chain in the process of its digitalization.

EMPIRICAL ASPECTS OF DIGITAL TRANSFORMATION IN THE GROCERY RETAIL BUSINESS

In the current development, the research emphasis is placed on interpreting more significant manifestations of the digital transformation affecting the grocery retail business, as well as on the change in consumer behavior and online food purchases by individuals. On this basis, certain dependencies are deduced, corresponding generalizations and conclusions are formulated.

The respondents of the research are the natural persons as consumers in the European Union. The data on their income, expenses and consumption refer to the period 2016-2021. The specified period provides tracking of the dynamics in the development of the research phenomenon. A particular research focus is placed on online food purchases by individuals in the EU-27. The data for this type of purchase is based on the results of a 2021 Eurostat survey on the use of information and communication technologies by individuals.

Methodologically, the single linear regression and correlation method is the basis of the study of the budgets of individuals from the 27 countries of the European Union. The application of the method is implemented using the statistical software product IBM SPSS Statistics. The analysis of the expenditure of individuals on online purchases goes through two successive steps: first step, estimating the total expenditure of individuals on groceries, i.e. purchased both offline and online, considering dependence on disposable income; second step, looking at consumer behavior and attitudes towards the Internet, and estimating the amount of spending on online grocery shopping. Such a methodological approach allows for an assessment of the economically related phenomenon - "expenditures of individuals for the consumption of food products purchased offline and online - disposable income of individuals".

The main hypothesis adopted is that consumer spending is a function of disposable income. Through the prism of the outlined research objective, it is assumed that the dependence of the total cost of purchasing food on the income available to consumers is manifested by relative similarities in terms of both the magnitude of the expenditure on food purchased offline and the magnitude of the expenditure for food ordered and purchased online.

In specialized theory and practice, judgments are made that modern European users clearly state their position regarding the use of the Internet. For consumers, the Internet is an extremely important tool for online ordering and purchasing. According to Eurostat estimates, in 2021 more than 7 out of 10 Internet users will make online purchases. In general, the share of this type follows an increasing trend, with the highest share observed in the youngest age group 16-24 years (80%), followed by the age group 25-54 years (79%) and the age group 55- 74 years (59%) (Eurostat, 2022). Within the European Union, the relative share of Internet users shopping online in 2021 varies widely. The reported values range from 42% in Bulgaria, 44% in Romania, to 94% in the Netherlands. Considering all individuals aged 16 to 74 in the European Union, the relative weight of online users in this group equals 66%. Denmark is among the European countries with the highest relative share, amounting to 91%. A survey of shopping frequency shows that in a given quarter of 2021, one-third (33%) of e-shoppers make purchases once or twice, another third three to five times, while 16% say they do so from six to ten times (Eurostat, 2022).

Users appreciate that it is convenient to shop anytime anywhere, as well as to have access to a wider range of products, to compare prices, and also to share their opinion about the purchased goods with other users. In response and as a reflection of online consumer demands, grocery retailers are moving towards implementing business models based on digital transformation. This

process is accompanied by the manifestation of a number of challenges and difficulties.

As retail companies evolve, they must continually refine their business model to the changes in the market environment that offer them opportunities to increase user engagement and improve the overall shopping experience. In this direction, as experts confirm, digital transformation is expected to have a profound impact on both retailers and consumers (Deloitte, 2019). The process of transition to digital technologies requires significant changes in the so-called "omnichannel retail landscape" or 'retail system'. Findings from experts show that the retail industry has a long way to go to effectively implement omnichannel strategies and digital platforms.

For example, according to the results of a global IBM survey among 1,900 retail leaders and manufacturing companies, conducted in 23 countries around the world, it was found that in 2021 (Orchestra, 2021):

- nearly 85% of retailers say they plan to use intelligent automation to better digitally engineer their supply chain;
- about 79% of respondents expect to use smart automation for smart users;
- over 67% of respondents predict sales revenue growth of over 10% as a result of future use of digital technologies.

The given data are visualized using Fig. 1.

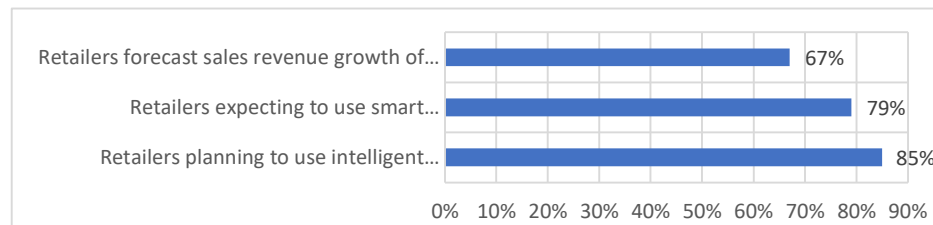


Figure 1. Opportunities for retailers in the use of intelligent automation

Source: https://www.orchestra.com/en/resources/ebook-white-paper/10_trends_changing_omnichannel_retailing_in_2021

Presented and visualized by means of Figs. 1. data allow the generalization that the difference between the importance of using digital technologies and the extent of their application is substantial. The lack of appropriate digital technology can be identified as one of the key issues for building an omnichannel strategy.

Retailers need digital tools including messaging apps, artificial intelligence, digital payments and visual builders, security that support e-commerce, especially for grocery and prepared food. A part of the retailers does not have a reliable strategy and sufficient financing of the transformation process towards digitalization. Retailers are digitizing the grocery ordering and acquisition environment, considering consumer preferences and emerging changes in consumer behavior. In this direction, the European Union Consumer Budget Survey is a useful tool for analyzing and evaluating the costs of groceries purchased online.

By its very nature, reaching effective market solutions imposes on retailers the need for precise knowledge of the specific characteristics and peculiarities of consumers, as well as the patterns of consumption they follow, including food products. Analysis of food consumption patterns can be based on the budgets of European consumers. The research emphasis on grocery consumption, including online, rests on the belief that this consumption is of paramount importance in explaining changes in an economy, in the case of the European economy. In this research direction, the teaching of J. Keynes confirms that consumption is an important element of any macroeconomic model (Keynes, 1993).

In the sequence of the first analytical step set in the present study, before the analysis of the costs of individuals for online purchases, as consumers, from the 27 countries of the European Union, the total costs of consumers for food can be evaluated goods purchased both offline and online. Such a methodological approach allows for an assessment of the economically related phenomenon - "expenditures of individuals for the consumption of food products purchased offline and online - disposable income of individuals". The results of the study of the relationship between the income of individuals in the EU-27 and their expenditure on groceries purchased offline and online are visualized by means of the following tables and a figure: Table 1. Model Summary, Table 2. ANOVA, Table 3. Coefficients and Figure 1. Relationship between food consumption expenditure and disposable income of EU-27 households.

Table 1. Model Summary

R	R Square	Adjusted R Square	Std . Error of the Estimate
,492	,242	,090	283076,380
The independent variable is available income .			

Source: Eurostat, 2022. E-commerce statistics for individuals. [Online] Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=E-commerce_statistics_

for_individuals&oldid=554700 [Accessed 25 June 2022].

The variance estimation is performed according to the data shown in Table 2.

Table 2. ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	127861572364.897	1	127861572364.897	1,596	,262
Residual	400661185393,681	5	80132237078,736		
Total	528522757758,578	6			

The independent variable is disposable income.

Source:Eurostat, 2022. E-commerce statistics for individuals.

[Online] Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=E-commerce_statistics_for_individuals&oldid=554700 [Accessed 25 June 2022].

The following data, visualized through Table 3., allow the presentation of the coefficients that are calculated on the basis of the single linear regression and correlation method used.

Table 3. Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
available income	1,368	1,083	,492	1,263	,262
(Constant)	5622897,478	1040642,440		5,403	,003

Source:Eurostat, 2022. E-commerce statistics for individuals.

[Online]

Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=E-commerce_statistics_for_individuals&oldid=554700 [Accessed 25 June 2022].

The following Figure 2 visualizes the relationship between EU-27 individuals' expenditure on offline and online food consumption and their disposable income.

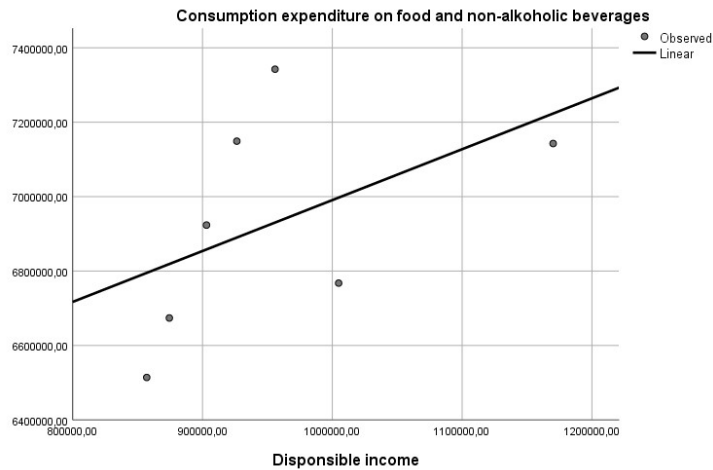


Figure 1. Relationship between food consumption expenditure and disposable income of EU-27

Source: Eurostat, 2022. E-commerce statistics for individuals. [Online]

Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=E-commerce_statistics_for_individuals&oldid=554700 [Accessed 25 June 2022].

Conducting a one-factor linear regression analysis requires testing the hypothesis of model adequacy. This verification constitutes a basis for its acceptance and further application.

The main measures of dependence, which have a cognitive significance in an analytical aspect, are the regression coefficients, the correlation coefficient and that of determination. In turn, the regression coefficient measures the average change in the outcome variables for a unit increase in the factor variable. As can be seen from the data in Table 3., this coefficient takes the value 1.368 and the assumption can be accepted that with an increase in the disposable income of households by 1 euro, an average increase in the cost of consumption of groceries purchased offline and online is established, with about 1,368. According to the data from Table 1., the correlation coefficient is 0.492. This coefficient is perceived as a measure of the degree of dependence, which is also called the "strength of the relationship" between the two variables. From the review of the specialized literature, it is established that at $0.3 < R \leq 0.7$, an average strength dependence is determined, i.e. moderate degree of dependence or moderate correlation. Therefore, the value of the correlation coefficient established in

this way allows to determine an average degree of dependence between the disposable income of individuals in the EU-27, in their capacity as consumers, and their expenditure on groceries purchased offline and online. In essence, the coefficient of determination measures the relative weight of variation in food consumption expenditure. This variation is explained by the change in the disposable income of individuals. According to the data from Table 1., the analyzed coefficient of determination takes the value as follows: $R^2 = 0.242$. This means that more than 24% of the differences between European consumers in their spending on food consumption - offline and online - is associated with differences between them in the magnitude of disposable income.

From what is shown in Figure 2, it is clear that the values of household disposable income are plotted on the abscissa axis, and the values of the consumption costs of food products purchased offline and online are plotted on the ordinate. The existence of a dependence between the two quantities is a basis for the statement that the actual values of food consumption costs tend to be distributed around or close to the regression line.

Along with the analysis and evaluation of the relationship between the disposable income of individuals in the EU-27, as consumers, and their spending on food purchased offline and online, both consumer behavior and their attitude towards the Internet, as well as the amount of spending on online grocery purchases. This aspect corresponds to the second analytical step set in the present study.

According to Eurostat data in 2021 (Eurostat, 2022):

- nearly 74% of Internet users shop online;
- over 42% of consumers make an online purchase worth between 100 and less than 500 EUR in the last three months before the survey;
- about 18% of individuals online order and purchase food or soft drinks from stores or food vendors.

According to Eurostat, the 16-24 age group has the highest share of online food shoppers, followed by the 25 to 54 age group (Eurostat, 2022). The 55 to 74 age group remains the lowest relative weight of online grocery shoppers.

CONCLUSION

At its core, digital transformation is revolutionizing the way goods, including food, are designed, manufactured and delivered to consumers. This process has huge implications and impacts for the value chain. Digital grocery shopping and changing consumer behavior from the European Union rely on consumer values related to favorable shopping experiences, fast and easy transactions, price comparison capabilities. Digital technologies are blurring the lines between the physical and digital worlds by providing real-time user access to new and existing data sources. Combined with powerful analytics, visualization and algorithmic tools, this access to data is fundamentally changing the way retail companies do business.

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