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Digital technologies and transformation of modern retail

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Abstract. The study considers the issues of enterprises transformation model forming and the corresponding processes of product distribution depending on informational and digital capabilities of the enterprise. Material tendencies, priorities and directions of transformation, achievements and mistakes in the field of retail computerization forming a new approach to interactions of parties in product distribution chains were detected. Earlier development and introduction of informational and digital technologies in retail were related only to distribution network management. Today the task aimed to arrange comfortable purchase with maximum profit for the client goes to the foreground. The organizational principles of digital enterprise changing retail and technological processes of enterprises have been brought to a system: personalization, digitalization, comfortable payments, comfortable and fast delivery. Capabilities from transfer to retail are given based on digital principles which enable to build an integrated product distribution model when the buyer selects the most comfortable channel to buy and becomes loyal against comfort and easy service.

1. Introduction

The information technologies for the modern retail became more important through all around tendencies for digitalization. The mentioned technologies penetrate to all business segments and economy fields altering their strategic tasks and tools. And if earlier development and use of information technologies were aimed to simplify management and arrange intra-company interaction nowadays the main challenge is to provide the client with comfortable buy and give it the maximum profit. Omnichannel, mobile commerce or mobile payment for products and services today are the crucial issues in the list of information technologies in retail [1]. Considering the velocity, irregularity and complexity of transformation the enterprises face difficulties in determining models and trends not to mention an effective action plan. So the retail specialists who are the target audience of this article should have an overview of the issue and ways to solve it. The relevance of the issue is determined by the fact that the authors refer to it. The object of the article is to study the main mechanisms of digital transformation of retail enterprises.



2. Application of information technologies in retail in retrospective

The priorities and directions of transformation can be determined based on the analysis of information technologies application in retail and evolution of science and technic development of the society. A retrospective view will allow taking into account previous achievements and mistakes in the field of trade informatization, taking a deeper analysis of changes in retail information technologies tasks.

The first information technologies in retail were aimed to make management more rational and optimize interaction inside a company. In particular, the first numbering systems of nomenclature positions for trade enterprises opened up new opportunities and prospects. The use of bar coding as a system for identifying commodity positions that is possible for machine readings has determined the vector of development of informatization in trade. Scanning has opened for retail wide capabilities to rationalize commercial operations considering no necessity to provide products with price labels, ability to manage stock reserves and analyze sales, product availability based on items. Now even widening range in retail does not influence ability to cope with new requirements to product stock management. Discounters took adequate decisions on the range, had more accurate forecasts of sales and created optimal orders based on valid data.

Besides information technologies related to rationalizing of product stock management the IT standard bearers in retail focused on optimizing the supply chains within distribution channels. Here we consider increased effectiveness of commercial activity through optimized integration of information systems, technological and logistic processes in enterprise. Nowadays it is a standard for a company to have a data base even of quite a small volume. Earlier it was a sensation and even a competitive advantage. Electronic data exchange on a vertical channel was one of the essential points in retail. Information technologies and data stores enabled the companies to use vertical integration from raw materials purchase to final product dispatch so they accelerated the velocity in a supply chain decreasing the overages risks. The companies using information technologies to arrange the vertical integration even today set the standards and priorities. Modern information systems enable optimize management of stock reserves and range of products, provide mechanisms of flexible pricing, systems to increase clients loyalty. Eventually investments to information technologies provide owners of retail enterprises with full control over retail processes and increased financial results.

Today the leading position took the idea implementing RFID (Radio Frequency IDentification) – the way of automatic identification of objects using a radio receiver and a transmitter (reader and tag) [2,3,4]. Such technologies enable us to register goods quickly and without need of personnel allowing automated check measurements. Nevertheless such technologies can be classified as mistakes in the field of retail informatization as fitness of RFID for mass market, consumer goods is nor economically feasible and their use is possible only in the segment of expensive goods. But this technology is applied in logistics to label containers and other equipment so the use is limited to backyard logistic processes as in high ticket goods segment and it gives the advantaged related to safety and protection.

Figure 1 gives a diagram of RFID market consumption volume distribution in cost units.

Digital technologies are becoming a crucial tool in shaping a number of opportunities for trade enterprises: new ways of product sales; development of client service system; correction of sales strategies considering requirements of target groups, etc. Stationary enterprises get integrated into online space. Multichannel and mobile commerce technologies come to the fore within the closest trends. Along with these tendencies “big data” technologies, predictive analytics and computing and operative memory technologies gain importance.

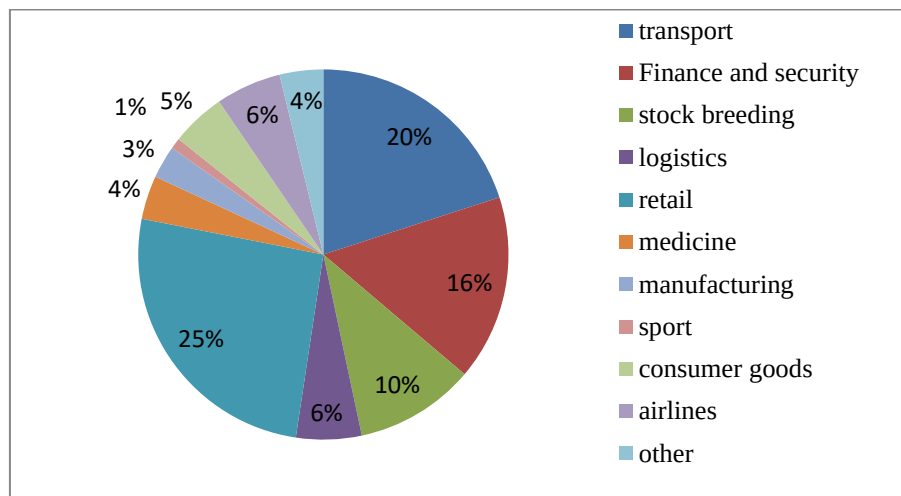


Figure 1. Diagram of RFID technologies market consumption volume distribution in cost units.

3. Main tendencies of digitalization influencing the retail

It follows from the foregoing. The modern retail market is changing under the influence of new trends. Compilation of information processes, operations, purchases, buys, delivery and acceptance, payment in stationary sales outlets and online shops data today is the main strategic areas of activities covered by digitalization projects. However, this does not replace the key elements of product distribution; these processes are being changed constantly and supplemented considering economics digitalization. Such economics serves a forming basement of digital society and the main material elements of its strategic prospective are just being formed. In this regard the commercial leaders and innovators should detect and define the interactions the implementation of which could It is necessary to justify the priorities that provide competitive advantages, the promotion of which digital transformation can and is intended to contribute to.

Main tendencies of digitalization which influence retail and various technologic and economic conditions can be split into three aggregated groups:

1) New technologies are being developed exponentially:

- Internet cover zone gets expanded;
- mobile applications get more popular;
- data analysis and processing methods undergo development.

2) New market players seriously compete with classic retail:

- market places get more popular;
- manufacturers develop ways to sale and deliver products to the end user;
- value of e-commerce companies is more than value of the largest retail networks.

3) New buyer is well-informed and is inclined to change its preferences quickly:

- the consumer uses 3 to 7 and even more channels to search for products and buy them;
- the consumer becomes discriminating thanks to its information capabilities, it analyses goods data online;
- the consumer is not loyal to one seller and buys wherever it suits it.

Therefore, the growing role of information and digital technologies makes even more urgent the need not only to develop and implement their main commercial goals, but also to develop common rules and principles, digital models of organization and transformation of product distribution chains. In new conditions the retailers need a model oriented to four principles of modern market: personalization, digitalization, comfortable payments, comfortable and fast delivery. Let's discuss these principles in more detail.

Personalization is expressed in the fact that digitalization and active use of cloud technologies at a modern enterprise generate a system of clients access to a product at all stages of product development and manufacture. It gives the following advantages:

- easy and comfortable client service in all sales channels;
- individual assortment and price offers;
- effective loyalty and marketing programs.

Digitalization in a contemporary world naturally transforms both routine life of humans and business [5]. Digitalization is a deep transformation of business considering application of digital technologies to optimize business processes in order to meet consumer needs which change along with development of technologies. Namely – the creation of a more comfortable and operational customer interaction with the company. This principle is expressed in the following:

- promoting online and mobile platforms sales (special offers, discounts);
- front-end methods to collect and analyze bigdata interactions for the purpose of proactive sales;
- automatization and robotization of warehouse handling and transportation of products.

The main drivers influencing retail include as well principles related with organization of comfortable payments:

- full range of methods to pay for the goods (card, cash, phone number account, digital wallet);
- confidential data of customers protected from fraud.

The necessity of close interaction between all participants of supply and product distribution system stipulates their determination to uninterrupted operation that requires mutual working over product distribution schedules and provides implementation of quick and comfortable delivery principle which is expressed in the following:

- retailer capability to provide an easy way to get the product (sales point, order issue point, car, home address);
- quick delivery of product to a customer irrespective of its location.

Therefore transfer to retail based on digital principles enables building an integrated product distribution model when the buyer selects the most comfortable channel to buy and becomes loyal to one or another product. This model provides the following capabilities and advantages given in table 1 which differ from a conventional product sales scheme. The table demonstrates that the existing product sales scheme outlives its usefulness and it is being replaced by a more flexible, adaptive and comfortable for the buyer media. In this regard retail should adapt its product distribution chains to existing challenges [6].

Table 1. Integrated model compared to conventional sales.

Principles	Digitalization capabilities	Existing product sales system	Integrated digital product sales system
Individualization	1) assortment offer diversity; 2) capability to track clients loyalty using multiple parameter scale	1) offer is greatly generalized; 2) products are sold through the channels available to retail enterprise.	1) offer is being individualized 2) products are sold through all channels at once available to retail enterprise
Digitalization	1) company analysis, goal setting and strategy development;	1) analysis is based on data from channels available to retail enterprise	1) analysis is based on data from all channels at available to retail enterprise

Principles	Digitalization capabilities	Existing product sales system	Integrated digital product sales system
	2) application of digital technologies and mobile applications.	2) used for promotion.	2) used throughout the whole product distribution cycle from informing to purchase and payment
Comfortable payment	1) diversity of product payment methods, comfortable for customer (including mobile applications); 2) crosswise shopping that means that the consumer studied the product at one channel and bought it in another.	1) not supported 2) not supported	1) widely used 2) widely used
Comfortable delivery	1) smart cargo routing; 2) diversity of product receipt ways.	Limited by infrastructural underdevelopment of enterprise	unlimited, flexible systems and alternative transportation are applied.

4. Specifics of transfer from conventional product distribution chains to digital ones.

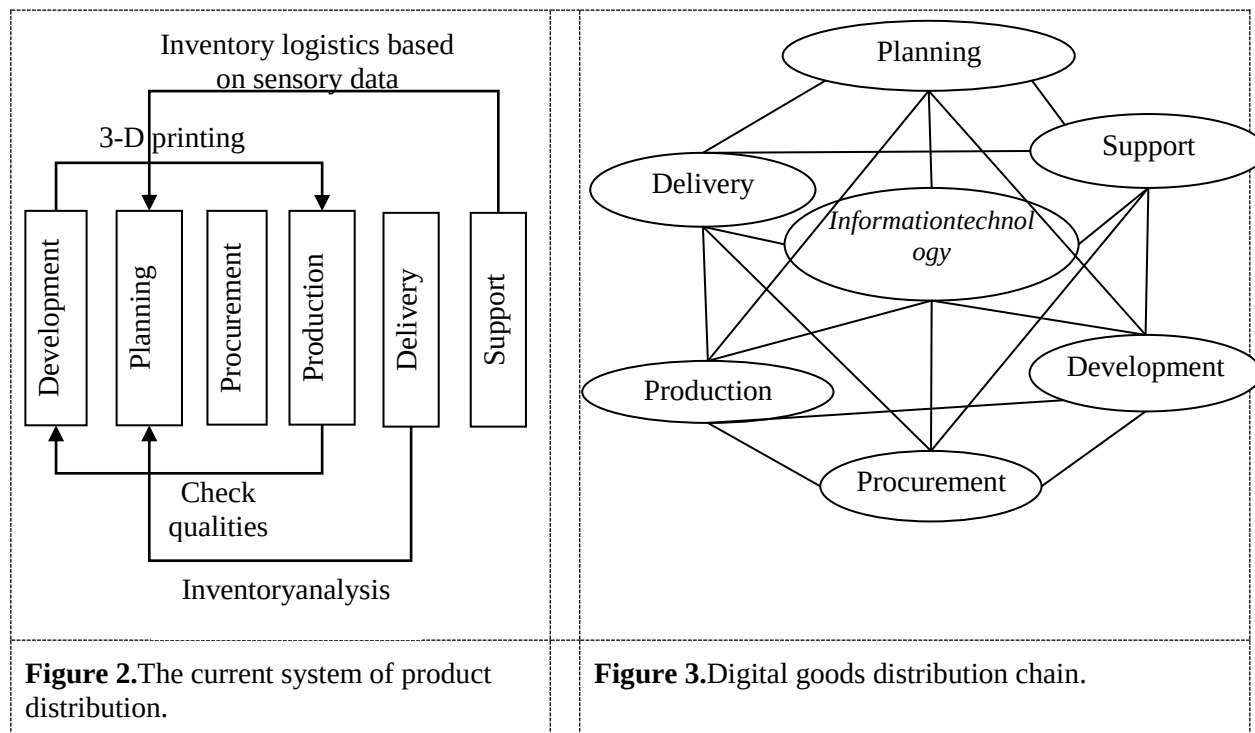
Changes in production sphere are initiated by digitalization and informatization. So retail companies business models start changing as well.

Product distribution chain is the basis for successful commercial activity. Each link, whether it is a manufacturer, distributor, wholesaler or retailer, represents a unique structure, with different characteristics. Transformation models of generalized kinds of such structures were given in [7].

To visualize transformation of the whole chain of product distribution it can be represented as a sequential overlaying of patterns where an information infrastructure component is a linking element. Product distribution chain is an interconnected system of relations between the suppliers or manufacturers of goods and services covering the whole transformation cycle of basis cost to added one through retail and technological operations and the final user [8].

Up to the moment the product distribution scheme was rather simple: goods or services are transferred by chain links from manufacturer to end user. But each link adds costs to a final price. The cost can be uprated greatly for the user or underrated for the seller as there is a competition at each chain link which is a cause of “wars” between links which usually cause price dumping, non-optimal credit policy and unsound provision of additional free services. This situation becomes unfortunate both for the user and for each participant of product distribution chain. Each link is a separate structure which manufactures/sells the goods, transforms it (packs, fills, etc.) and sells.

The contemporary arrangement of product distribution is characterized by integration of all participants to general open structures [9]. Link structures begin operating as a single organism gaining a competitive advantage due to the fact that the information is transparent and each participant knows what will be the price for its “companion” to sell the product to have a competitive advantage at its step of market hierarchy having a stable (maybe a little less) instead of short-term (larger) profit [10, 11]. Comparison of two systems of product distribution implementation is given in figures 2 and 3.



Using comparison of these systems we can determine the most material tendencies forming a new way of interactions of parties in product distribution chains [12, 13]: 1) the business ecosystem is formed through uninterrupted online interaction of partners (retailers and manufacturers) between each other and with a consumer; 2) transparency in interaction chains is implemented: through a unified information system with data on reserves and movement of products within the net [14, 15]; 3) set of flexible connections in interaction chains: is implemented through dynamic change of system depending on changing demand, available capacities and implementation of risks in product distribution chain [16].

It is no more effective to operate in digital reality using previous models and business processes. Flexibility and ability to change quickly become the main trait enabling modern companies stay competitive.

5. Conclusions

The issues of all forms of economic activity which occur today are related to a new turn of progress determined by deep penetration of digital and information technologies to all fields of society activity. Concurrently with that the list of development key drivers was supplemented by such factors as business processes digitalization and output of new products that reveals the active position of companies and readiness to structural changes. In this regard the search for new technologies as well as their application becomes the strategic determinant for business representatives. Most company managers understand that the success of their business mostly depends on their responsive adaptation to market requirements and application of new technologies in company daily routine.

The study has determined the tendencies forming the new approach to interactions of parties in product distribution chains: multichannel commerce, client operation individualization. The article contains the description of retail tools to make current reserves data and product distribution more available, to allow dynamic change of product distribution chain depending on changes in demand. The organizational principles of enterprise changing retail and technological processes of enterprises have been brought to a system: personalization, digitalization, comfortable and fast delivery and payments. Their implementation optimizes value chain in course of retail enterprise digitalization.

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