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INFORMATION TECHNOLOGY IN RETAIL TRADE

Introduction

Advancements in information technologies offer a possibility of implementing a great number of innovative solutions in retail. These solutions aim to increase the effectiveness of a retail enterprise and improve customer service. Information technologies may be applied to different areas of operations of a retail enterprise, for example supplies, stock control, logistics, customer service. Some of them are used for back-room operations, others are available for customers in a salesroom.

The paper aims to discuss selected solutions based on information technologies used in retail and present the results of field research conducted among retailers and customers of retail enterprises – the users and beneficiaries of these solutions.

1. Information technologies in retail – applications

The use of innovative technologies in retail has become possible as a result of the specialization of the IT sector in the area of retail-oriented solutions, involving the latest developments, radio frequency technologies, computer systems and the Internet. Information technologies may be used in:

- the management of retail establishments – financial and accounting systems as well as payroll and personnel systems in connection with software used for distribution and warehouse management, e.g. Personel – a financial and accounting system, POSitive Retail (with POS modules), POSitive Management Center – a central sales, distribution and warehouse management system, POSitive Multimedia Management System – a central multimedia point-of-sale advertising management system,

- the identification and management of products and prices, sales floor layout and product display – e.g. the electronic label provides such information as sales dynamics, the number of products in stock, the size of the latest supply batch,
- data processing and analysis – databases and data warehousing, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM). Based on customer research, CRM allows to develop marketing strategies and multi-channel communication (personal contact, telephoning, text messaging, the Internet, teleconferencing)¹,
- theft protection – RFID technology,
- customer relationship management – e.g. a store kiosk, the Interactive Voice Response application, email service within the Call Centre. The store kiosk provides customers with information on a customized offer, e.g. discount coupons addressed to a particular customer based on the information that a retail establishment has collected about his buying choices and preferences. The Interactive Voice Response application, on the other hand, allows to identify the needs of customer contacting a Call Centre and store this information in the Call Centre system,
- the improvements and modifications of customer service processes – e.g. self checkout, interactive trolleys, electronic labels.

The product purchasing process in retail establishments is more and more often supplemented with interactive multimedia shopping systems. They make use of home media (teleshopping, online shopping) and point-of-sale media (customer direction systems – e.g. navigating computers installed on trolleys, information and promotional displays). The full use of e-technologies only takes place in the case of online shopping – all stages of a transaction (before, during and after a purchase) are conducted via the net. In the initial stage of the technologisation of retail, the mixed systems are more popular – the channel used to present the product is different from the channel used to place an order, e.g. product display on the website, a purchase in a retail establishment².

Not only can information technologies facilitate processes within an enterprise, but they can also change enterprise-customer relations. This can be achieved

¹ More on the topic: *Handel detaliczny – funkcjonowanie i kierunki rozwoju*. Ed. J. Szumilak. Oficyna Ekonomiczna, Kraków 2004, p. 190; *Zarządzanie sprzedażą w przedsiębiorstwie handlowym i usługowym*. Ed. G. Sobczyk. PWE, Warszawa 2010, pp. 127 and further; *Modele biznesu w handlu detalicznym*. Ed. M. Sławińska. Wydawnictwo Uniwersytetu Ekonomicznego, Poznań 2010, p. 68.

² D. Kubacka: *Zastosowanie technologii w działalności detalicznej firm handlowych*, <http://www.światmarketingu.pl>.

through the accelerated customer service process and the elimination of problems that customers encounter while shopping, e.g. finding a product or information about a product in a retail establishment, or discrepancies between the price at the checkout and the price on the shelf.

The solutions facilitating the customer service process are:

- self checkout – it accelerates the transaction compared with conventional checkout. The customer can also control the transaction more closely. It combines the self-service functions of scanning, paying and packing. This causes that the retailer has to show due care about product barcodes;
- the product self-scanning system – the scanner which is activated at the start of the customer's way through the store allows to register the products put into the trolley. This solution gives the customer the control of the value of selected products, price control and accelerates payment. In addition to the benefits for the customer in accelerating and facilitating the shopping, it also allows the enterprise to reduce costs;
- radio trolleys – „speaking” shopping trolleys. The handle carries an in-built radio system – a small speaker and an infra-red receiver. The shelves have special transmitters which emit signals intercepted by the receiver. The transmitters run product commercials. If there are a few trolleys close to the shelf, only one receives the transmission;
- electronic labels – the wi-fi electronic price display system. It allows to modify prices without employee involvement. Price updates are made in the checkout system and the change is instantly displayed on the shelf;
- self-service product weighing systems – mainly used for vegetables, fruit and confectionary. The latest developments include weights equipped with a digital camera which recognizes the product (its shape, colour and size) and determines its value. The dual-monitor weight can also recognize a customer's gender. Adequate advertising is displayed on the customer's side. The weight then measures the time that the customer spends watching the advertisement. It can also print discount coupons, bonus and loyalty tickets,
- M-payment – making payment at a point-of-sale (PMP physical mobile payment) making use of portable equipment (a mobile phone, a PDA – a pocket computer, a palmtop)³.

A particular role in retail is played by solutions based on the RFID (Radio Frequency Identification) technology. This technology allows to identify products

³ *Zarządzanie sprzedażą...* op. cit., p. 108; *Mówiące wózki*. „Handel” 2007, No. 13, p. 22; *Elektroniczne etykiety w ITM*. „Handel” 2008, No. 3, p. 6; K. Pierzchała: *Samo(obsługa) w ważeniu*. „Handel” 2007, No. 21, pp. 36-37; *Inteligentne ważenie*. „Handel” 2008, No. 5-6; *Waga rozpoznająca płęć*. „Handel” 2008, No. 5-6, p. 34; K. Pierzchała: *Sztuka ważenia*. „Handel” 2006, No. 18, p. 23.

using electronic tags which can store information (e.g. a type of product, a place of origin, a producer, ingredients, a sell-by date). The presence of a product near the reader is sufficient for receiving the signal allowing identification. The product must have its individual electronic product code (EPC) in the system⁴.

RFID allows to facilitate the flow of information between a producer, a supplier and a retailer, and provides the control of supply flows at every stage of the supply chain. It helps to: use storage area effectively, segregate products, find products quickly, restock store shelves, reduce theft, decrease costs due to reduced employment. It can be used together with barcodes.

The benefits resulting from the use of RFID include, primarily, the efficient flow of information on the product allowing:

- to eliminate product past their sell-by date,
- to transport and store goods in appropriate conditions,
- shortened checkout lines (products do not have to be taken out of the trolley, it is enough to walk past the reader in order to get a receipt),
- to find a product in a retail establishment quickly and easily,
- to reduce the number of thefts,
- to obtain information on complementary and supplementary products.

The use of RFID will be limited due to the high cost of a tag, problems with coding metal items and containers for liquids. Moreover, the fact that a customer knows the exact value of his shopping may cause that he will reduce the amounts that he buys.

The implementation of information technologies in retail will mainly depend on the resources and attitudes of retail enterprises and customer willingness to use innovative solutions. Not only demographic features will be important, but also psychographic and social characteristics – confidence levels, acceptance for technological innovations, the ability to use these innovations.

2. The research theses and the survey

Field research aimed at recognising:

- innovative information-technology-based solutions implemented or planned in retail establishments,

⁴ Another innovation is the GS1 Databar system, which allows to reduce a barcode area and, consequently, use barcodes for small-size products. *Zarządzanie sprzedażą...* op. cit, p. 105.

- solutions that are already used by customers or that customers intend to use in the future,
- customer attitudes towards modern technologies in retail establishments.

Field research into innovation in retail in Poland was carried out among 300 selected retailers and 600 customers⁵ at the turn of 2012. It was conducted with a use of direct interviews (a measuring tools – an interview questionnaires). The interviewees were the owners or managers of retail establishments and their customers.

3. Retailers and innovative solutions in retail

The study has an equal representation of hypermarkets, supermarkets, discount stores, specialist shops, local stores (50 of each). The majority of them are privately owned (84%) and have a good (41.3%) or satisfactory (34.3%) financial standing. The largest group of establishments comprised those with the area not exceeding 99 m² (38.7%). Almost $\frac{3}{4}$ of respondent retail establishments were the enterprises employing fewer than 49 people. Almost 40% were located on housing estates (mainly small local shops), while 30% in shopping centres (mainly hypermarkets, specialist stores and supermarkets). The establishments that had been on the market for at least 10 years had a similar share in the sample as the ones which had operated for less than 10 years – 51.7% and 48.3% respectively.

The survey comprised retail establishments offering different types of products. The largest group included retailers selling food products (51%). The establishments also provided additional services, e.g. mobile top-ups (67.4%) and payment of bills (41.7%). Few establishments offered such services as Lottomat, Cash back, catering services, dry cleaning. 5% of establishments had petrol stations. More than 63% operated within a retail chain. Others were independent retail enterprises. The majority of enterprises were businesses with domestic capital (56.1%) $\frac{1}{4}$ of the respondents represented enterprises of mixed capital (25%). Almost 19% were based only on foreign capital.

Nearly half of the respondents used information systems in their operations, the most popular ones were, for example, CRM (39.5%), SFA (12.3%) and ECR (12.3%) – Table 1.

⁵ The study was conducted within the research project “Innovation in retail and the creation of value for the customer” – the project financed by the National Science Centre based on the decision no. 0128/B/H03/2010/38 of the Minister of Science and Higher Education.

Table 1

Information systems used by retail enterprises (n=140, in %)

Specification	Total sample
CRM Customer Relationship Management	39.5
SFA Sales Force Automatization	12.3
ECR Efficient Consumer Response	12.3
SRM Supplier Relationship Management	4.4
EAS Electronic Anti-theft System.	3.5
EFTPOS electronic funds transfer at point of sale	2.6
OTHER: e.g. SAP. WP MAG. EDI. MMS. SYMFONIA. own	36.8

Table 2

Areas where information systems are used by retail enterprises (n = 127, in %)

Specification	Total sample
Inventory, warehousing, logistics	37.8
Supplies	31.5
Sales	29.1
Other	2.2

Table 3

The use of the Internet in retail enterprises (in %)

Specification	Total sample
e-mail	65.9
own website	54.9
obtaining information	53.1
internal communication	48.1
external communication	33.7
contacting clients	27.1
supplies	23.4
sales	22.7

More than 1/5 of enterprises had an online store (Table 4) – most frequently hypermarkets, supermarkets and discount stores. 18.3% of respondents declared the intention to start online operations by 2015 – mainly hypermarkets, specialist stores and enterprises which had been on the market for the shortest time. More than 60% did not have an online store and did not plan to start one by 2015.

Table 4

Retail enterprises according to running and planning to run online operations (in %)

Specification	Total sample
Enterprises which did not have an online store and did not plan to start one by 2015	60.4
Enterprises which did not have an online store and planned to start one by 2015	18.3
Enterprises which had an online store	21.3

Limited plans concerning new solutions resulted mainly from the shortage of funds which could be allocated for their implementation. The respondents declared that given more favourable financial conditions they would introduce: drive-in shopping (26.2%), interactive walls and floor (24.6%), price trolley scanners (22.0%), electronic labels (20.7%), a virtual hostess (20.0%) and self check-out (19.6%).

Retailers were asked to indicate the customer service solutions which had already been introduced in their establishments.

The most frequently used were price scanners – more than half of the respondents (52%) – Table 5. They were part of the equipment mainly in hypermarkets (83%), supermarkets (72%) and discount stores (17%). Sporadically, they were used in local shops and specialist stores. Newer establishments, less than 10 years on the market, had introduced them more often (68%).

In about ¼ of the establishments customers could pay with a proximity card. This possibility was again offered more often by large-format stores and newer establishments. More than 17% of enterprises serviced pay-back cards. 15% of establishments, mainly large-format stores, offered self checkout facilities to customers.

The solutions that were still only sporadically used included: the presence of an establishment on social networking sites, price trolley scanners, electronic labels, 2D photocodes, virtual hostesses, RFID, interactive walls and floors.

In the future, retailers declared that they planned such innovative solutions as proximity cards (19.7%), advertising monitors (13.0%) and social networking presence (12.7%) – Table 5.

Table 5

Customer service solutions implemented and planned by retailers (N=300, in %)

Specification	Implemented	Planned by 2015
price scanner	51.7	7.3
proximity cards	24.3	19.7
advertising monitors	22.3	13.0
pay-back cards	17.3	9.0
cash – back	15.0	9.3
self checkout	15.0	5.3
infokiosks	11.7	5.3
social networking presence	6.3	12.7
price scanners in trolleys	2.7	8.0
electronic labels	2.7	6.7
2D photocodes	2.3	8.3
virtual hostess	2.0	7.7
RFID	1.7	6.7
interactive walls and floor	1.3	6.3
drive-in shopping	0.3	6.3

4. Consumers and innovative solutions in retail

The sample of respondents contained equal numbers of men and women in different age groups (18-29, 30-44, 45-59, 60 and more). Almost 44% of respondents had secondary education and 38% – higher education. More than 60% actively participated in the labour market. They described their financial situation as satisfying (very good, good, rather good – 59%). Their favourite shopping destination was a large-format store – a supermarket (35%), a hypermarket (22%), a discount store (23%). The respondent expressed the preference both for daily shopping (42%) and larger, weekly shopping (55%). The majority of respondents used the computer (83%), both for work and in their private life. They used the Internet for e-mail correspondence (90%) and communication (61%).

The survey showed that the respondents tended to agree with the opinion that customers expected innovative solutions from retailers (48% agreed, 13.3% agreed completely) – Table 6. They also declared that customers were open to changes in retail (52.3% agreed, 11.3% agreed completely), but they also claimed that customers might have problems with using innovative solutions. More than 38% did not agree with the opinion that such problems would not emerge. At the same time, they thought that customers were willing to learn how to use innovative customer service solutions in retail (57.7%).

Table 6

Consumer attitudes towards innovation in retail (in %)

Specification	I agree completely	I agree	I neither agree nor disagree	I disagree	I disagree completely
Customers expect retailers to introduce innovative solutions	13.3	48.0	26.3	11.2	1.2
Customers are open to changes in retail	11.3	52.3	25.8	9.7	0.5
Customers do not have major problems with using innovative solutions	5.2	25.7	25.7	38.5	5.0
Customers are willing to learn how to use innovative solutions in a store	6.8	57.7	26.5	8.2	0.8

Table 7

Innovative solutions in retail – currently used by customers (in %)

Specification	Total sample
Price scanners (n = 559)*	93.4
Self checkout (n = 492)	52.0
Pay-back cards (n = 527)	36.2
Advertising monitors (n=479)	34.9
Proximity cards (n = 523)	31.3
Drive-in shopping* (n=520)	31.1
Infokiosks (n = 513)	17.7
Cash-back cards (n=493)	11.6
Social networking presence (n = 519)	7.3
Other** (n = 530)	13.1

* – due to a small number of similar solutions in Poland, it may be concluded that while answering this questions respondents thought about solutions commonly used by catering establishments,

** – other solutions comprise 2D photocodes, electronic labels, a virtual hostess, interactive walls and floor, price trolley scanners.

One in two respondents used self checkout facilities to finalise a transaction. This was the option chosen much more often by younger respondents. More than 1/3 of respondents used pay-back cards and advertising monitors in retail establishments. Almost one in three respondents paid with a proximity card. Similarly to other solutions, they were chosen by younger respondents more often, irrespective of gender.

In future the modern information technology solutions will be used by retailers to improve the activity of enterprise in the area of logistics, inventory control and personnel management. Investment in IT technology will be used to gather more information about clients needed to the decisions connected with the trade mark, the product development and marketing strategy redefinition. Information technology will be important in shaping the relationships with customers, especially in the area of customer service. A limitation of their use will be financial resources, especially in the case of small traders.

Conclusion

Information technologies in retail aim not only to increase the effectiveness of retail establishments in different areas of their operations, but also to improve customer service – mainly due to the automation and customization of the offer. The success of the implemented solutions depends, on one hand, on the capabilities of a retail enterprise, on the other hand, consumer attitudes to innovative technologies. The survey showed that the customers of retail establishments both used the solutions already implemented and expected retailers to introduce innovations in the area of customer service.

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INFORMATION TECHNOLOGY IN RETAIL TRADE

Summary

The modern information technology solutions are increasingly used in the retail trade. There are used in many different areas of enterprise mainly to improve the functioning of enterprise, offer customization, management of information and more efficient customer service. Information technology can not only improve the processes in the enterprise, but also affects the business relationship with the customers. Information technologies include among others such solutions as RFID, the mobile Shopping System, kiosk stores with touch screen, Electronic Shelf Labeling. Information technology are also connected with the use of Internet. The article presents the use of information technology in retail trade and results of the survey. The research was carried out among 300 selected retailers and 600 consumers at the turn of 2012. The aim of the study was to identify currently used and planned information technology in retail trade in Poland and the attitudes of consumers towards new solutions in retail.

Keywords: information technology, innovations, retail trade