

Artificial Intelligence Implications in Retail in the New Normal: A Qualitative Approach

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Abstract

Purpose/objectives: The recent COVID-19 pandemic has caused major disruptions not only in the supply chains, but also in the activity of retailers. Although food retailers were able to keep their stores open during the lockdown period, non-food retailers had to identify appropriate ways to keep in touch with customers. To attract them to stores, more and more retailers have resorted to artificial intelligence systems and applications. In the New Normal, a number of these systems and applications maintain their validity, and they are used to attract customers' attention, but also to enhance their experience.

Design/methodology: To highlight the way in which retailers with activities in Romania resort to systems and applications based on artificial intelligence in the context of the New Normal, an in-depth interview guide was administered by means of telephone and face to face. It consisted of open-ended questions operationalized based on the literature. The authors distributed the in-depth interview guide to different representatives of retailers in Romania. In total, 15 in-depth interview guides were collected, the results being analysed by thematic analysis.

Findings: The results reveal that while the large retail networks are already considering the use of systems and applications based on artificial intelligence, i.e. even resorting to them in the form of chatbots and/or autonomous robots for attracting and advising customers; retailers also employ AI based software for stock management, and implement self-service/self-pay counters. Although big retail chains resort more and more often to artificial intelligence-based techniques and instruments, small retailers do not have interest in them. For representatives of small retailers, the costs associated with investing in artificial intelligence systems are not justified and do not generate enough added value.

Originality/value: The results point to an increased interest in artificial intelligence systems applied in retail, with representatives of large store chains understanding their usefulness and even already implementing certain solutions based on artificial intelligence. However, there are also representatives of retailers who are sceptical and do not see, for the moment, the relevance of resorting to these systems.

Keywords

Artificial intelligence (AI), retail, Romania

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Introduction

The recent COVID-19 pandemic has generated major changes in customer purchasing behaviour (Vătămănescu et al., 2021; Valaskova et al., 2023), in particular, due to the countless restrictions imposed by the health crisis, lockdowns, and social distancing (Pop et al., 2022). Food and non-food retailers had to adapt to this situation, identify viable solutions to serve customers in the best conditions (Vinerean et al., 2022), shifting the activities already carried out to the online environment, adopting new technologies

based on artificial intelligence (Adulyasak et al., 2022), thus trying to offer unique and attractive experiences to the customers (Obadă, 2013; Obadă, 2014a; Obadă, 2014b; Dabija et al., 2022).

Although the COVID-19 pandemic has lessened its intensity, at least the restrictions have been lifted and retail stores have returned to a work schedule similar to the one before the health crisis, the recourse in the New Normal to intelligence systems, rapidly developed in the last two-three years, became more and more intense. Whether we refer to self-pay/self-service kiosks, chatbots, virtual assistants, autonomous robots, etc., these systems based on artificial intelligence and the accelerated development of technology are increasingly making their presence felt in the context of the New Normal in the retail landscape, tending to soon become a normality. Recently, the Walmart group encouraged the use of mobile applications directly in its store, allowing enhancement of the customer experience by identifying relevant areas for shopping, scanning products to check their availability and/or comparing them with similar items, quick and easy payment through an automatic check-out process (Adulyasak et al., 2022). Thus, the online experience can be very well combined with the one in the store.

The question that arises is to what extent retailers manage to resort to such artificial intelligence systems within their own networks, but also to what extent they manage to accustom and/or educate customers with them, causing them to return to the stores.

To identify the extent to which Romanian retailers' resort to AI-based technology systems in the New Normal, qualitative research was implemented with the help of an in-depth interview guide with open-ended questions. It was sent by the authors to the food and non-food retail management with activities in Romania. In addition, 15 interviews were carried out over the phone, through videoconference systems, respectively face to face.

The paper is structured as follows: Section one contains the review of the literature on artificial intelligence systems used mainly in retail, highlighting their advantage and disadvantage, respectively, the extent to which customer experience can be enhanced by the use of AI-based technologies. The second section contains the research methodology, and the third section presents the research results and their discussion. The paper ends with theoretical contributions and managerial implications, but also with limits and emerging research perspectives.

1. Research of the scientific literature

Technological progress is affecting and transforming contemporary retail, and enhancing company performance (Kliestik et al., 2023), with the recent COVID-19 pandemic accentuating the phenomenon (Pop et al., 2023). Technological development is essential for lasting economic growth, but also for generating and especially maintaining competitive advantages at the organisational level (Grădinaru et al., 2022). Of course, innovations find new utility in retail (Dabija et al., 2017), being used to generate and improve the customer experience. Increasingly, the literature highlights the role and importance of AI-based technologies in retail by resorting to the Internet of Things, virtual reality (VR), augmented reality, autonomous robots, chatbots, virtual assistants, etc. (Kushwaha et al., 2021; Pelau et al., 2021a; Pelau et al., 2021b).

AI-enabled virtual assistants (VA) are rapidly evolving to provide personalised shopping assistance and front-line service 24/7. This reduces the workload of human employees and provides a unique customer experience. Especially retailers that adopt an omnichannel strategy (Abrudan et al., 2020) resort to the use of AI based virtual assistance, as they aim towards increased customer satisfaction, thus enhancing their offline in store-based experience with the use of smart online technologies. Thus, virtual assistants allow customers to obtain connected and personalised experiences, but also collect data that retailers can extract to improve the decision-making process and personalize offers according to actual customer purchases (Kushwaha et al., 2021).

However, virtual assistants in the form of chatbots and voice assistants are artificial intelligence-based information systems that can reproduce human knowledge using natural language programming, machine learning, and deep learning methods. Such automated systems can provide 24-hour customer support, enhancing their shopping experience, but also reducing the effort of store employees. Virtual assistants can simulate human conversations, being able to assist customers at different stages of their customer-shopper journey (Hoyer et al., 2020; Przegalinska et al., 2019). Virtual assistants such as Amazon Alexa are evolving; as they had earlier only conversational functions, nowadays they are able to communicate naturally with users, and becoming increasingly popular because of their ability to respond quickly to requests. The literature highlights that the users of these chatbots are much more involved in the decisions

they make, being more strongly engaged in purchases and having greater trust in the company that offers such a virtual assistant (Alimamy & Kuhail, 2023).

Moreover, the adoption of conversational agents also brings with it countless challenges: on the one hand, retail unions believe that the implementation of these artificial intelligence systems can lead to layoffs, which is not desirable; on the other hand, because a chatbot system needs a large amount of data, often not available, to work efficiently (Galetsi et al., 2020). Moreover, in retail, compared to other industries such as healthcare or finance, data is changed very frequently, due to the large number of items that the company sells (Malodia et al., 2022). Of course, the literature highlights the need to continue studies on artificial intelligence-based virtual assistance in other contexts, than those of finance, hospitality, and telecommunications (Kamoonpuri & Sengar, 2023).

Retailers have begun to adopt digital technologies to satisfy customers under pressure to remain competitive (Andronie et al., 2021; Lăzăroiu et al., 2019; Lăzăroiu et al., 2020; Majerova et al., 2020) and many companies are using artificial intelligence (AI) applications to build beneficial relationships with customers (Morgan, 2019; Delicato et al., 2020). Artificial intelligence is often employed in retail settings, customer perception, management, and customer engagement (Oosthuizen et al., 2020).

Advances in artificial intelligence have the potential to improve the customer experience by developing companies' knowledge of customer preferences and shopping patterns. Therefore, the strategically deploying of AI technologies at various key customer touchpoints can benefit retailers and increase customer satisfaction. AI technology allows for the customisation of services and the provision of individualised recommendations to each individual customer based on their previous purchases, sociodemographic characteristics, preferences, etc. (Ameen et al., 2021).

2. Research Methodology

In order to identify the extent to which the representatives of food and non-food retailers with activities in Romania, call in the New Normal to systems and/or technologies based on artificial intelligence (self-pay counters, autonomous robots, chatbots, etc.), respectively, include them within the general business strategy and processing of the local market, the authors resorted to the implementation of a qualitative research, based on an interview guide. In this sense, they compiled an in-depth interview guide with open-ended questions that included the following topics, derived from the literature (Shavarani et al., 2019; Attaran, 2020; Delgosha and Hajiheydari, 2021):

- The perceived usefulness of artificial intelligence (AI) systems in retail activities.
- The perceived advantages and limitations of adopting artificial intelligence systems in current retail activities in Romania.

The guide was sent to retailers from Romania. People who have management positions from the main food chains (Kaufland, Lidl, Penny), from smaller chains, and also from the non-food trade were contacted. In addition, in order to complement the data, a number of 15 interviews were conducted by the authors over the phone and face to face. The average duration was of 23 minutes.

3. Results and discussions

3.1. Perceived Utility of AI Systems in food and non-food retail

According to research participants, the use of artificial intelligence systems can be useful for the proper inventory of stocks, for carrying out the general inventory, and for making the work of employees more efficient. Especially AI-based technologies that could include “systems for photographing, scanning, and OCR type recognition of products” were perceived as able to facilitate the inventory of items on the shelf (food retailer representative 1). To respondents, such systems can be of use, especially in special situations, where hiring more people is not a viable solution, i.e., when the flow of customers is significant.

“I believe that these machines can help us especially in overworked periods, for example before the holidays when the cashiers are completely overwhelmed by the high volume of work, but I still believe that they can also be a disadvantage for employees. The company might consider replacing employees with machines, but there is a risk that these robots will be overvalued, and, in the end, we will have to rely on physical employees” (food retailer representative 2).

Chatbots and/or virtual assistants were seen as especially useful *“in the Customer Service department, as they can take calls from customers, handle complaints, or provide shopping advice”*. Moreover, such

“chatbots can support the retailer’s employees in the development of promotional materials and/or promotion flyers” (food retailer representative 3).

Recourse to Artificial Intelligence Systems

International food and non-food retail chains with large stores present in Romania call on the various artificial intelligence systems, based on machine learning algorithms, which allow the automation of some processes, the reduction of operating costs, the possibility of streamlining some activities, or improving performance general of the company. These systems are largely based on collected data, which can be used to analyse and understand customers’ buying behaviour, but also to improve their in-store/shopping experience by identifying customers’ favourite products and making offer recommendations customised, and to reduce labour costs.

Among the artificial intelligence systems implemented in food and non-food retail in Romania are self-pay/self-service kiosks, software that allows automatic ordering of products from the network’s central/regional warehouse and/or from suppliers, vending machines of exchanging coins into money and/or storing them on valid shopping cards in their own network, devices for automatic scanning of purchased products, chatbots that allow quick and efficient interaction with customers, but also easy communication with them, and autonomous robots that walk around the store, informs customers about the various products and/or promotions, respectively, carries out merchandising actions.

Advances in autonomous mobile robotics are essential to flexible working environments, especially in intelligent manufacturing but they also have relevance for the retail sector. These complex sensor, motion, and navigation systems are composed of many sensors and powerful processors, enabling these robots to continuously monitor the environment and move freely, 24/7. Such robots allow the implementation of complex tasks consisting of lifting and/or transportation of goods; their operating time between charges depends on the distance travelled, the energy consumption of the payload, the mass of the load, the attachments it has (tilting trays, robotic arms, etc.). (McNulty et al., 2022). Such robots can supplement and replace humans, being able to navigate independently without any assistance from human operators. Of course, this robot has an efficient perception system (based on sensors) that allows it to determine the actions necessary to perform tasks (McNulty et al., 2022).

The self-pay counters allow quick and efficient scanning of products by customers, ten such counters being managed by a single cashier, who has the role of supervising and offering help to people who do not know how to use these systems. The cashier responds to customer requests which mainly concern the completion of purchases, the correct identification of certain products, such as those sold by the piece or those of high value. Resorting to these self-pay/self-service stores allows for substantial labour savings and implicitly, the reduction of the store’s operational expenses (Taylor, 2016). Research participants were aware of the benefits of such systems:

“In the future, we intend to better familiarise consumers with such services because in this way we can increase the speed of customer service, making them responsible. At the same time, the cash registers allow for the reduction of expenses with employees, the savings thus achieved allowing the sale of products at lower prices, which is to the advantage of our customers” (food retailer representative 3).

Of course, apart from the self-pay/self-service cash registers, retailers also use specialised software that allows the proper management of products and stocks, the identification of stock shortages, facilitating rapid replenishment from the central or regional warehouse, and also the transmission of automated orders for fast-selling products to suppliers. Algorithm-based software also allows estimating the quantities of products that will be sold in certain periods of time, i.e., days, facilitating to a certain extent the logistic processes in the store.

“Cash registers use artificial intelligence when scanning products, whether it is done by a cashier or by the customer at self-service/self-pay checkouts. The data thus obtained allow for proper management of stocks. Self-service/self-pay cash registers are extremely easy to use, offering customers a certain convenience and speed in purchases. Our company considers the new technologies on the market and will adapt to market developments depending on the changes imposed by other retailers in our field of activity” (food retailer representative 5).

On the other hand, chatbots are important for commerce networks, promptly assisting customers and providing them with answers to questions or providing additional information when needed. At the same time, chatbots are also used to present personalised offers to customers, to recruit them, or to remind them to come back to shop. Thus, an attempt is made to facilitate the interaction between the customer and the store, under the conditions of a strong reduction of staff costs, of prompt, efficient, and quick responses, respectively of providing answers to questions and/or notifications.

“Chatbots are used to provide support in order placement, store navigation, and support for Food Retailer 3’s products and services. To familiarise consumers with bots and chatbots, Food Retailer 3 uses a variety of techniques, such as advertising and marketing, along with online presence. Robots and chatbots are also used to analyse data and customer buying behaviour, thus being able to offer personalised recommendations to customers” (food retailer representative 6).

The recourse to artificial intelligence systems is all the simpler and easier in Romania because the degree of use and acceptance of technology in everyday life is very high in the large cities, the rate of adaptability and acceptance of innovations, at least by young customers, being very high. That is why the retailer Auchan has recently resorted to the use of an autonomous robot in its large-area stores that walks among the shelves, carrying out merchandising actions, informing customers about existing promotions, new products, etc., within an RI Smart Service project, but also to get feedback from customers (<https://www.youtube.com/watch?v=0UXhTceUkYg>).

“We have recently started the implementation in some of our own stores, together with a manufacturer of autonomous industrial robots, of a joint project - RI Smart Service, which aims to assist customers, inform them, and obtain their feedback with the help of an autonomous robot” (food retailer representative 7).

3.2. Considerations on the use of artificial intelligence systems in Retail in Romania

Representatives of small retailers (neighbourhood stores in food retail, independent stores, or chains of small stores in food and non-food retail) who participated in the research stated that they do not use artificial intelligence systems because the operations carried out are too small, and the costs assumed by the implementation of systems based on artificial intelligence are too large and/or too complex. On the other hand, there is also the shortcoming that resorting to artificial intelligence systems must be very well thought out; otherwise, the human effort required by them can be too significant.

“At the moment we are not willing to invest in artificial intelligence systems because they are too expensive.” (non-food retailer representative 8)

“Of course, at the level of our network management, there are discussions regarding the use of artificial intelligence systems, but nothing has been finalised yet, because this concept is primarily based on very high efficiency and accurate information, any novelty must be very well thought out because a measure insufficiently well designed can generate additional efforts for its implementation, respectively, it can cause unwanted costs. For example, we have had requests from customers to offer cold drinks (beer, water, juices, etc.) in the summer, but installing such a refrigerator and restocking it with products requires about 1-2 hours of daily work for an employee, which creates our difficulties because he fails to fulfil the rest of his obligations” (food retailer representative 9).

In resorting to such artificial intelligence systems, a possible obstacle consists in the mentality of retail chain managers. According to some of the respondents, artificial intelligence cannot properly analyse the needs of customers, or it does not know and/or understand their past, respectively emotional states in which they are found. Moreover, sales through stores *“rely entirely on people and not on machines, everything is managed and systematised by people”* (food-retailer representative 7). Organizations must consider acting ethically and fairly when managing sensitive customer information (Cuellar, 2023).

Chatbots and/or virtual assistants with whom a customer might verbally interact would not be able to address conversational topics other than strictly technical ones that relate to existing promotions, products sold, and/or their features. As phrased by a research participant, *“the Romanian customer likes to socialise when shopping”*, but an artificial intelligence system, even if it may have proven its utility and/or economic efficiency, *“creates a certain social distancing”* (food-retailer representative 10), thus there is a risk of losing important customers, especially for small retailers.

“These AI systems cannot empathize with the customer, which makes them unattractive to our customers, who visit us and socialise with our employees” (non-food retailer representative 11).

The general strategy of some retailers, especially in the food sector, is to offer the best possible quality at the lowest cost to the customer. To research participants, the use of artificial intelligence systems would increase these costs, which could result in the loss or diminution of the network’s comparative competitive advantage.

“Our company resorts to investing in such systems because they are based on low prices, and such an option would increase prices, which would increase the company’s costs which would not lead to any advantage, since our target customers are people with low budgets, who prefer our stores precisely because we offer them attractive prices” (food-retailer representative 5).

Retailers can use machine learning models to accurately predict the delivery time required for each online order. Such systems are based on a combination of supervised learning techniques, regressions, and neural networks capable of estimating the total delivery time of goods to customers based on order information: order size, delivery time, route, distance to customer, etc. (Adulyasak et al., 2022).

Conclusions

The COVID-19 pandemic has had a significant and ongoing impact on retailers, forcing the acceleration of initiatives to integrate AI-based applications and/or systems into ongoing businesses. Such transformations are inevitable and even necessary, allowing retailers to increase their competitiveness in the New Normal. In the future, retailers will have to rely more on data processing capabilities, and to react proactively and promptly to changes induced by situational factors, difficult to control, but also by uncertainties, respectively, disruptive factors. Of course, business strategies based on the use of artificial intelligence require monitoring, updating, and permanent recalibration depending on the feedback provided by users, but also on the extent to which, for example, the advice of virtual assistants generates an increased turnover or at least customers who are more satisfied with the retailer's performance. At the same time, the use of artificial intelligence systems must be based on economic efficiency, as there is a risk that, at least in the case of small store chains, such approaches will not be profitable.

A limitation of the research is given by the very small sample. However, as responses to open ended questions are more difficult to obtain than for multiple choice questions, the research suggests there is a need for the voices of those working in retail, to be heard. Nevertheless, obtaining answers to the qualitative research was difficult given the competing priorities of the respondents. However, our research suggests the importance for future research to apply the research tool to a single sector of activity (retail food or non-food retail), respectively, referring to companies with international activities versus national companies. At the same time, the existence of a certain number of applications based on artificial intelligence was not pursued, but the aim was to obtain general feedback on the applications and artificial intelligence systems used by retailers with activities in Romania.

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