

## A Business Framework of Architecture for a Retail Information System

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### Abstract

**Purpose:** Retail is one of the most important sectors in modern life. Retail information systems support organizational processes in retail chains. Since such systems are very complex, they need to be structured in a framework based on actual business requirements for understanding the nature and sources of retail information systems. This article focuses on developing a business framework of architecture for a retail information system. This framework allows us to explore the main modules of retail information system. Design/methodology/approach: Research is based mainly on theoretical studies of retail information systems.

**Findings:** As a result, we developed a framework that enables integration of processes in the following areas: assortment management, floor planning, shelf space allocation, pricing strategies, promotion, and store operations. Such solutions allow, among others, for optimization of available shelf space, reducing out-of-stocks, increasing employee productivity, enhance company profitability and improve customer satisfaction.

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**Research limitations/implications:** Because of the fact that in retail organizations, RIS modules are generally managed by different departments, some issues in implementation and data transfer could appear. Moreover, in the current framework, there is no artificial intelligence or the Internet of Things included.

**Originality/value:** The results of the research can be used both by retail information systems developers and by retail managers in traditional and online retailing.

**Keywords:** retailing, retail information systems, decision making, processes integration, merchandising.

**JEL:** C61, L81

## Ramy biznesowe architektury systemu informatycznego zarządzania sprzedażą

### Streszczenie

**Cel:** handel detaliczny jest jednym z najważniejszych sektorów gospodarczych. Systemy informatyczne zarządzania sprzedażą wspierają procesy organizacyjne w sieciach handlowych. Systemy takie są bardzo złożone, dlatego należy nadać im strukturę opartą na rzeczywistych wymaganiach biznesowych, aby zrozumieć naturę i źródła systemów informacyjnych dla handlu detalicznego. W niniejszym artykule opracowano ramy biznesowej architektury systemu informatycznego zarządzania sprzedażą, które pozwalają określić podstawowe moduły tego systemu.

**Metodyka badawcza:** skupiono się głównie na badaniach podstaw teoretycznych systemów informatycznych zarządzania.

**Wnioski:** w rezultacie realizacji badań opracowane zostały ramy biznesowe systemu informatycznego zarządzania sprzedażą, które umożliwiają integrację procesów w następujących obszarach: zarządzanie asortymentem, planowanie powierzchni, alokacja powierzchni półkowej, strategie cenowe, promocja i operacje sklepowe. Zaproponowane podejście pozwala m.in. na optymalizację dostępnego miejsca na półkach, zmniejszenie braków magazynowych, zwiększenie produktywności pracowników, zwiększenie rentowności firmy oraz poprawę satysfakcji klientów.

**Ograniczenia/implikacje badawcze:** ponieważ w organizacjach detalicznych moduły analizowanego systemu wspierają na ogół zarządzanie w różnych działach przedsiębiorstwach, mogą pojawić się pewne problemy we wdrażaniu systemu i w procesie przepływu danych. Opracowane podejście w małym stopniu uwzględnia wykorzystanie sztucznej inteligencji i internetu rzeczy.

**Oryginalność/wartość:** wyniki badania mogą być wykorzystywane zarówno przez twórców systemów informatycznych handlu detalicznego, jak i menedżerów handlu detalicznego w handlu tradycyjnym i internetowym.

**Słowa kluczowe:** handel detaliczny, systemy informatyczne zarządzania sprzedażą, podejmowanie decyzji, integracja procesów, merchandising.

## 1. Introduction

Nowadays, consumers are inundated by information about goods and services from various omnichannel environments. Modern technology assists retailers in targeting appropriate consumers and enables consumers to make reasonable decisions about which products or services to choose. Some of their decisions are spontaneous, made quickly, often prompted by strategic visual merchandising rules and promotion strategies conducted by a retailer. Based on the analysis of historical data, including operational

data (e.g., product price, purchased quantity, shopping basket content), personal data (e.g., gender, age, family structure, occupation), environmental data (e.g., temperature, season, workday or holiday) a retailer may predict customer behavior and propose methods of increasing sales (Grewal, Roggeveen, & Nordfält, 2017).

Most of the purchasing decisions are made inside stores. Despite low or competitive prices, given products are not always chosen by customers. Many other factors such as product quality, salience on a shelf, loyalty to a particular brand, brand acceptability, new products and other product features influence customers choices (Reyes & Frazier, 2007).

In the rapidly growing retail industry, entrepreneurs need to build their brands simultaneously meeting customer expectations. They need modern retail information systems (RIS) which can deliver conscious, integrated business planning and responsive store operations. New technologies such as artificial intelligence, machine learning, the Internet of Things, robots can process real-time data and provide retailers with new business models focusing on their inventory, assortment, shelf space, pricing, store operations as well as predictive analytics tools which are based on robust forecasting and which ensure optimized planning and execution of retail operations. Such methods definitely help retailers to meet customer expectations, improve sustainability and increase revenues. Retailers aim at improving store profitability and increase customer satisfaction. Therefore, optimizing shelf space, inventory, product on-shelf availability are critical issues for retailers.

However, existing publications related to RIS (e.g. Becker, 2015; Schütte, 2017; Wally et al., 2015) do not provide a framework for RIS in order to integrate business processes in retailing (for example, shelf space allocation processes are not considered in RIS architecture). Such a framework can be used both by the developers of RIS and retail managers to increase the efficient use of RIS and enhance the proficiency of the wholesale business.

The aim of this paper is to develop a business framework of architecture for a retail information system. The main structural components and the main business processes are explained. RIS based on this framework, can help retail managers increase the efficient use of RIS and enhance the proficiency of the wholesale business. This study also attempts to provide a deeper understanding of the main retail tasks and the drivers that push retailers to use innovations. Through our discussion of the proposed framework, we try to extend the knowledge of RIS issues that require further investigation, as well as innovative stimuli to achieve success.

The research is conducted on the basis of literature review, retailers' and customers' needs and observation of phenomena based on authors' practical experience gained in retail companies. The rest of the paper is organized as follows. Chapter 2 provides a theoretical basis. Chapter 3 contains the results – presentation of a business framework with its modules. Chapter 4 summarizes the work and suggests directions for future research.

## 2. Theoretical Basis

The advent of the abundance of information and a significant increase in the use of information technology in retailing has significantly impacted the way retailers do their business. In this part, we briefly look at the aspects of RIS. With the increasing globalization of retailing, the RIS involved in the retail sector has increased significantly. They play a highly important role in the management of retail operations.

RIS are the tools, hardware and software that allow retailers to achieve goals in the retail industry. They provide retailers with several functions involving planning, managing budgets and sales goals and any logistic operation. RIS are used to improve the efficiency and effectiveness of retail stores. Such systems gather information about data configuration, merchandising rules, planning, purchasing, pricing, replenishment, store operations, post-season analytics.

Nowadays, the retail sector is continuing to grow, and it is becoming more complex. Therefore, most of retailers deploy advanced RIS in order to perform target business operations. RIS have received some attention in scientific literature.

Burden and Proctor (1997) highlighted the approach to information systems development. Based on the company goals, they outlined the areas of critical success factors: (1) customer satisfaction (speed of service, time for order execution, stock availability, price accuracy, workers availability) and (2) company performance (profit margins, sales ranks, stock holding levels).

Wang and Head (2001) suggested a web-based information system model designed for e-retailing which offers an integrated and overall perspective on four interconnected layers: business determinants; web-based information systems; business interface; and users/customers. Obviously, such types of outcomes ensure business functions and policy, attract and hold customers.

To effectively conduct management and order processing, retailers require a cohesive order distribution system. The goal of the RIS is to collect, organize, and store relevant data on a regular basis and present the information flow to proper decision-makers. RIS should take into account existing retail business, modern technology practices, as well as customers' shopping experience in order to allow retailers to achieve a significant advantage over their competitors (Schütte, 2017).

Controlling increasing volumes of data and information is the key factor in obtaining a competitive advantage in the retail industry. RIS are used by retail managers and company decision-makers as they collect, organize and store appropriate useful data on a continuous basis. Next, such a tremendous amount of information are processed and directed to staff and proper decision-makers in order to achieve business and financial success.

The reasons for using RIS are as follows (Becker, 2015):

- To gather and analyze robust customer data with regard to differentiation.

- To increase retailers' ability to process orders thanks to enhanced speed and flexibility.
- To work more efficiently.
- To perform operations across all stores in a retail chain, definitely improving business processes.

Geographical information systems (GIS) are novel tools in retail location planning. Although many retailers have store location or planning strategies, or computer-based systems, they do not explore the possibilities of these dedicated systems. Clarke and Rowley (1995) discussed a basic case for investing in dimensional decision support systems in retail geographical planning. They introduced a strategic tool such as GIS used in retail organizations and outlined the benefits, which can be received from investing in such systems.

The main advantage of GIS is their usefulness in planning retail development, its linkage to different demographic databases with no regard to zip-codes, which do not correctly represent the local market area. Tayman and Pol (1995) focused on the use of geographic database systems and their application in retail site selection decisions. They showed the methodology of data retrieval that can be used for forecasting potential demand for retail services.

Essentially, meaningful RIS and GIS, which reflect business processes in retail stores, can speed up retail operations and deliver cost-saving benefits to retail chains.

Information systems (IS) development projects are becoming more complicated and uncertain. During the IS development project's lifetime, researchers could focus on a wide range of difficult situations and the appearance of trouble at and across different sensemaking levels, allowing them to better understand the sources and nature of trouble, as well as how people respond to it (Baghizadeh et al., 2020).

Category management is also performed by RIS. It is retail management action, the goal of which is to improve a retailer's overall performance in a product category because of more meaningful buying strategies, better coordinated merchandising, and defining pricing of brands in a given category. There is a tremendous retailer and manufacturer interest in the overall category management process and rapid adoption of it in the retail industry (Hübner & Kuhn, 2010).

The RIS also allow for supporting merchandising. It specifies methods or practices of visual presentation of products in retail stores. Numerous recent research has found dependencies between customers buying behavior, dividing products into categories, shelf location and visual display of them (Anic et al., 2010; Desrochers & Nelson, 2006; Elbers, 2016). Bianchi-Aguiar et al. (2018) studied grouping products into families and arranged them into rectangular blocks in a hierarchical structure of a category. Park,

Jeon and Sullivan (2015) recommended the measure of merchandising salience on the basis of the dependency between the impact of visual merchandising perception, attitude to a brand and customers purchase decisions. Desrochers and Nelson (2006) claimed that customer behavior is the main factor in the category management process. Retailers must take into account that the customer's product preferences highly depend on the location of a product on the shelf and on assigning it to a given category. Gabrielli and Cavazza (2014) studied placing products at the end of aisles. Their research highlighted that the key factor for brand recognition is the shelf level (low, medium or high).

The procedures and the provided data are the key structures in retail for an integrated retail information system. The retail management processes successfully integrate controlling, strong data consolidation and the strategic plan for a company. The requirements for efficient information modeling in retail business are presented by Becker et al. (1998). They also proposed a framework to perform business tasks in a specific industry and also guarantee the methodical quality of the information models. Luxem (2000) developed an adjusted framework for RIS, which can be used as a reference model while dealing with digital products trading issues. Wally et al. (2015) developed a prototypical retail information system with a generic Resource-Event-Agent engine, which could be used for recording business data with the possibility of configuring it at runtime. It provides a modern and flexible approach to gain control of economic events. Burazin et al. (2009) developed a personalized shopping system responsive to the customers' needs. This system could also respond to the user's requests for information, evaluate it and present information with regard to customers' media preferences.

Recent tendencies in the development of enterprise information systems have been stimulated by the willingness of companies to process historical data, data gathered in an external environment and data received from customers and partners. Modern concepts of the Enterprise Information System, which are used by all partners and satisfy common business interests, include the following trends:

- automation of business processes and the role of ERP system;
- openness and transparency of system technologies;
- structural changes of system architecture;
- enlargement of system implementation;
- extending the system functionality (Serova, 2012).

IS architecture evolves as a result of interactions between two sorts of agents. To complete their business responsibilities, actors (groups of humans) create, use, and manage IT applications. Business tasks are enabled, facilitated, and constrained by IT applications (artifacts). The context of the operators and the environment of the organization influence the progress of an IS architecture (Haki et al., 2020).

However, existing publications do not present the RIS framework, which can integrate business processes in retail companies. Therefore, such a framework has been developed in this research, and it is presented in the next section of the paper.

### 3. Results – Business Framework

Business analysis is the foundation of the retail process, which involves category management, corporate goals, priorities, functional terms, assortment planning, shelf space management, store localization and company policy. The results of such analysis are an estimation of measurable benefits obtained thanks to the implemented solutions.

Changing needs of customers force retailers to make decisions about products, their location on shelves, and sale at the right store. The whole process involves a lot of staff such as category managers, business consultants, assortment analysts, space planners whose goal is to match customer expectations with the retailer profit outcomes. Retailers appear to rely on their personal biases rather than scientific expertise to make visual merchandising decisions.

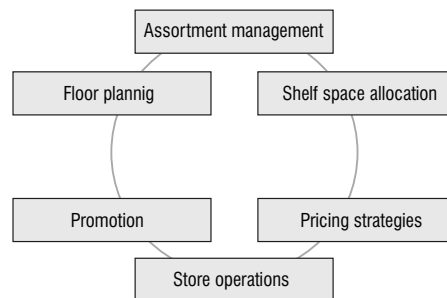
The goal of the integrated automation solutions is to incorporate planning processes and store execution, accomplishing enough product visibility for customers and retailer monitoring purposes. Meaningful retail policy and expert solutions improve customers' loyalty, expand basket size and increase overall satisfaction. Automation of the retail processes improves companies' efficiencies that can respond to rapid modification in demand and industry practices.

In order to facilitate the understanding of the integrated business process and analyze retail data as a basis for RIS, reference processes can be applied. Retail business reference processes demonstrate the core, the management and the support processes used by a retail company. A reference model should be used in order to simplify the overall view of company goals and to understand better the links between the combined processes (Becker, 2015).

The efficient control of the retailing industry can be improved, giving merchants a competitive advantage. One of the most significant things that retail logistics managers choose to invest in is information technology (IT). The economic benefit of IT adoption is that it allows businesses to operate more efficiently by increasing sales and profits. The acceleration of information exchange and an increase in automation in retail operations are two of the key functions of these IT (Suriyantphupha & Bourlakis, 2019).

This paper investigates six key topic areas: (1) assortment management, (2) floor planning, (3) shelf space allocation, (4) pricing strategies, (5) promotion, and (6) store operations. We introduce these areas by integrating the insights and special features of these topics. Figure 1 provides a visual overview of mentioned issues.

Figure 1  
Organizing framework



Source: Self elaboration.

### 3.1. Assortment Management

Assortment management is used to create localized products mix for stores. The selection methods incorporate sales performance, available space and inventory at a definite store. An optimally selected assortment increases sales and profits, customer satisfaction and reduces retailers' losses and working costs.

An assortment is a set of products, which are sold in each store at each point in time. The aim of assortment planning is to choose an assortment that maximizes sales or profit subject to various merchandising constraints, the most frequent of which are limited budget for the purchase of products, limited shelf space for exposing products, and a variety of other miscellaneous constraints (Kök et al., 2006).

Making the decisions on the basis of a huge variety of assortment mix and its appropriate number of facings is a very hard job that retailers must execute (Cachon et al., 2005; Kök et al., 2008; Flamand et al., 2017). The right assortment choice combines purchase preferences, limited shelf space, in-depth analytics and involves the following elements: assortment breadth, depth and inventory level (Kök et al., 2008). Such a strategy helps to build customer loyalty.

Most of retailers' requirements arise from the outcomes of available shelf space, backroom repository, brand recognition, advertising, logistical, marketing, and pricing criteria. Therefore, they select the best possible assortment which will be sold with the help of planograms. A planogram is a graphical representation of a product mix displayed on fixtures, which in consequence facilitate retailers in achieving maximum returns and ensure brand promotion (Daruka & Palekar, 2006).

Retail know-how and expert solutions based on the integration of assortment, pricing, promotion, replenishment, and inventory decisions constantly improve a store's efficiency (Maddah et al., 2014; Ghoniem &



Maddah, 2015). Among the elements which stimulate retailers to competitive assortment planning and to periodically revise sold assortment are the attempts to attract more customers to stores, get them involved in local events (i.e. holidays, seasonal products, special or popular products) and change their preferences (Kök et al., 2008).

Kahn (2017) highlights issues connected with the abundance of assortment, how hard it is sometimes for customers to process all the information, and he has made several recommendations on how to reduce the assortment size, decrease information intensity, perform appropriate grouping of displayed products in relation to other products in the category and conduct more a meaningful merchandising policy. If retailers want customers to react with positive emotions to the presented assortment, they should make their assortments attractive and varied. Moreover, offers should be flexible and easily noticeable and understood.

One way to increase product visibility in case of a large assortment of products is to increase the number of facings or increase the size of the package or a product. Chandon et al. (2009) concluded that the number of facings stimulates product salience because of greater noticeability and the possibility of re-examining one's choice. They highlighted those shelf facings have a positive influence on visual attention, which results in the brand evaluation.

On the one hand, suppliers have knowledge of their products at each store where they are sold. On the other hand, retailers need a better examination of the whole assortment category provided by many suppliers. This challenge requires implementing up-to-date management initiatives in order to achieve corporate goals and fulfill customers' expectations.

### **3.2. Shelf Space Allocation**

An automatic planogram creation is the key feature of comprehensive shelf space solutions used by distributors and retailers. The goal is to facilitate more accurately displays of product assortments. The main characteristics of such solutions is the intuitive shelf space planning using different fixture libraries, easily adding or replacing products on any planogram. Robust analytics on which such planning must reduce product understocks and overstocks and ensure correct store inventory levels.

Planograms creation as a part of retail processes at operational level have received a lot of attention in recent research (Bai & Kendall, 2005; Bianchi-Aguiar, 2015; Bianchi-Aguiar et al., 2015; Bianchi-Aguiar et al., 2016; Bianchi-Aguiar et al., 2018). A sophisticated architecture of shelf space allocation solutions must match merchandise strategy with customers' behavior while presenting convenient visual graphics displays for retailers. Moreover, such solutions improve store efficiency enabling planograms to be quickly read, managed, printed and distributed.

Shelf space allocation solutions must ensure the right quantities of optimally selected product mixes assigned to the right store, fixture type

shelf maximizing effectiveness of selling space. The main goal of retailers is to maximize gained profits. With the help of such solutions, they can implement category plans, layouts and performance of categories, assign better positions for products with regard to store-specific merchandising rules and reduce manual work.

The essential visual merchandising elements affect client awareness and, as a result, shopkeeper profit. Planograms containing products from several categories are extremely challenging for retailers to maintain. Therefore a full description of retailer requirements and customer expectations leads to the development of a novel shelf space allocation models with different constraints (Czerniachowska, 2021; Czerniachowska & Subbotin, 2021).

Understanding the connection between store layouts and what a customer sees on the shelves is critical because these influences their experience and impacts business. The exposed shelf allocations according to Mowrey et al. (2019) are a function of the layout and the shopper's field of view. The usage of angled racks in a retail concept may save search time and possibly discomfort for customers. More rack locations can be noticed by customers during their usual travel path at store without having to unreasonably extend their pathways. (Mowrey et al., 2019).

In some retail chains, such as grocery and pharmaceutical ones, the amount of shelf space given to a product category is a vital component of the assortment planning process. This concept especially concerns fast-moving products because of high demand, which causes that a significant amount of inventory is allocated on a shelf. On the other hand, in the case of categories such as shoes, clothes, music, books to which only several units are allocated, the amount of inventory and shelf space is not very important at the product level (Kök et al., 2006).

### 3.3. Floor Planning

Appropriate floor planning supports retailers in making smarter space allocation decisions which result in higher revenues, better management of available selling space and greater ease of measuring KPIs. In order to maximize category sales opportunities, retail solutions must use an analytical approach to ensure the integration of planograms into floor plans available at each store. Floor plan management is used to correctly estimate the size of a category space. The graphical floor plan also includes store layouts, aisles and traffic flow.

An efficient floor layout is required for better visibility of products on planograms and therefore increased customers satisfaction. This goal could be achieved by defining the optimal layout for the floor planning with proper rectangular floor dimensions (Choubey, 2017).

A lot of research literature noticed the need for including visual measures in designing retail floor layouts, especially interaction of the racks layouts with travelling customers viewing angles. The alternate rack layouts may

influence the floor space at the store and the architecture of the store subsection (Mowrey et al., 2019).

A floor plan in a retail store strongly affects the in-store traffic flow, customers shopping behavior, emotional shopping atmosphere and operational efficiency of a store. Grid and rectangular floor layouts are generally used in the grocery sector because customers usually plan their purchases before visiting the store. The main advantage of such locations is minimal floor wasted space and cost efficiency (Ozgormus, 2015).

### 3.4. Pricing Strategies

Correct pricing optimization strategies result in better financial performance of retail stores. It also reduces return charges. While providing pricing strategies, a retailer must use the appropriate level of granularity in order to reduce losses caused by good returns by customers and maximize store profits. Such strategies are performed in real-time due to everyday pricing of, e.g. fresh grocery goods.

Generally, price decisions are conducted by a buyer (retailer) who initially chose given merchandise and ordered it from a manufacturer. An analytical approach to pricing management requires the interconnection of components such as (1) a sales forecasting model, (2) a price optimization algorithm dedicated for store and item level, (3) financial performance measurement of the system efficiency (Smith, 2006).

Lots of theoretical literature on category profit-maximizing in retail stores generally stresses the role of cross-price elasticities of demand between brands for setting the optimal price. Such an approach results in cross-brand pass-through behavior. Hall et al. (2010) developed a multi-brand framework for retailer pricing and ordering decisions. Their model combines collaboration of manufacturer and retailers, ordering costs, retailer buying behavior, own- and cross-price effects of each brand in the product category. Dubé and Gupta (2008) investigated the responsiveness of cross-brand across stores and across regular price and promotional price weeks, which can be used to estimating only with promotional or only with regular price weeks. They concluded that the magnitude of pass-through strictly depends on the promotional conditions, the percentage of nonzero cross-brand pass-through elasticities is lower.

Surjandari et al. (2012) conducted a study to obtain the configuration of product on shelf allocation with regard to the relationships between selected categories, subcategories, products and their prices, with the goal to maximize retailer's profits. They claimed that assortment, product allocation, and product price have a significant impact on customer buying behavior. So retailers can determine the prices of products, which customers often purchase together in the same basket.

Maddah et al. (2014) studied the interdependence among the important decisions on (shelf) inventory, pricing, and popular-set assortments (with

highest consumer demand) of a retailer's product line. They provide interesting insights into specifying optimal pricing considering a realistic demand function. They concluded that an optimal price could be increasing or decreasing along with the size of an assortment, but if a retailer ignores costs of inventory, optimal prices always increase along with the assortment size.

Basuroy et al. (2001) focused on the implications for practitioners and researchers of the influence of category management techniques on retail prices, sales, and profitability in a competitive retail environment. Special attention is given to the dependency on higher retail prices, which leads to lower sales.

Because of the fact that retailers are interested in methods and tactics to intensify the impact of sale prices, Biswas et al. (2013) focused on the optimal discount depth or optimal sale price shelf locations. They concluded that the location of the sale price relative to the original price affects consumer evaluations as customers calculate the discount depth. Such retail tactics have received widespread appliance for customers, retailers, academics, and practitioners.

### **3.5. Promotion**

Being part of visual merchandising rules, retailers must take into account the location effects of their sales promotions. Recent researches have presented novel findings of the considerable impacts of the location on the sale price in visual displays. Biswas et al. (2013) stated that the sale price is more effective when it is located to the right of a higher advertised reference price rather than when it is placed to the left side. These effects are totally reversed in the case of discounts. They show that customers evaluations depend on the display location of the sale price, but such evaluations are balanced by discount depth.

When planning a price-promotion strategy, retailers must consider the global chain-level impact of their promotions in order to enhance revenues to manufacturers, i.e. "think globally, but act locally". Additionally, retail managers must keep in mind that promotion implementation differs in different stores and must match the responses to their marketing programs. What is more, a retail manager must take into account not only brand promotion and its influence on related brands but also the sales effect on other categories (Kamakura & Wooseong, 2007).

A good product promotion policy and a price reduction strategy create a more profitable and customer-centric environment, simultaneously reflecting specific business needs. As a result, the retailer receives a larger long-term return on his investment.

### 3.6. Store Operations

Store locations and layouts are very important factors that are influencing customer purchase behavior in the retail environment. Significant factors related to store location are the convenience of a store location, store availability, public transport connection, access to the parking lot, multi-store locations, store visibility from public transport stations. A store's layout design affects customers' emotions while shopping. Among store layout components, one can determine the following: convenient navigation, appropriate visual merchandising, aisle space, location of billing counters, variations of product assortment, store composition (Behera & Mishra, 2017).

A retail store's layout influence customers' visual experience and, in consequence, the time spent while shopping in a store, navigation through structured aisles, paying attention and spending money across categories. Alternate rack layouts affect more than a rack's facing to appear in the customers' visual notification. Obviously, items, which are not sufficiently visible, are not likely to be purchased unless a customer had a prior intention to buy them (Mowrey et al., 2019).

Managing everyday store operations is a very complicated task faced by retailers. Business operations are focused on ensuring uninterrupted product availability, reducing waste, increasing sales and optimizing inventory level. Mobile solutions facilitate the execution of store operations, support retailers expectations in promoting brands.

Solutions for executing store operations must facilitate managers that put more time and energy into serving customers, which results in increased sales. Generally, stores are grouped into clusters based on the same attributes, such as demographic areas and product assortment, which allows analyzing customers' behavior and forecast sales. Store managers must rapidly adjust customer maintenance with vital retail goals such as controlling cash, eliminate fraud, reduce food waste and increase product quality. Otherwise, customers go to a competitor's store.

The backroom storage significantly affects decisions regarding quantities of orders. In case of ignoring such effects, the overall cost increases by 30 per cent. The cost of operations to shelf-refill and replenishment operations must also be taken into account (Chiralaksanakul & Sukhotu, 2016).

To continue to be competitive, a store needs to achieve operational excellence in managing prices, inventories, orders, replenishment and staff scheduling based on robust analysis and forecasts across the whole retail chain. Such goals require integrating data from different sources and providing intuitive presentation of processed information, e.g. graphical charts, dashboards, meaningful reports. The optimal retail policy provides better decision-making across all stores.

## 4. Discussion

In this article, we investigate the important retail processes areas and propose to combine them into RIS framework. Visual merchandising elements should be integrated into operation procedures by retailers and other category experts. This should be incorporated in their sales strategies because it is a really unique. We recommend that retail category managers design their RIS based on store-specific merchandising principles, which include the following modules: assortment management, floor planning, shelf space allocation, pricing strategies, promotion, and store operations.

The retail store serves as a vital link between retailers and customers. The physical store layout serves as the backbone for all other design considerations, including customers' behavior, merchandise, visual communication and space planning principles.

Focusing on a wide range of retail problematic cases gives us the opportunity to understand the sources and nature of the retail issues and to develop the recommendations for RIS modules. Making products available for customers is a functional field of retail activity that includes assortment selection, floor and shelf space planning, pricing management and promotion, physical storage of products, as well as the execution of store operations.

The concept of RIS may contribute to retail-oriented literature the theoretical insights that can influence category managers' decisions. Retail stores should provide their operational units with the use of IT applications at reasonable costs. Next, they should adjust their IT application ecosystems to be able to meet new requirements that arise in retailing.

## 5. Conclusion

Retail is a complex and very large business sector with a broad variety of strategies of how retail business is conducted. There is no doubt that without RIS and associated with the business frameworks, a retailer would be unable to keep its position on the market.

In this paper, features of correct information management carried out for the retail business have been investigated. We have presented a structural framework for positioning retail business modules of a real retail chain into architecture. Such types of RIS frameworks increase the quality of RIS models and could be initial prerequisites for retail enterprise modeling, which are relevant in practice and theory.

The key benefits of using efficient RIS frameworks can be summarized as follows:

- Integration of business processes in retail companies,
- Optimization of available shelf-space across a store, which increases productivity.

- Ensuring allocation of the right products in the right locations in the right stores.
- Increasing customer satisfaction with assortments availability and planograms visualization.
- Reducing out-of-stocks, which maximizes revenues in a product category.
- Increasing employee productivity and the ease of creating working timetables for them.
- Integration with other systems (e.g. forecasting, inventory and replenishment systems) which enables interconnection with the supply chain.

It should be stressed that the proposed RIS framework can be used both in traditional and online retailing. By investigating this problem, we have tried to stimulate further research and encourage the use of RIS and shelf space optimization techniques integrated with other retail modules in practice. Many opportunities lie within the integration of these tactics. However, in real life, since separate RIS modules usually belong to different organizational hierarchies or external firms, some obstacles may occur in cooperation and regulating responsibilities in practice. A deeper understanding is also needed in these important areas: the Internet of Things, virtual reality, augmented reality, artificial intelligence.

Future research in RIS frameworks points to the most promising open issues in this field:

- Combining retail know-how to manage date-sensitive and temperature-sensitive products to reduce spoilage and to increase the availability of fresh products that customers expect.
- Providing up-to-date integration with other retail systems in order to increase the speed of real-time decision making through access to consolidated performance across all stores in the retail chain.
- Developing easy to access and customizable framework modules, which could be fully intuitive and comprehensive to category managers.

The main limitation of the study is that it covers operational processes at a real store. Particularly, the RIS framework could be used in online sales but it is not its main application, i.e. the online usage needs significant justification of it, because there is no visual merchandising but web-design is; there are no customers' paths but browsing history is.

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