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CONTEMPORARY CASES OF DIGITAL PRODUCT ASSORTMENT MANAGEMENT IN AN INTERNET SHOP

Within the outlined research, the main focus is on economic entities that operate not just as retail merchants but conduct their activities through various types of Internet-shops. It has been proven that effective management of their product assortment is crucial. While this process is characterized by the ability of the curated set of products or services to meet customer demand over an extended period, what is critically important is precisely the effective management of their product assortment, which distinguishes the ability of the curated set of products or services to satisfy customer demand over an extended period. According to the above, the purpose of the article is to specify and analyze contemporary cases of digital assortment management across basic types of Internet shops. Within the study, attention is drawn to the fact that digital technologies are significantly changing the paradigm of product assortment management in Internet shops and are providing new opportunities that open up a wide range of strategies and approaches in this area.

Keywords: *demand, multichannel Interaction, conversion, demand forecasting, assortment planning.*

JEL classification: *D29, F20, F23, F41*

СУЧАСНІ КЕЙСИ ЦИФРОВОГО УПРАВЛІННЯ ТОВАРНИМ АСОРТИМЕНТОМ INTERNET-SHOP

У межах окресленого дослідження основна увага зосереджена на суб'єктах господарювання, які не просто діють, як роздрібний торговець, а реалізують свою діяльність через Internet-shop різних типів. Доведено, що важливим є саме ефективне управління їх товарним асортиментом. Хоча цей процес вирізняє здатність сформованого набору продуктів або послуг задовольняти попит клієнтів протягом тривалого періоду часу, критично важливим є саме ефективне управління їх товарним асортиментом, яке вирізняє здатність сформованого набору продуктів або послуг задовольняти попит клієнтів протягом тривалого періоду часу. Відповідно до вищенаведеного, метою статті є конкретизація та аналіз сучасних кейсів цифрового управління товарним асортиментом за базовими типами Internet-shop. У межах дослідження звернено увагу на той факт, що цифрові технології суттєво змінюють парадигму управління товарним асортиментом в інтернет-магазинах та надають нові можливості, які відкривають широкий спектр стратегій та підходів у визначеній площині. Така специфіка стає все більш варіативною за змістом, за розподілом пріоритетів цільового впливу, а також за набором доступних методів та технік реалізації. Зазначимо, що цінність дослідження полягає у тому, що автор через низку кейсів з управління товарним асортиментом наводить аргументи щодо важливості індивідуалізації пропозицій для клієнтів, а також вказує на збільшення варіативності, щодо використання аналітики даних та інструментів прогнозування для більш точної ідентифікації попиту та трендів ринку. За результатами дослідження доведена важливість автоматизації рутинних завдань та експериментування з новими товарними пропозиціями, враховуючи їх прямий вплив на урізноманітнення стратегій та підходів до управління товарним асортиментом. У дослідженні підкреслюється значення активної та ефективної мультиканальної взаємодії з клієнтами, через різні комунікаційні канали. Відповідно до отриманих результатів, перспективи подальших досліджень полягають у вивченні сучасних способів оптимізації процесів автоматизації та експериментування з метою досягнення кращих результатів в управлінні асортиментом Internet-shop.

Ключові слова: *попит, мультиканальної взаємодії, конверсія, прогнозування попиту, планування асортименту.*

Statement of the problem. Given that the focus of this study is on businesses that operate not just as traditional retailers but conduct their activities through various types of Internet shops, effective inventory management is crucial. This entails the ability of the established set of products or services to meet customer demand over an extended period. Considering the characteristics of the product assortment in modern Internet shops (including flexibility, dynamism, and diversity), it's worth noting that meeting customer demand is focused on maximizing the use of digital technologies and tools to optimize and improve processes aimed at targeted influence on the product assortment.

Analysis of recent research and publications. A generalized analysis of the peculiarities of product assortment management in Internet shops is provided in the works of contemporary Ukrainian scholars such as Demchuk N.I., Filippov V.Y., Nesterenko A.M., Rumyantsev A.P., and Mikhaylova K.S. However, most of these works highlight the question of how adding new products influences increases in certain cost items such as product proposition development, acquisition of necessary equipment for storage, order processing, transportation, and so forth. Given that managing the product assortment of Internet shops is a variable process, it requires examination through cases reflecting specific instances, situations, or

practices. These cases are analyzed to identify important aspects of planning, control, and product assortment optimization.

Objectives of the article. The aim of the article is to specify and analyze contemporary cases of digital inventory management across various types of Internet shops.

Summary of the main results of the study. We note that classical inventory management shares certain commonalities in accomplishing tasks. However, in an Internet shop, these commonalities disappear due to the utilization of digital technologies (see Table 1). Such specificity becomes increasingly variable in terms of content, priority distribution of targeted influence, as well as the pool of available methods and techniques for implementation.

The features that distinguish digital inventory management include enhanced personalization, extensive utilization of data analytics and forecasting tools, and automation of numerous routine processes. The effectiveness of such management is evidenced by elements such as boosted sales, heightened impulse purchases, enhanced conversion rates, and increased average customer spending [3] (Figure 1).

Overall, the effectiveness of digital inventory management for an Internet shop lies in leveraging digital technologies to address tasks such as [4; 6]:

1. Planning assortment and individual product offerings by creating distinctions in the offerings of different product categories, identifying the most popular items to be included in the product assortment, and considering seasonal and regional variations.
2. Forecasting demand involves utilizing past sales data to forecast demand for products. This process aims to improve the accuracy of forecasting.
3. Personalizing the assortment by using customer data.
4. Monitoring and updating the assortment.

In some cases, inventory management tasks may include areas such as inventory control (specifically minimizing the risk of forming dependent demand and the risk of product spoilage [4]) and several other quite specific tasks.

The specificity of digital inventory management is most vividly outlined by modern case studies focused on the general features of addressing the above-mentioned tasks in various types of Internet shops, including General Store, Niche Store, and Marketplace.

Introducing case studies of digital inventory management for a General Store, it's worth noting that this type of store offers a wide range of products, including electronics, clothing, home goods, sporting goods, and much more. A characteristic example is the world's largest online retailer, Amazon, which offers nearly any imaginable product, including books, electronics, clothing, cosmetics, food items, furniture, and much more. In fact, the General Store caters to a diverse target audience, including people of different ages, interests, and financial means.

Therefore, the main focus of inventory management in this case is on a wide range of products, sufficient to meet the needs of a diverse target audience, as evident from the characteristics outlined in Figure 2.

Amazon addresses the issue of planning a vast array of products and its assortment offerings in conjunction with demand forecasting through such basic steps as:

Customer purchases analyzing (in terms of volume, determining popular items and new trends). In particular, Amazon gathers large volumes of customer purchase data, including purchase history, product views, ratings, and reviews. Internet shop experts utilize various analytical methods, including machine learning and statistical analysis, to identify popular items, purchasing trends, and changes in consumer demand.

Remote monitoring of changes in demand and market trends for swift response. In addition to internal data,

Table 1

Digital technologies for managing the product assortment of Internet shops

Digital Technologies	Features of solving assortment management tasks	Possible results from the implementation of the task	Specificity
Data analytics	Utilizing data analytics to analyze purchases, views, search queries, and other interactions of customers with products or services	It allows for identifying popular items, forecasting demand and market trends, as well as developing personalized offers for customers	The impact becomes increasingly diverse in content, prioritization, and available methods and techniques for implementation
Artificial intelligence	Utilizing artificial intelligence to automate assortment planning processes, such as recommendation systems for determining the optimal product mix, demand forecasting, and addressing other tasks		
Electronic platform tools	Utilizing electronic platform tools, such as specialized programs for assortment management and electronic marketplaces for product sales, for centralized control and monitoring of the assortment	It enables monitoring and updating of the assortment, planning new items, and phasing out outdated inventory	
Competitor analysis tools	Studying and analyzing the assortment, offerings, and strategies of competitors to determine one's uniqueness and opportunities for improvement.		
Customer data and profiles	Collecting and analyzing customer data to understand their needs, preferences, and behavior	It helps determine which products or services are most important to your target audience.	
Planograms in specialized software and other visualization technologies	Presenting the assortment in the most appealing manner. The tools enable configuring effective product displays, facilitating rotation, and managing the assortment of goods	attracts the attention of customers and motivates them to make purchases.	

Source: formed based on [1; 4; 5–6]

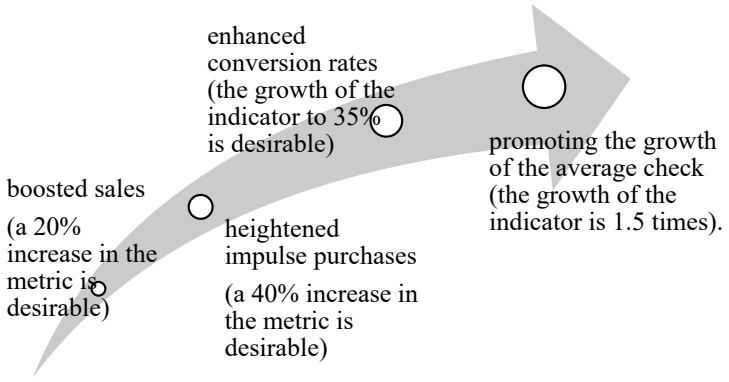

Figure 1. Indicators of effectiveness in digital inventory management for an Internet shop

Source: formed based on [3]

Amazon also utilizes external data and monitoring tools to observe market trends and changes in demand. Marketers utilize this data to understand general trends in consumer behavior, the competitive environment, and other factors influencing product demand.

The specifically outlined approach to problem-solving allows for balancing different categories of products that cater to various customer needs.

Amazon addresses the issue of personalizing the product assortment for each customer through such basic steps as:

– Developing a system of personalized recommendations for each customer based on their past purchases, views, and interests. So, the sales platform integrates automatic analysis technologies to examine data on past purchases, product views, and individual customer interests. Based on this data, personalized product recommendations are automatically generated in user interfaces, tailored to individual needs and preferences. For instance, if a customer frequently purchases books about cooking, Amazon may recommend new books on this topic or kitchen appliances to them.

– Utilizing artificial intelligence to enhance recommendation algorithms and provide more accurate suggestions. Specifically, artificial intelligence continually improves personalization algorithms to ensure they offer more relevant recommendations for each customer. Amazon's current assortment personalization algorithms take into account not just purchases but also demographic information and health interests;

– Testing products that are new to the market through A/B testing methods to assess the effectiveness of new items or product categories before their large-scale launch.

The outlined approach to solving the task of personalizing the product assortment helps Amazon provide each customer with individually tailored recommendations, enhancing their satisfaction with their purchases.

Amazon addresses the issue of enhancing navigation and search for customers, to increase their visibility and sales, through basic steps such as:

– Grouping products into categories and subcategories. Amazon organizes its product assortment into a large number of categories and subcategories, which helps customers find the items they need quickly and efficiently. For example, home goods are divided into subcategories such as kitchen appliances, tableware, living room furniture, and so on. This, along with search filters, facilitates navigation for customers and assists them in navigating through Amazon's extensive assortment [5].

Utilizing analytics to determine the optimal product placement on the website, Amazon uses analytics data to identify popular items, frequently purchased items together, and products customers are searching for. Based on this data, store managers optimize the placement of products on the website by positioning the most popular and profitable offers in prominent locations to increase their visibility. For example, items with high ratings or popularity are placed on the homepage or in the "Best Sellers" section.

These approaches help Amazon, as well as a range of similar Internet shops (including Alibaba, eBay, Best Buy, etc.), create a convenient and efficient environment for interacting with customers, facilitating search and navigation, and increasing the likelihood of purchasing products. An effective environment for interacting with customers is one that meets their needs, offers comfort, and encourages interaction.

Providing case studies of digital inventory management for Niche Stores, we note that this store specializes in niche product offerings. A characteristic example is the online store of vegetarian products "VEGETUS," which sells only tofu, hummus, and sausages for vegetarians. Niche Store has a limited target audience, so the main focus of inventory management is on specific product categories or individual items, in quantities sufficient to meet the specific needs of a limited consumer base, as evident from the data in Figure 3.

The vegetarian products online store "VEGETUS" addresses the challenge of assortment planning and specialized offerings (in conjunction with demand forecasting) through fundamental steps such as:

– Careful selection of vegetarian products that are highly popular among the target audience. The ABC analysis assesses each product's sales contribution, while the XYZ analysis evaluates sales stability across products or groups.

– Continuous assortment updates are based on trends in vegetarian cuisine, popularity, and customer demands. It involves product introduction and the removal of outdated or low-demand items.

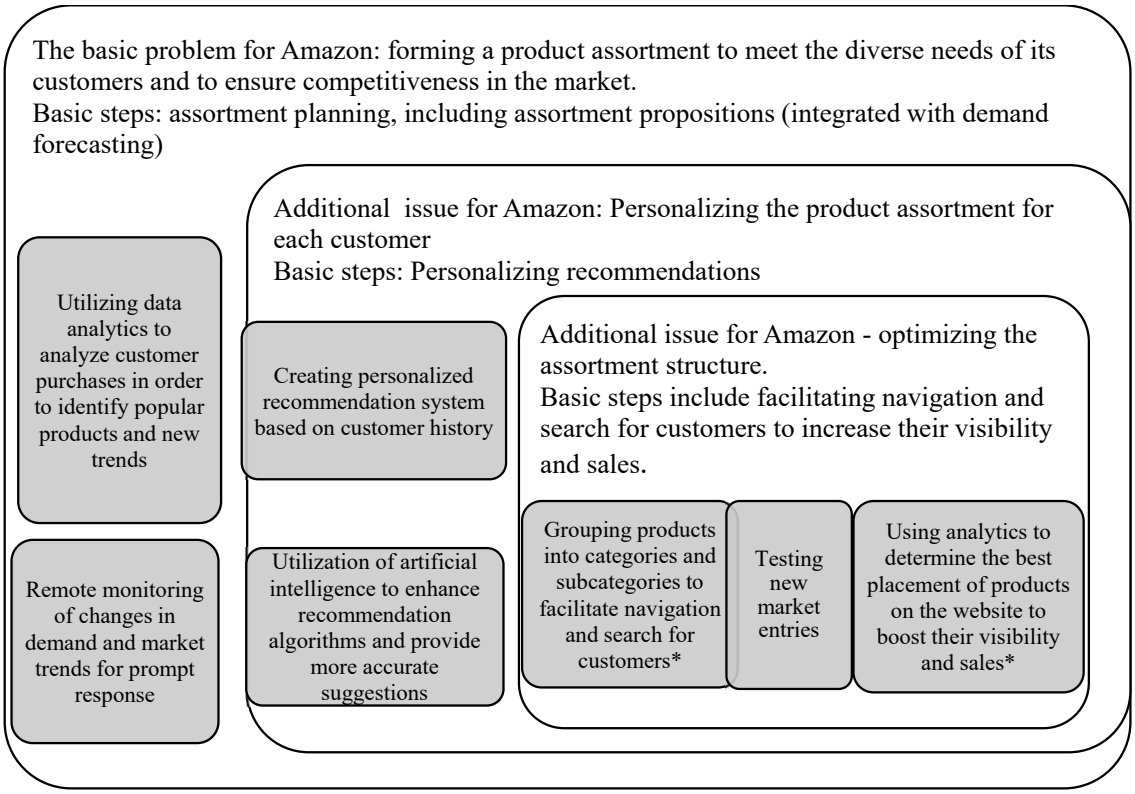

Figure 2. Digital inventory management case study of General Store exemplified by Amazon

Note

* The process can be initiated through these tools; marketing campaigns can be launched to promote popular items on the platform and attract attention to new products

Source: formed based on [1; 3-4]

This approach to addressing the outlined task allows the "VEGETUS" store to create a category matrix based on various indicators (turnover, sales quantity, profit, sales stability) and respond effectively to changes in the tastes and preferences of the target audience. It helps maintain a high level of customer satisfaction and adjust sales volumes accordingly.

The online store of vegetarian products "VEGETUS" addresses the issue of personalizing its product assortment for each customer through fundamental steps such as [3]:

– Analyzing customer purchases and browsing history. Specifically, the "VEGETUS" web analytics system tracks each customer's purchases and website views. Based on this data, an individualized food profile is created for each customer, which includes their preferences and can be linked to their purchase history.

– Generating personalized recommendations of vegan products that may interest the customer. These recommendations can be displayed on the website's homepage, under the "Recommended Products" section, or sent to the customer as personalized email newsletters [2].

– Modifying the appearance and structure of the interface or offerings based on previous interactions with the customer. In essence, "VEGETUS" creates a personalized interface experience for each user, displaying products and services that are likely to be of interest to them.

These steps help the online store "VEGETUS" create an individualized and personalized shopping experience for each customer.

The online store of vegetarian products "VEGETUS" addresses the issue of incorporating into its assortment such quality products that meet the needs of its target audience through basic steps such as:

– Continuous collaboration with suppliers to ensure the availability of quality products. The "VEGETUS" store carefully selects its suppliers, verifying their certificates and reputation in the market.

– Continuous monitoring of product quality and feedback from customers. It allows for the timely detection of quality issues and taking measures to address them.

– Searching for new products and innovations to introduce into the assortment if they meet the target audience's needs. The store actively explores the vegetarian product market to identify new trends and innovations.

These steps contribute to improving the quality level of products in the "VEGETUS" online store. Overall, the defined case is typical of most Niche Stores, making it appealing to target customers.

Showing cases of digital inventory management for Marketplaces, it's important to note that this is essentially a platform where multiple or significant numbers of independent sellers operate, wishing to sell their products [4; 6].

Marketplaces, like General Stores, cater to a diverse target audience, including people of different ages, interests, and financial capabilities. A characteristic example is ROZETKA, which offers a wide range of products for home, kitchen, household, and other categories.

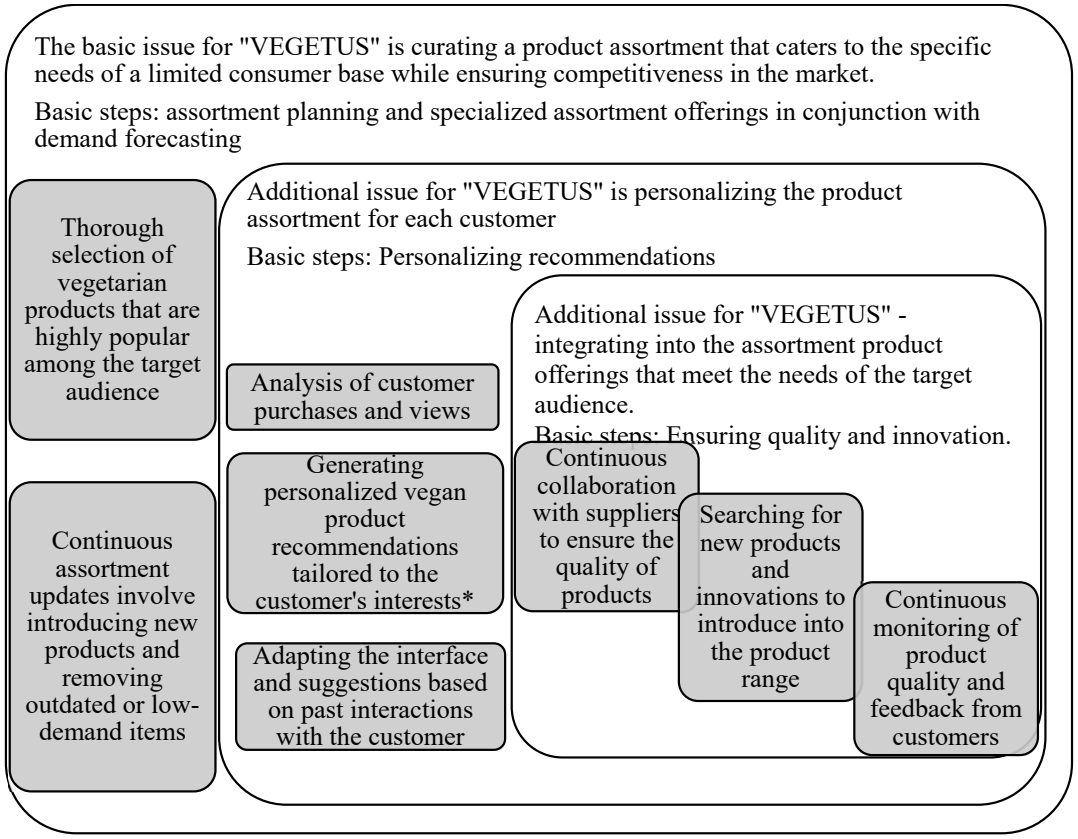

Figure 3. Digital inventory management case study of Niche Store illustrated by the online vegetarian product store "VEGETUS"

Note

* Customers can receive individualized offers and discounts based on their previous purchases and preferences, utilizing adaptive interface design. This encourages customers to return to the store and make purchases that meet their needs

Source: formed based on [1-3]

For Marketplaces, the primary focus of inventory management is oriented toward a wide but unique range of products (sufficient to meet the needs of target audience), as evident from the data in Figure 4.

ROZETKA addresses the challenge of planning a wide range of product assortments and their offerings in conjunction with demand forecasting through several key steps:

– Studying the demand and preferences of different segments of its target audience. Through automatic sales analysis, customer feedback analysis, and marketing research, ROZETKA forms a model of the preferences and needs of platform visitors.

– Identifying the most popular products and their categories. By tracking user actions on the website, such as browsing electronic catalogs, actual purchases, and search queries, ROZETKA can obtain a comprehensive picture of product popularity and its categories.

– Studying and analyzing data on market trends and competitors. ROZETKA utilizes data on competitors' pricing policies as well as monitors new products and industry trends to shape its assortment strategy and offerings.

These steps enable ROZETKA to effectively plan its product assortment by considering customer demand and preferences.

ROZETKA addresses the challenge of forming a unique assortment through several key steps:

– Supporting brands and small manufacturers. ROZETKA can actively promote products from brands and small manufacturers, that have unique styles or products that differ from mass producers. This can be achieved through special sections on the website and highlighting such products in advertising campaigns [3].

– Promoting unique product categories. ROZETKA can actively promote and develop unique product categories that may only be available on their platform. These could include items produced exclusively by certain manufacturers, limited edition exclusive products, or items created specifically for ROZETKA.

– Visual merchandising. ROZETKA utilizes a service for working with planograms to create assortment planograms, and configure product displays, enabling platform sellers to rotate and manage the assortment of goods.

These steps enable ROZETKA to create a unique and diverse assortment of products offered on their platform, allowing sellers to stand out among others and attract the attention of various categories of buyers [5–6].

ROZETKA addresses the challenge of continuously updating its assortment by considering changes in demand and market trends through such fundamental steps as:

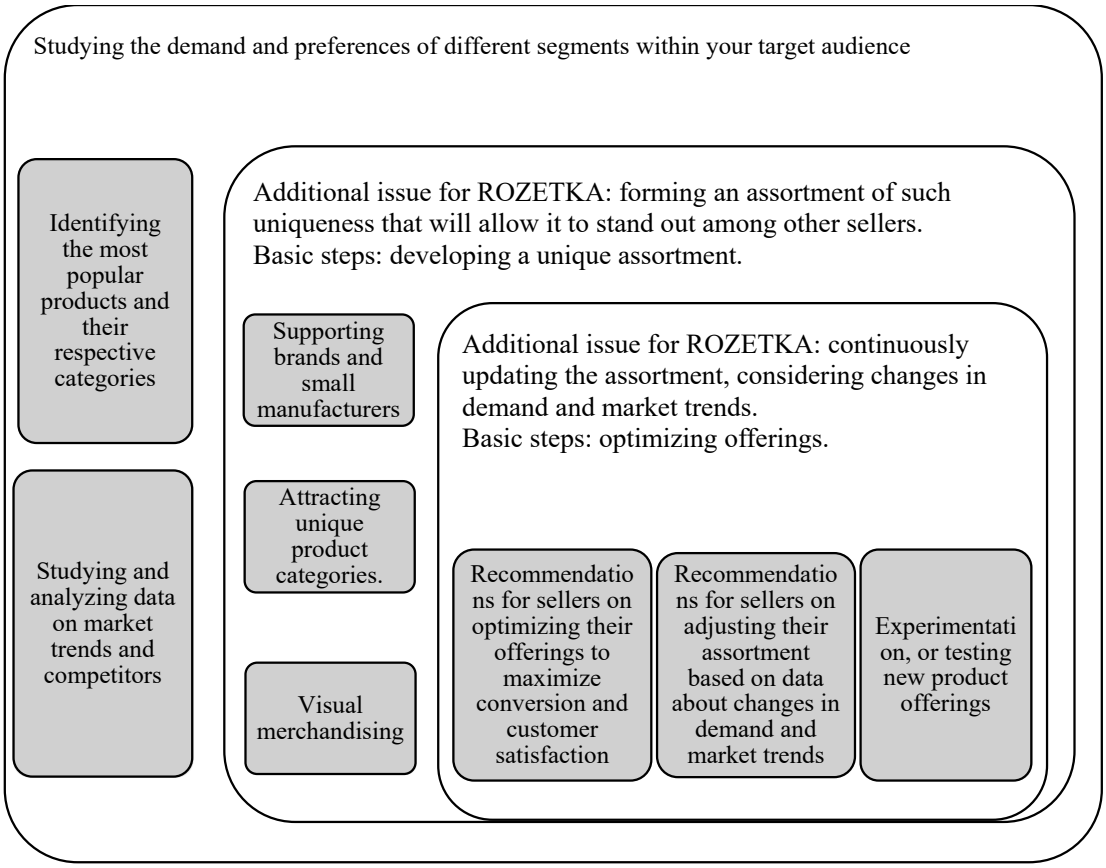

Figure 4. Case of digital management of product assortment in the ROZETKA Marketplace platform

Note

* Allows to formulate and maintain a strategy of personalization of offerings, which helps attract the attention of customers to various propositions, send them personalized promotions and personalized content on the website, in emails, or in mobile applications

Source: formed based on [1; 3]

– Providing recommendations to sellers on optimizing their offerings to maximize conversion and customer satisfaction. So, the platform automatically sends recommendations regarding product assortment, pricing, marketing strategies, and other aspects of the business.

– Recommendations to sellers for adjusting their product offerings based on data about changes in demand and market trends [3]. This may include suggestions to remove outdated items, introduce new products, or change the assortment to align with emerging trends or consumer demand.

– Experimentation, specifically testing new product offerings by introducing a limited quantity of items onto the platform to determine their popularity and make decisions about future strategy.

These steps enable ROZETKA to ensure that its product assortment responds to changes in demand and market trends, constantly updating according to consumer needs.

Conclusions. Within the study, attention was drawn to the fact that digital technologies are significantly altering the paradigm of managing product assortments in Internet shops and providing new opportunities, thereby opening up a wide range of strategies and approaches. This specificity becomes increasingly diverse in terms of content, distribution of priority in target impact, as well as the pool of available methods and implementation techniques. It has been concluded that several features effectively diversify digital strategies and approaches to managing product assortments:

1. It has been demonstrated that crafting personalized offers diversifies strategies and approaches to inventory management based on attention to each customer's unique needs, preferences, purchases, and behavior. At the core of this process are product recommendations, personalized promotions, customized content on websites, email newsletters or mobile applications, adaptive interface design, and customer support through communication channels.

2. It has been demonstrated that leveraging data analytics and forecasting tools diversifies strategies and approaches to inventory management by more accurately identifying product demand, considering market trends, and adjusting inventory offerings accordingly.

3. It has been demonstrated that automating many routines, and repetitive processes diversifies approaches to inventory management by introducing variable components into inventory replenishment, pricing, and product performance analysis processes.

4. It has been demonstrated that experimentation diversifies strategies and approaches to inventory

management by providing opportunities for rapid testing of new product offerings.

5. It has been demonstrated that customer interaction diversifies strategies and approaches to inventory management through active and effective multi-channel engagement (encompassing channels such as social media, chatbots, emails, and other communication channels).

Based on the obtained results, the prospects for further research lie in exploring contemporary methods of optimizing automation processes and experimentation to achieve better outcomes in assortment management.

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