

Sustainable Consumption and Production Development in the Context of Retail Transformation Influenced by Digitization

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Abstract. The subject of the research is the formation and development of models of rational consumption and production in the context of the digital economy's development and the transformation of the economic context, institutional structures, social expectations, and consumer behavior models. The authors examine the evolution of the sustainable consumption and production concept in Russia, provide a detailed characterization of models of rational consumption in the context of the digital economy and the growth of online processes and transactions.

1 Introduction

The global community is actively discussing solutions and approaches to government regulation aimed at strengthening measures for shaping the "Green Agenda" and promoting the concept of sustainable development. The transition to sustainable development requires the implementation of a global strategy presented in the Agenda 2030, which includes Sustainable Development Goals 17.6 to 17.8, including the transfer of environmentally friendly technologies to developing countries. These technologies must be environmentally and socially justified to avoid negative consequences for the environment and social well-being. Obstacles to the dissemination of such technologies can be not only economic and infrastructural but also socio-economic and socio-cultural.

For a successful transition to sustainable development, it is necessary to implement a new social ideal that will define the framework for the development, transfer, and adoption of technologies, as well as the framework for national technological platforms. The social ideal, directed towards effective management of current socio-economic challenges, reduction of inequality, and the development of models of rational consumption and production, holds fundamental significance. Sustainable Development Goal 12, "Ensure sustainable consumption and production patterns," encompasses various aspects such as efficient resource utilization, waste reduction, and per capita food waste reduction. This goal intersects with all other Sustainable Development Goals and aids developing countries in building their scientific and technological capabilities.

The very idea of sustainable production and consumption represents a model of conscious consumption and production aimed at waste reduction and mitigating the negative impact on

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the environment and society. In 1972, the report titled "The Limits to Growth" by the Club of Rome was published, predicting an unexpected and uncontrolled decline in population and a sharp reduction in production if population growth and resource depletion continued. However, the concept of sustainable development allows for achieving economic and environmental stability.

The increase in consumption and production is inevitable, but to prevent a global ecological crisis, it is necessary to alter consumption and production models. The concept of sustainable production and consumption addresses key issues, including meeting human needs, improving the quality of life in society, efficient resource utilization, waste reduction, and the use of renewable energy sources. This concept also entails a systemic approach to the development of production and consumption processes, taking into account the product life cycle.

At the core of this concept lies the idea of a circular economy, which differs from the traditional linear model of production and consumption, where resources are extracted, used, and discarded after use. Instead, the circular economy emphasizes efficient resource use, waste reduction, and the establishment of sustainable economic and environmental development.

Circular economy aims to eliminate or reduce resource losses by developing strategies that promote the reuse, recycling, and recovery of materials and products. This model extends the lifespan of products, as they can be repaired or upgraded, and their components can be recycled and reused in other products.

Successful examples of circular economy implementation can already be observed across various industries and countries. Instead of landfilling old electronics that have reached the end of their life cycle, leading companies have initiated reverse logistics programs, allowing consumers to return their old devices for recycling or refurbishment, thereby extending their lifespan and recovering valuable materials. In the consumer sector, some fashion brands have started utilizing recycled materials in the production of new items. For instance, they may create new products from recycled plastic bottles or old textile waste. Additionally, clothing rental programs are being launched, enabling people to rent and return fashionable garments instead of purchasing them and eventually discarding them. In the construction industry, organizations are emerging that specialize in the dismantling and recycling of old building materials for their subsequent use in new projects. For example, old concrete can be recycled into stone or recycled metal products can be used to create new structures. These examples demonstrate that circular economy holds significant potential for implementation across various sectors and can make the economy more environmentally and economically sustainable by minimizing resource losses and reducing negative environmental impacts. Thus, circular economy itself is focused on creating a resilient and efficient resource utilization system, considering waste and used materials as valuable resources that can be reused.

As part of the sustainable production and consumption concept, an important component is the formation of consumer behavior models that are oriented towards an eco-agenda, conscious consumption, and the reduction of individual waste generation. The change in consumer behavior influenced by the circular economy is facilitated through a range of mechanisms and incentives:

1. Consumption restraint: The circular economy encourages reducing excessive consumption and purchasing goods with consideration for their lifespan. Users can opt for products that are less prone to obsolescence and prefer more durable and repairable items.

2. Boosting demand for resource-efficient products: The circular economy fosters the development and production of goods that have minimal impact on the environment during manufacturing, use, and disposal. Consumers are increasingly inclined to purchase energy-efficient, environmentally friendly, and recyclable products.

3. Development of exchange and rental business models: The circular economy promotes the development of business models based on exchange, rental, and shared use of goods. For instance, companies are beginning to offer rental services instead of solely selling products. This can lead to reduced consumption and more efficient resource utilization.

4. Increasing the consumption of secondary resources: The circular economy incentivizes the use of secondary resources obtained through recycling or recovery of waste. Companies and consumers may prefer products made from recycled materials, such as using plastic bottles instead of new plastic.

5. Popularization of green labeling: The circular economy contributes to the popularization of green labeling systems and certification of products that meet environmental standards and resource efficiency requirements. Consumers can take into account such labeling when purchasing goods.

These measures are aimed at changing consumer behavior towards a more responsible approach to resources and the environment.

Modern society has actively pursued an ecological agenda for over 50 years and is in search of new, more effective tools to ensure sustainable development and widespread engagement of the population in adhering to the goals of sustainable development (SDGs). Transformations in the economic sphere, technological advancements, and digitalization of processes are leading to changes that have an impact on the implementation of SDGs. Consumer behavior models and technological processes are changing, entire production systems are being reconfigured, logistics and product delivery have undergone significant changes, and companies are increasingly utilizing automation and digital technologies, leading to a fundamental restructuring of business processes. Consequently, production models and supply chains are being reconfigured. Therefore, the aim of this research is to investigate the impact of new business approaches, specifically marketplace platforms, on achieving the SDGs, particularly waste reduction (Goals 12.3-12.5).

2 Materials and Methods

Methods:

In order to achieve the research objective, general scientific methods were employed, including the systematic research method, as well as analysis and synthesis methods, abstraction, and generalization. These methods allowed for the creation of a comprehensive understanding of the transformation of consumer behavior models as a factor that directly impacts the expansion of the sustainable consumption and production concept. The authors also utilized statistical analysis methods, which helped establish a correlation between the growth of online commerce and the reduction of excess inventory and disposal of unsold goods in retail networks and stores.

Materials:

The issue of solid municipal waste affects every individual worldwide, whether it's individuals managing their own waste or governments providing waste collection and disposal services to their citizens. This problem becomes particularly critical with the increasing urbanization in modern cities and population growth. According to the World Bank, waste generation is projected to continue growing each year. In 2016, an estimated 2.01 billion metric tons of solid municipal waste (SMW) were generated in cities worldwide. On average, this equates to 0.74 kilograms per person per day. However, forecasts indicate a significant increase in this figure by 2050, reaching 3.40 billion metric tons. This means that annual waste generation is expected to increase by 70% from 2016 to 2050 [1].

The issue of inefficient waste management is becoming increasingly pressing. At least 33% of the waste generated worldwide is currently being disposed of through open dumping or incineration, which is an unsustainable practice. This approach has adverse effects on the

environment, causing air, soil, and water pollution, and also wastes valuable resources that could be recovered and reused.

In addition to the increasing volumes of municipal solid waste (MSW) in low-income developing countries, a common issue is the lack of control by local authorities over the waste collection and disposal process in cities [2]. As a result, in some countries, up to two-thirds of the waste is either dumped on the streets or in nearby unauthorized landfills. According to the Russian Federal Service for Supervision of Natural Resources, up until the second half of the 2010s, almost all solid municipal waste in Russia was transported to officially sanctioned and unsanctioned landfills. Only 4-5% of the waste was sent for recycling or incineration. By the end of 2020, 36.1 million metric tons, or 75% of all waste, were disposed in landfills, while only a mere 24.1 thousand metric tons were incinerated for electricity or heat generation [3].

Changes in consumer behavior have a direct impact on the increasing volumes of solid waste. For instance, the growing popularity of convenience foods and ready-to-eat meals contributes to an increase in the amount of discarded packaging [4]. The use of plastic tableware in cafeterias and food establishments also significantly contributes to the rising volume of plastic waste, with only a small portion being recycled. According to Ivan Didenko, the president of GK "Gofromaster" (the largest manufacturer of corrugated cardboard and paper packaging in Siberia), packaging production volumes increased by 7% in 2021-2022. Alexander Pasyankov, a representative of Comus-Packaging in Siberia and the Far East, believes that the packaging materials market in Siberia saw an 8% growth in quantitative terms in 2021 [5].

On the other hand, the emergence of reusable shopping bags leads to a reduction in the number of plastic bags purchased in supermarkets and grocery stores. Some retail companies, in addition to plastic bags, offer paper bags or provide reusable shopper bags made from recyclable materials.

According to the research agency Data Insight, the retail e-commerce market in Russia reached a volume of 5.7 trillion rubles and 2.8 billion orders in 2022. The growth rate of the number of orders was +65%, positioning 2022 as one of the top three years in terms of revenue growth and order dynamics in the Russian e-commerce market. The market volume in rubles increased by 38%. The growth rate of online retail in 2022 is expected to be lower compared to 2021 and slightly below the forecasted figures. This is primarily due to the exit of a significant portion of the premium segment and companies from sanctioned countries from the market.

The average order value in eCommerce continues to decline, as it reached 2,010 rubles in 2022, which is 16% lower than the figures in 2021. The reason for the decrease in the average order value is the increasing share of stores with smaller transactions and frequent orders (marketplaces, ultra-fast grocery delivery). However, for the majority of marketplace sellers, the average order value has increased over the year. According to Data Insight's forecast, the sales volume in the Russian eCommerce market is expected to reach 7.4 trillion rubles in 2023, with a growth rate of 30%. The number of fulfilled orders in this market will reach 4.6 billion (+64%). Growth rates for the current year will continue to slow down, but the growth figures will still remain significantly above the global average.

Let us examine the changes in online orders and transactions by industry. The Russian logistics market (including MLM and C2C, but excluding food delivery) experienced natural growth in 2022, with a total of 2.55 billion orders. In the final quarter alone, 880 million orders were delivered, which is only slightly lower than the total for the entire year of 2020. The priority strategies for development in the logistics services sector included expanding geographical coverage, maintaining the current level of service, and developing ancillary services. In 2022, the eGrocery market experienced significant growth, with a 66% increase, reaching 553 billion rubles, and the number of orders rising by 75% to 402 million rubles.

The ePharma market showed significant growth in the first half of 2022, reaching 110 billion rubles in revenue and 60 million orders. This represents a growth rate of 50% and 36% respectively. From April 2021 to March 2022, Russians placed 2.6 billion orders for services using the internet. The number of service providers in the market decreased by 9% to a total of 8.6 million people.

The presented statistical and analytical data confirm the overall trend of increasing online transactions and the rising number of deals conducted online. Next, we will examine what drives this trend and how consumer and producer behavior is changing, as well as the impact this has on shaping environmentally responsible behavior in society and achieving the SDGs.

3 Results and Discussions

In 2021-2022, we observe several factors that directly influence changes in consumer behavior models and contribute to the continuous growth of online sales on marketplaces:

1. **Brand Power:** Leading companies like Wildberries, Ozon, Yandex.Market, KazanExpress, AliExpress, and SberMegaMarket do not require extensive advertising as they have become the primary destination for many consumers in their search for desired products. With a constantly expanding assortment, consumers increasingly turn to marketplaces for their shopping needs. According to RBC [6], marketplaces have significantly increased their share of smartphone sales (in terms of revenue) over the past few years, growing from 5% in 2019 to 25% in the first half of 2023. Collectively, marketplaces now hold the second position in terms of smartphone sales share, while mobile operators (including their online sales) have dropped to the third position, with their market share decreasing from 25% to 20%.

2. **Crowd-sourced Assortment Management:** Marketplaces attract a vast number of sellers, which enables them to offer a comprehensive assortment without gaps. These sellers often prove to be more effective in managing assortment compared to professional retail teams. Additionally, an advantage lies in the fact that new brands and importers are now choosing marketplaces as their primary distribution channel. On the other hand, digitization and the ability to track real-time demand dynamics allow sellers to be more flexible by stocking and supplying the products that are in high demand, resulting in reduced logistic costs. Specifically, the reduction of inventory levels among marketplace sellers is achieved through paid storage for each unit of product in the seller's warehouse. This significantly increases the need for inventory control and analysis to minimize storage costs. The storage fee can reach up to 0.39 rubles per unit per day.

3. **Online Sales Growth.** According to data from the E-Tinkoff platform [7], in 2021, the number of sellers operating on two marketplaces increased by 64%, as shown in Figure 1. Their share of the total number of sellers grew from 13% to 18%. One in five new sellers who started trading in 2021 and 2022 joined an additional marketplace within a year of starting their operations, and the number of active sellers on marketplaces increased by 21% in a year's time. In the first quarter of 2022, there was a growth rate of +288%. In the first quarter of 2023, the number of new sellers increased compared to the fourth quarter of 2022 on three marketplaces: "Yandex.Market" (+39%), Ozon (+25%), and "SberMegaMarket" (+17%). However, the growth rate of new sellers on the most popular platform, Wildberries, decreased by 4%. One in five business owners who are not currently selling on marketplaces plans to expand their business through these platforms. Wildberries remains the most popular marketplace, but in the first quarter of 2023, the share of active sellers decreased from 64% to 52% compared to the previous year.

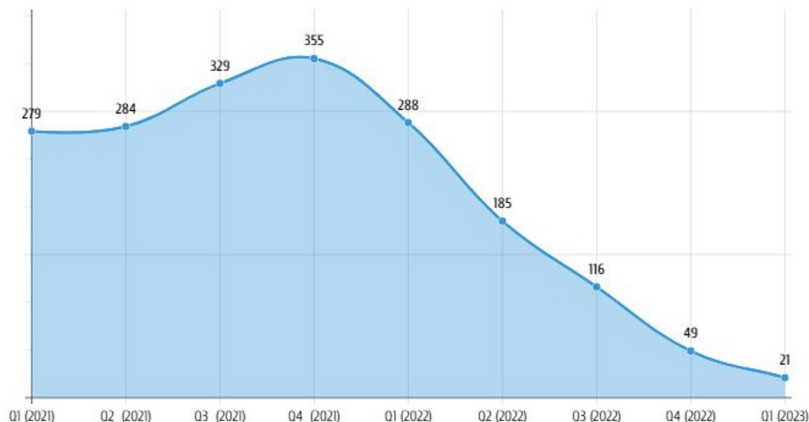


Fig. 1. Growth of marketplace sellers from 2020 to 1st quarter of 2023.

4. Degradation of offline retail. This phenomenon has a positive impact not only on marketplaces but also on eCommerce as a whole. Offline stores are closing, assortments are shrinking, and prices and product offerings are changing rapidly and unpredictably. The costs per sale in the online channel are significantly lower compared to sales through physical retail outlets. Additionally, offline stores are limited in the assortment they can carry due to space constraints, while online retailers face no such limitations.

5. Online is now accessible offline. This refers to the continually growing number of order pickup points. According to Retail Agency [8], Wildberries increased the number of their own and partner pickup points by 10.9 thousand, reaching a total of 27 thousand. There are 13.3 thousand partner pickup points throughout the country. Furthermore, the company launched over 200 thousand square meters of new warehouse space starting from July. Ozon expanded its network of pickup points from 13 thousand to 16 thousand over the year. The company also doubled the number of warehouses, with 17 warehouses in 14 cities at the end of the third quarter.

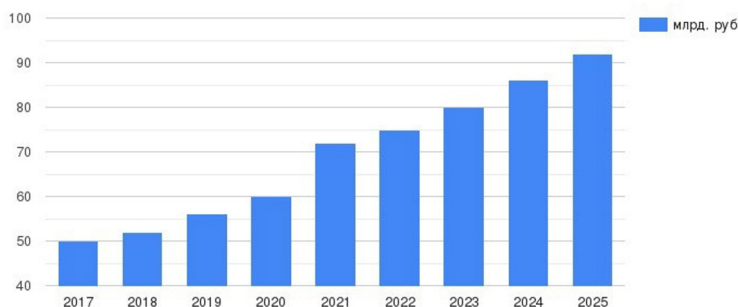


Fig. 2. Dynamics of courier and postal delivery services growth from 2017 to 2022, forecasted growth of services for 2024-2025.

The development of courier delivery services is actively ongoing, and in 2021, the market continued to expand rapidly. According to preliminary estimates, the volume of courier and postal services in Russia grew by 19.6%, reaching nearly 72 billion rubles. During the period

up to 2025, the market will continue to grow, albeit at a more moderate pace, with a projected CAGR of 6.5%. As a result, the market volume is expected to reach 92.5 billion rubles in 2025 [9], see Fig. 2. The growth of the delivery sector leads to an increase in job opportunities, with the average monthly salary for a courier being around 75,000 rubles, which is higher than the wages of retail workers.

Let us consider the forecast for the development of online sales and the impact of new trends on the environmental agenda. Firstly, a decrease in the number of impulsive online purchases is expected as consumers approach their product choices more consciously due to several factors:

1. Declining population incomes overall.
2. Increasing adoption of a rational behavior model and conscious perception of material goods.
3. Decreasing share of seasonal purchases and pre-planning of personal expenses.
4. Development of a culture of conscious consumption.

This leads to a decrease in the number of purchases of disposable or "emotional" products that are used once and then discarded. The influence of the brand becomes more significant in the decision-making process, especially when choosing between similar products. Consumers are now increasingly considering not only the price but also the positioning of the manufacturer's company when selecting a product. Many prefer environmentally and socially responsible brands. According to the Okkam agency [10], responsible consumption is transforming under the influence of economic realities. Consumers have started paying more attention to secondary and recyclable materials, product energy efficiency, and product lifespan. For example, 75% of respondents prefer to purchase a more expensive item if it is more energy-efficient. At the same time, markets for rental, sharing, repairing, and restoring are growing, as well as transactions in the secondary market.

Secondly, the growth of consumer environmental consciousness will continue. Marketers and brand representatives confirm the interest in ESG agendas among consumers in Russia. According to Okkam agency data, 68% of respondents stated that consumers are willing to pay a premium for products with eco-labeling, and 64% believe that people are willing to pay more for socially and environmentally responsible brands.

Thirdly, there is market concentration on a few large and strong players, while maintaining market flexibility in terms of distribution among brands and constant adjustments by the leader. In order to maintain their positions, large companies focus on enhancing customer loyalty through expanding their environmental and social responsibility. Global events have slowed down the adoption of sustainable development practices in the country: as of June 2022, only 29% of business representatives were actively engaged in these practices, 57% faced slower progress, 14% postponed initiatives indefinitely, and 40% reduced funding. The retail, e-commerce, ecosystem IT companies, telecom, and fintech sectors remain the most active in ESG development. Moreover, 48% of surveyed business representatives believe that government support for sustainable financing is insufficient, and 52% note difficulties in long-term planning of ESG projects due to the complex geopolitical situation. However, reducing environmental risks remains a priority for 43% of Russian companies.

Most experts are confident that within the next three to five years, businesses will invest in the development of corporate programs to enhance employee well-being and social projects. They consider the temporary decrease in the significance of the ESG agenda. According to experts' forecasts, over time, attention to sustainable development will increase from pharmaceutical companies, FMCG brands, and small and medium-sized enterprises.

Russian consumers expect brands to demonstrate social responsibility, with 61% of Russians expressing this expectation. The most important social issue for them is the brands' care for them as consumers (56%), which includes financial support (32%) in the form of

discounts and "fair" prices, psychological support (20%) through feedback and brand loyalty. Only 10% of respondents consider addressing environmental issues important. This calls for the transformation of business models and the implementation of new business processes for companies that see their contribution to the development of the environmental agenda as a significant business strategy. For example, the online platform Avito introduced "environmental contribution" badges on seller accounts from April 2022 onwards for those who have made at least one transaction and have a rating of at least 4.5 stars. The company decided to draw the attention of buyers and sellers to waste sorting and responsible environmental practices. To calculate this data, Avito has launched an eco-calculator that automatically tallies the resources saved by users based on the items they have sold. The company used the calculation system developed by Bloom Amsterdam and Rebel Group [11]. The re-utilization coefficient indicates how much the resale of items extends their useful life. In other words, it represents the ratio of the lifespan of a new item to the period of its reuse. By purchasing, for example, a jumpsuit for a child on this platform, you not only extend the life of the old one but also, at the same time, do not stimulate the production of new ones.

The calculation of the environmental contribution is based on four indicators:

- CO2 emissions;
- energy consumption in kilowatts;
- materials - the saved hectares of forest are calculated;
- water - measured in cubic meters.

The amount of resources used in production, logistics, and disposal of goods is automatically taken into account.

The company calculated that in 2020, thanks to platform users, approximately 18 million tons of greenhouse gases were prevented from entering the atmosphere. The environmental contribution resulted in the conservation of 122 million cubic meters of water, 12 million hectares of forests, and 75 billion kilowatt-hours of electricity.

4 Conclusions

The widespread adoption of automation and digital technologies is shaping new market dynamics, creating new opportunities for all participants. Sellers are expanding their market reach and have the ability to reduce inventory levels by forecasting sales volumes based on analytics and adjusting production accordingly to meet demand fluctuations. Buyers have a wider range of product choices and can take advantage of various delivery services, making products more accessible and reducing the need for impulsive purchases. Moreover, the practice of conscious consumption and rational decision-making is growing as consumers have more options and information at their disposal.

The modern ESG agenda shapes the ecological culture in society, which has an impact on the development of environmental and social responsibility in business. In online retail, these transformations are just beginning, but there are prerequisites that direct manufacturers and sellers towards implementing circular economy principles and increasing their contribution to achieving sustainable development goals.

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