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Theoretical perspectives and conceptual framework for online grocery shopping: Adapting to environmental circumstances and influencing internal factors

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Abstract
In recent years, the availability of online grocery shopping (OGS) has increased globally. However, considerable uncertainty persists regarding its future development and associated economic challenges. OGS providers face a dual challenge: they must achieve sustained growth in an increasingly competitive market while ensuring long-term profitability. Consequently, some providers have been forced to downsize their workforce, exit specific markets, or undergo acquisitions by competitors. This research aims to reduce this uncertainty by offering theoretical perspectives and a conceptual framework that integrates both external and internal factors influencing OGS. Specifically, the framework accounts for *environmental circumstances*—comprising *global*, *market-specific*, and *consumer-specific circumstances*—as well as *internal factors*, such as *strategic orientation* and *operational effectiveness*. Applying this framework offers valuable insights for both academic research and industry practice. For scholars, it establishes a foundation for further investigation into OGS implementation. From a managerial perspective, the framework serves as a strategic tool for systematically adapting OGS to external conditions while optimizing internal operations to enhance its viability and success.

Keywords E-food · E-commerce · Online grocery · Online grocery shopping · Retailing · Retail

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1 Introduction

Online grocery shopping (OGS) has been a research topic since the 2000s [e.g., 1–5]. Due to its lower adoption compared to other online shopping categories, however, scholars appeared to have prioritized other online industries [6, 7]. Nonetheless, in recent years, there has been a notable change. As OGS revenue and user penetration increases over the last few years for the top five countries (i.e., China, USA, Japan, India, and United Kingdom) and is expected to increase continuously in the coming years [8], research in this domain has regained momentum [7]. The COVID-19 pandemic appears to have facilitated the growth of OGS, as indicated by statistical data and empirical research [8–11]. However, the post-pandemic trajectory of OGS remains uncertain. Although the pandemic appears to have accelerated the adoption of OGS, its usage declined significantly following the easing of restrictions and the end of lockdown measures [12]. Nevertheless, recent forecasts suggest that OGS will continue to expand globally. Statista [8] projects that the global grocery delivery market will expand from USD 633.19 billion in 2022 to USD 1,347.28 billion by 2029, corresponding to an average annual growth rate of 13.5%. In contrast, the overall food market is projected to grow at an average annual rate of only 6.7% until 2029 [13]. Current statistics suggest that the share of OGS within the food market was 6.11% in 2023, with a projected increase to 10.23% by 2029 [8, 13]. These projections are consistent with expert predictions, underscoring the growing importance and expected expansion of the OGS market in the years ahead [14, 15]. While these statistics and expert analyses emphasize the substantial untapped potential of the OGS market, they also highlight the considerable uncertainty surrounding its future development.

In addition to the uncertainty surrounding the development of OGS, the environmental conditions that also can substantially influence its evolution remain uncertain. The United Nations Development Programme (UNDP) [16] emphasizes that "the world today is experiencing multiple crises that reinforce each other". These crises, shaped by the impacts of climate change, biodiversity loss, ongoing conflicts and crises, and the enduring effects of the COVID-19 pandemic, profoundly influence global dynamics [16]. During periods of uncertainty, societal practices can shift significantly [17]. In the context of global instability, the long-term impact of OGS on the retail landscape remains uncertain. This highlights the critical importance of incorporating *environmental circumstances* when examining OGS. A focused approach to OGS, rather than general retailing, is critical, as OGS diverges significantly from traditional grocery retail in several key aspects, as prior research has highlighted. For example, retailers aiming to implement OGS face unique challenges in fulfillment [18–20].

Despite the growing importance of OGS and the profound impact of multiple global crises, a comprehensive conceptual framework addressing the various factors associated with OGS remains absent in both academic research and practical application. In a dynamic and expanding market like OGS, a structured approach to strategic planning is particularly important. The practical relevance

is underscored by recent developments, such as corporate acquisitions aimed at market consolidation [21], employee layoffs [22], and the withdrawal of OGS providers from certain countries [23].

To address the identified research gap, this conceptual paper seeks to develop a comprehensive framework that integrates key factors relevant to researchers investigating OGS and grocery retailers who are either considering or have already implemented OGS solutions. The objective of this research is to provide a structured and tailored framework for OGS, offering clear and actionable guidelines to support decision-making for practitioners and to advance scholarly research in the field.

This study contributes to the literature as a foundational reference for both academic inquiry and practical applications. For researchers, the framework serves as a basis for systematically analyzing the factors influencing OGS, enabling studies to be positioned within a broader context while facilitating a comprehensive examination of the OGS landscape. For businesses, it provides a practical overview to evaluate the opportunities and risks associated with OGS, supporting strategic and informed decision-making. By bridging these dimensions, the framework fosters both academic advancements and practical insights, addressing the unique challenges and dynamics of the OGS market.

2 Theoretical background and conceptual framework

2.1 Theoretical perspectives on online grocery shopping

Although research on OGS dates back to the early 2000s [1], its development and widespread adoption remain relatively limited. While OGS continues to grow, its diffusion is still in an early stage, with market forecasts predicting a market penetration of approximately 10% by 2029 [8, 13]. However, the extent to which OGS will achieve broader consumer adoption remains uncertain. Current market conditions suggest that some providers face significant challenges in maintaining their operations, resulting in market withdrawals or complete business exits [23]. Given these dynamics, gaining a deeper understanding of theories relevant to OGS is essential for both academic research and practical application.

Theories on the performance of technological innovations in businesses can generally be categorized into macro-level and micro-level perspectives. Macro-level theories take a broad, external perspective, analyzing factors such as regulatory and environmental influences [24, 25], market competition [26], and industry-wide dynamics [27, 28] that shape innovation adoption. In contrast, micro-level theories focus on how individual businesses develop, implement, and integrate technological innovations within their strategic and operational frameworks [29–42]. The following sections analyze these theories within the macro- and micro-level perspectives, emphasizing their specific relevance to OGS.

2.1.1 Macro-level theories

PESTEL framework: The PESTEL framework [24] analyzes political, economic, social, technological, environmental, and legal factors influencing an industry. In OGS, external factors such as government regulations, economic conditions, technological advancements, and shifting consumer behavior play a crucial role. For instance, COVID-19 lockdowns temporarily increased OGS demand as consumers sought safer shopping alternatives [12].

Porter's five forces: Porter [25] developed the Five Forces framework to systematically analyze the competitive dynamics within an industry. This model identifies five key forces that shape market competition: the threat of new entrants, the bargaining power of suppliers, the bargaining power of buyers, the threat of substitutes, and industry rivalry. In the context of OGS, businesses operate in an intensely competitive environment, where traditional supermarkets, digital platforms, and emerging market entrants vie for market share. Understanding these competitive forces enables firms to develop effective pricing strategies, strategic partnerships, and differentiation tactics, allowing them to strengthen their market position and achieve a sustainable competitive advantage.

Institutional theory: DiMaggio and Powell [26] introduced Institutional Theory, which examines how organizations adapt to social, political, and economic pressures to achieve legitimacy within their industry. The theory identifies three distinct forms of institutional pressure that influence organizational behavior: regulative pressures, which stem from laws, policies, and governmental regulations; normative pressures, which arise from industry standards and professional best practices; and cognitive pressures, which reflect cultural beliefs, societal values, and consumer expectations.

In the context of OGS, these institutional forces can significantly shape business strategies. Regulative pressures include government regulations on e-commerce operations, data protection, and food safety standards. Normative pressures emerge from established practices in OGS related to quality control, logistics, and ethical sourcing. Meanwhile, cognitive pressures are driven by evolving consumer expectations, e.g., regarding convenience, sustainability, and ethical business practices.

Theory of disruptive innovation: Christensen [27] introduced the Theory of Disruptive Innovation, which explains how emerging technologies and business models initially cater to niche markets before gradually reshaping entire industries. OGS represents a partially disruptive innovation in the grocery sector, as it shifts consumer preferences from traditional brick-and-mortar stores to digital platforms. However, a complete displacement of physical grocery stores remains unlikely, as many consumers continue to value in-person shopping experiences [12].

Nevertheless, advancements in online platforms, AI-driven inventory management, and autonomous delivery systems have the potential to drive a significant industry transformation, particularly for specific consumer segments. While OGS may not fully disrupt the grocery industry in the way Christensen describes, his

macro-level theory remains essential for understanding how online grocery services reshape market structures.

Ecosystem theory: Adner [28] introduced Ecosystem Theory, which examines how firms operate within interconnected networks of suppliers, partners, and customers. This mainly macro-level theory emphasizes that success is determined by the coordinated interactions among all ecosystem participants rather than the performance of individual firms alone. In the context of OGS, businesses rely on a complex ecosystem that includes retailers, logistics providers, technology partners, and regulatory bodies. The effectiveness of OGS platforms depends on the seamless coordination among these actors to optimize business performances.

2.1.2 Micro-level theories

Diffusion of innovations (DOI): Rogers' Diffusion of Innovations (DOI) Theory [29] explains how new technologies and services are adopted by consumers over time. This process is shaped by five key attributes: relative advantage, referring to the perceived benefits over existing alternatives; compatibility, which reflects alignment with consumer needs and habits; complexity, indicating the ease of use; trialability, which considers opportunities to test the innovation before full adoption; and observability, or the extent to which the benefits are visible to others.

DOI is classified as a micro-level theory, as the diffusion process is primarily driven by these attributes at the individual level. A critical aspect of the theory is the influence of early adopters, who facilitate broader adoption by shaping market penetration rates. In the context of OGS, DOI provides a framework for identifying early-adopting consumer segments and understanding the factors that drive their adoption. Younger, tech-savvy consumers are more likely to embrace OGS [43], whereas others may hesitate due to concerns regarding product quality, delivery reliability, or the persistence of existing shopping habits.

Expectation-confirmation theory (ECT): Oliver's Expectation-Confirmation Theory (ECT) [31] explains post-adoption consumer behavior, particularly in relation to customer satisfaction and repurchase intentions. According to ECT, when consumers' expectations are met or exceeded, they experience satisfaction, leading to continued usage. Conversely, if expectations are not fulfilled, dissatisfaction can result in disengagement. In the context of OGS, businesses can leverage ECT to develop effective customer retention strategies, such as customer feedback loops, loyalty programs, and proactive issue resolution, all of which help improve service reliability, strengthen consumer trust, and encourage long-term engagement with OGS platforms.

Network externalities theory: Katz and Shapiro [32] introduced the Network Externalities Theory, which posits that the value of a service or product increases as the number of users grows. This effect can be classified into two types: direct network effects, where a larger user base enhances interaction and engagement among

consumers (e.g., peer influence and social validation), and indirect network effects, where increased adoption attracts more complementary services, suppliers, and investment in infrastructure. Since the theory is primarily concerned with evaluating the value of specific products or services, we classify it as a micro-level theory.

In the context of OGS, network effects play a critical role in shaping market expansion and operational efficiency. As more consumers adopt OGS, delivery networks scale, supplier partnerships expand, and online platforms become more efficient. Thus, leveraging network externalities is essential for individual OGS providers to drive adoption, optimize logistics, and establish a competitive advantage.

Technology acceptance theories: The Technology Acceptance Model (TAM), developed by Davis [33, 34] and rooted in the Theory of Reasoned Action (TRA) [30], explains technology adoption based on two key determinants: perceived usefulness and perceived ease of use. However, TRA—and by extension, TAM—did not account for external constraints or an individual's confidence in effectively using technology. To address this limitation, Ajzen introduced the Theory of Planned Behavior (TPB) [35], which incorporated perceived behavioral control—a construct that reflects both self-efficacy and situational barriers that may hinder adoption despite positive intentions.

Although TPB and TAM were initially developed as separate models, later extensions of TAM integrated elements of TPB. TAM2 [38] expanded the original framework by including subjective norms and result demonstrability, acknowledging the influence of social factors and observable benefits on adoption. TAM3 [42] further refined the model by incorporating emotional and control-related factors, such as computer anxiety and perceived behavioral control, thereby aligning more closely with TPB's broader approach to decision-making.

To unify these evolving models, Venkatesh et al. [39] developed the Unified Theory of Acceptance and Use of Technology (UTAUT) [39], integrating key elements from TRA, TAM, TPB, and other frameworks. UTAUT introduced four core constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions, offering a more comprehensive perspective on technology adoption.

In the context of OGS, these models provide valuable insights into consumer adoption behavior by identifying key drivers such as perceived convenience, trust, social influence, and technological ease of use. A deeper understanding of these factors enables retailers to enhance the user experience and reduce barriers to adoption.

Resource-based view (RBV): The Resource-Based View (RBV) by Barney [36] argues that firms achieve a sustainable competitive advantage by possessing valuable, rare, inimitable, and non-substitutable resources. Since this theory focuses on individual firms rather than a broader industry perspective, we classify RBV as a micro-level theory. In OGS, key resources can include logistics infrastructure, brand reputation, customer data analytics, and AI-driven inventory management. Businesses with superior technology and supply chain integration can potentially outperform competitors because these assets are difficult to replicate.

Motivation-opportunity-ability (MOA): The Motivation-Opportunity-Ability (MOA) Model, proposed by MacInnis et al. [37], explains behavior as a function of motivation (desire to act), opportunity (external enablers), and ability (individual capacity to act). If one of these three factors is missing, behavioral engagement is unlikely. In OGS, motivation could be convenience or time savings, opportunity could be availability of delivery services, and ability could be digital literacy or trust in the platform. Businesses can optimize OGS adoption by ensuring that all three elements are optimized.

Habit theory (HT): The Habit Theory (HT) proposed by Verplanken and Orbell [40] explains that repetitive behaviors become automatic when performed consistently in a stable context. OGS adoption is not just a rational decision but also a behavioral shift requiring habitual formation. Many consumers are accustomed to in-store grocery shopping, making habitual behavior a significant barrier. Retailers can leverage HT by offering subscription models, reminder notifications, and personalized reorder functions to help consumers integrate OGS into their routine.

Push–pull-mooring (PPM): Bansal et al. [41] proposed the Push–Pull-Mooring (PPM) model, which explains why consumers switch from one service to another. Push factors (e.g., dissatisfaction with in-store shopping), pull factors (e.g., convenience of online shopping), and mooring factors (e.g., habitual resistance) determine consumer migration. For OGS, PPM can be useful in understanding why some consumers transition from traditional supermarkets to online platforms. Factors such as crowded stores, long checkout lines, and time constraints (push) make OGS appealing. However, mooring barriers—such as lack of trust, perceived complexity, or delivery fees—must be addressed as well.

2.1.3 Summary of theories relevant to online grocery shopping

Table 1 provides a summary of the selected theories relevant to OGS, categorized into macro-level and micro-level perspectives. A comprehensive list, including detailed descriptions and the full names of the theories, is available in Appendix. By systematically organizing these theoretical approaches, we aim to offer a thorough examination of key aspects influencing OGS adoption and performance. Additionally, we illustrate the practical application of these theories in the context of OGS.

2.2 Conceptual framework to manage online grocery shopping

2.2.1 Rationale and overview

MacInnis [44] points out that a conceptual contribution can be achieved by clearly delineating and summarizing a research objective, thereby enhancing understanding within a specific domain. The author defines delineation as the process of

Table 1 Summary of macro- and micro-level theories relevant to OGS[1]

Perspective	Focus area	Theories	Example application in OGS
Macro-level	Regulatory frameworks, industry competition, technological advancements, and environmental influences	PESTEL [24], Porter's Five Forces [25], Institutional Theory [26], Diffusion of Disruptive Innovation [27], Ecosystem Theory [28]	Understanding how, e.g., global shocks, market regulations, technological advancements, or changes in consumer demand impact online grocery markets
Micro-level	Individual and organizational decision-making, adoption, and continued usage behavior	DOI [29], TRA [30], ECT [31], Network Externalities [32], TAM [33, 34], TPB [35], MOA [36], RBV [37], TAM2 [38], UTAUT [39], HT [40], PPM [41], TAM3 [42]	Understanding how consumers adopt, accept, and repeatedly use OGS, considering factors like convenience, trust, and social influence

[1]A detailed overview of all considered theories, along with their full names, is provided in Appendix.

"detailing, articulating, charting, describing, or depicting an entity" [44, p. 144], while summarization involves "taking stock of, digesting, recapping, and reducing what is known to a manageable set of key takeaways" [44, p. 144]. Applied to OGS, this approach involves developing a conceptual framework by first examining the current state of OGS and relevant theoretical perspectives, then synthesizing this information into structured and manageable components.

A firm's performance is typically influenced by a combination of internal and external factors [45]. Menguc et al. [46] argue that when internal factors are guided by a proactive environmental strategy, they can have a substantial impact on firm performance. In contrast, external factors, such as government regulations or environmental conditions, are beyond a firm's direct control, requiring firms to adopt reactive strategies to adapt to these dynamic conditions [46]. We apply this fundamental distinction to OGS and establish a framework that differentiates between *environmental (i.e., external) circumstances* and *internal factors*. This framework is then divided into further subcategories, which we develop subsequently.

2.2.2 Conceptualization of environmental circumstances

Consistent with previous research, we define *environmental circumstances* as all external factors that influence an organization's operations [see, e.g., 47–49]. While these *environmental circumstances* cannot be directly influenced, organizations affected by them must navigate and adapt to their potential changes [36]. Prior research categorizes *environmental circumstances* in various ways, such as differentiating between macroenvironmental and microenvironmental factors [50], identifying political forces, industry-specific forces, and shifts in consumer behavior [51], or considering market turbulence, competitive intensity, and technological turbulence [52].

To provide a comprehensive and structured perspective, we classify *environmental circumstances* into three distinct categories: *global circumstances*, *market-specific circumstances*, and *consumer-specific circumstances*. *Global circumstances* encompass factors related to international supply chains and pricing within the broader global economic environment, drawing on the macroenvironmental perspectives of the PESTEL framework [24] and Ecosystem Theory [28]. *Market-specific circumstances* refer to factors shaping a particular market, such as those within a specific country or industry, with theoretical foundations in frameworks such as Porter's Five Forces [25] and Institutional Theory [26]. Finally, *consumer-specific circumstances* are shaped by changes in consumer demand, with the Diffusion of Disruptive Innovation Theory [27] providing a relevant theoretical framework for explaining the evolution of consumer adoption patterns over time.

2.2.3 Conceptualization of internal factors

Internal factors encompass all organizational activities and decisions that shape competitive advantage and business performance [36]. Unlike *external environmental* conditions, which require firms to adapt, *internal factors* can typically be actively managed to enhance market positioning and improve operational

efficiency [36, 53]. Porter [54] distinguishes between strategic positioning and operational effectiveness, emphasizing that while strategic decisions define an organization's long-term trajectory, operational effectiveness ensures cost efficiency and service reliability—both essential for sustained profitability [55].

Building on this distinction, we classify *internal factors* into two primary dimensions: *Strategic positioning* and *operational effectiveness*. The subsequent sections outline the theoretical perspectives relevant to each dimension, integrating insights from the previously discussed theories.

Strategic positioning: Various theoretical perspectives contribute to the development and refinement of *Strategic positioning*. According to Porter [54], *strategic positioning* entails the deliberate selection of a distinct competitive approach that differentiates an organization from its rivals. Unlike *operational effectiveness*, which primarily focuses on optimizing processes, *strategic positioning* determines how a firm competes in the market, defines its unique value proposition, and shapes its overall business model.

Several theoretical frameworks provide valuable insights into how firms can establish and sustain a strong strategic position. The RBV [36] posits that firm-specific capabilities, such as proprietary technology, logistics expertise, or supplier relationships, constitute key drivers of sustainable competitive advantage. Organizations that cultivate unique resources and capabilities enhance their *strategic positioning* by offering differentiated value that competitors cannot easily replicate. The DOI Theory [29] provides a complementary perspective by explaining how new technologies and services gain adoption among consumers, thereby informing market expansion strategies. By strategically leveraging early adoption dynamics, OGS providers can establish themselves as industry leaders. Additionally, Network Externalities Theory [32] underscores how an increasing user base enhances the value of a platform, fostering economies of scale. This mechanism is particularly relevant in OGS, where a growing customer base can contribute to lower per-unit costs, improved supplier agreements, and stronger customer loyalty. By integrating these theoretical perspectives, firms can develop *strategic positioning* approaches that facilitate long-term differentiation.

Operational effectiveness: *Operational effectiveness* is equally supported by several theoretical perspectives. Technology Acceptance Theories (TAM, TAM2, TAM3, UTAUT) [33, 34, 38, 39, 42] emphasize the role of perceived usefulness, ease of use, and external influences in shaping the adoption and continued use of digital grocery platforms, directly affecting individual adoption decisions. The MOA Model [37] highlights the impact of workforce capabilities and resource availability on OGS *operational effectiveness*. Furthermore, sustained business performance depends on post-adoption behavior and customer retention. The ECT [31] stresses the importance of meeting customer expectations regarding service quality, which in turn influences retention and repeat purchases. HT [40] provides a framework for understanding how repeated interactions with OGS platforms contribute to habit formation, ultimately fostering long-term consumer loyalty. Finally, the PPM Model

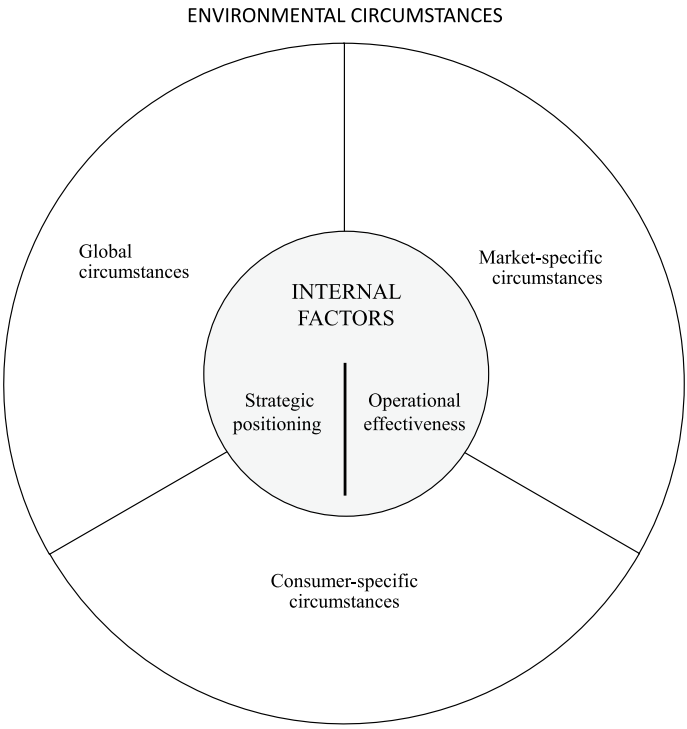

Fig. 1 Conceptual framework

[41] provides insights into consumer switching behavior, reinforcing the necessity of consistent service performance to minimize churn.

2.2.4 Synthesizing a conceptual framework to manage online grocery shopping

Figure 1 illustrates the core structure of the conceptual framework, highlighting key factors that influence organizational decision-making. This framework is particularly relevant to OGS, a rapidly evolving market characterized by high uncertainty and distinct operational challenges, such as the home delivery of perishable goods, digital rather than in-store shopping experiences, and expanded opportunities for personalized pricing and promotions.

While the framework offers a structured approach to understanding organizational influences, applying it to OGS requires consideration of specific complexities. The sector's rapid growth, alongside the failure of certain providers, highlights the need for a strategic and adaptable market development approach. Given the uncertainties surrounding OGS [12] and the broader economic challenges shaped by multiple crises [16], the framework provides a valuable tool for managing this evolving landscape. By integrating *environmental circumstances* and *internal factors*, along with the previously introduced distinctions, it serves as a comprehensive foundation for strategic decision-making.

For practical application, however, a further, individualized differentiation is recommended to refine the rigid structure presented in Fig. 1 and tailor it to specific priorities. While the conceptual framework establishes a clear structure, its detailed adaptation at a more granular level allows for flexibility in application, making it particularly valuable for OGS providers and beyond. In the following chapter, the conceptual framework is applied and elaborated in greater detail for a specific implementation in the context of OGS.

3 Environmental circumstances and internal factors in online grocery shopping

3.1 Environmental circumstances in online grocery shopping

3.1.1 Global circumstances

Global circumstances refer to significant, wide-ranging events that exert a direct or indirect influence on economic structures worldwide. We classify *global circumstances* into categories such as *global shocks*, *climate change*, and d*igitalization and technological advancements*. The justification for this classification is provided and examined in detail in the context of OGS in the following section. Our choice of these categories aims to highlight the diverse facets of various globally impactful events and trends. However, these classifications may overlap. Therefore, it is essential to consider all *global circumstances* and examine their interactions.

Global shocks: *Global shocks* include major events such as the 2008 financial crisis [56], the nuclear disasters at Chernobyl in 1986 and Fukushima in 2011, the volcanic eruption of Eyjafjallajökull in Iceland [57], the COVID-19 pandemic [58], and the ongoing conflict in Ukraine [59–61]. In times of multiple crises with far-reaching global consequences [16], these shocks play a critical role in shaping business operations. Their impact on OGS can be particularly profound, especially when they disrupt global supply chains and influence consumer purchasing behaviors during periods of heightened uncertainty. For example, the COVID-19 pandemic significantly accelerated the adoption of OGS in Germany, albeit temporarily [12].

Climate change: Our definition of global circumstances also encompasses long-term trends such as climate change [64]. The ongoing impacts of climate change must be considered in the context of OGS, particularly in terms of addressing the growing demand for sustainable products [65, 66], minimizing food waste [67], and optimizing energy consumption [68]. This is especially crucial during periods of multiple crises and economic downturns, as consumers tend to be more mindful of their expenditures in such times [63].

Digitalization and technological advancements: The continuous advancement of digitalization is driving profound and lasting transformations across society [69], increasingly influencing consumer behavior and accelerating the shift toward online

shopping [70, 71]. A key factor in this transition is the evolution of smartphones, which has significantly contributed to the expansion of mobile commerce [72]. Additionally, artificial intelligence (AI) is enhancing the capabilities of online shopping by enabling the processing and analysis of vast datasets, thereby optimizing various aspects of e-commerce [73].

In the context of OGS, addressing the challenges associated with last-mile delivery is essential for ensuring efficiency and sustainability [74, 75]. Innovations in logistics, such as the use of environmentally friendly electric vehicles, autonomous vehicles, and drones, have the potential to significantly shape the future of OGS. These technological advancements are particularly relevant for improving accessibility in rural areas, where adoption rates tend to be lower [76].

Moreover, emerging digital innovations, such as the metaverse, may fundamentally reshape digital marketing strategies, intensify competition within the retail sector [77], and influence consumer behavior [78]. In the context of OGS, Wang et al. [79] demonstrate that different levels of immersion—from traditional 2D OGS to more immersive 3D OGS experiences utilizing virtual reality—can impact impulsive consumer purchasing behavior.

Ultimately, *digitalization and technological advancements* continue to drive the evolution of OGS applications, fundamentally altering the way consumers purchase food [80]. Particularly in times of crisis, digitalization and technological advancements play a critical role in the adoption and utilization of OGS. This is especially significant given that the implementation and development of modern technologies require substantial financial investment. During economic downturns, this factor becomes even more relevant, as businesses may be more hesitant to allocate resources to innovative projects due to increased financial constraints [81].

3.1.2 Market-specific circumstances

In contrast to *global circumstances*, *market-specific circumstances* include factors associated with a specific target market. To define these circumstances, actors must first delineate the relevant market, which may correspond to a specific region or country where OGS is scheduled for implementation. These *market-specific circumstances* can vary individually, depending on elements such as country, organization, or product characteristics. As a possible organization of *market-specific circumstances*, we classify five main types for OGS: *Economic fluctuation*, *societal change*, *cultural characteristics*, *regulatory requirements*, and *competitive structure*. The following sections provide a detailed, literature-based discussion of these circumstances in relation to OGS.

Economic fluctuation: The *economic fluctuation* within a market can influence consumer purchasing behavior [82] and thus affect the performance in OGS. Especially during periods of crisis, a country's inflation rate can influence the rate of new firm entries [83]. Furthermore, geopolitical conflicts can create considerable challenges specific to certain markets; for instance, the Yale School of Management [84] reports that over 1,000 firms have scaled back their operations in Russia since its invasion of Ukraine. In the highly competitive online grocery shopping market, it

is essential to continuously analyze and account for economic conditions. In periods of economic downturn, consumers are more likely to purchase lower-priced food products and shop more frequently at discount retailers [62]. Given that products in OGS tend to be more expensive branded items compared to those in brick-and-mortar stores [43], economic fluctuations may hold particular significance for OGS. For example, during periods of inflationary pressure, consumer price sensitivity tends to increase [63], which may place OGS at a disadvantage if its prices remain higher than those of traditional supermarkets. This underscores the importance of accounting for economic fluctuations when evaluating the resilience and long-term viability of OGS, particularly in times of uncertainty.

Societal change: *Societal change* can have a profound impact on consumer demand, with demographic shifts serving as key drivers of economic trends and innovation [85]. For example, Hojnik et al. [86] explore the relationship between digitalization, demographic change, and the circular economy, demonstrating how firms adapt their products and services in response to these shifts. Similarly, Abeliansky et al. [87] highlight the importance of workforce transformations, driven primarily by automation and demographic change, as critical considerations for businesses.

Beyond long-term demographic trends, the COVID-19 pandemic has further accelerated societal shifts, particularly by increasing remote work [88, 89]. This shift is especially relevant for OGS providers, as individuals working from home can receive grocery deliveries with greater flexibility and convenience. Given these dynamics, we consider *societal change* a significant *market-specific circumstance* influencing the adoption and development of OGS.

Cultural characteristics: Another key *market-specific circumstance* is the influence of cultural differences and shifts in cultural norms, which play a particularly significant role in online purchasing behavior [90, 91]. For instance, an OGS provider entering an Islamic market must account for specific cultural preferences, such as the demand for halal products [92]. Similarly, purchasing behaviors, including preferences for private labels, can vary substantially across countries [93] and should be carefully considered. These *cultural characteristics* are especially relevant for online grocery providers operating internationally.

Moreover, cultural dynamics can become even more critical during periods of multiple crises. For example, refugees migrating due to war may have different consumption habits than the existing customer base in a given market. As a result, *cultural characteristics* should be continuously monitored and, if necessary, adapted, particularly in uncertain times when *market-specific circumstances* are subject to rapid change.

Regulatory requirements: *Regulatory requirements* vary across countries and must be carefully considered when targeting specific markets. In the trade of perishable goods, logistical mandates play a critical role [94]. Lederman [95] highlights distinct characteristics of OGS in Australia compared to offline sales, illustrating how

regulatory frameworks can shape market operations. A particularly relevant example for OGS is the implementation of uniform EU-wide food labeling regulations [96] alongside additional food safety laws [97].

E-commerce regulations are especially important for retailers engaged in OGS, as they govern digital transactions, consumer rights, and data protection. Moreover, sustainability regulations [65] and waste management laws [98] have gained increasing significance in the context of climate protection and resource conservation. Given the escalating climate crisis, evolving *regulatory requirements* play a crucial role in shaping OGS, particularly by promoting environmentally sustainable logistics, minimizing packaging waste, and ensuring compliance with resource conservation regulations.

Competitive structure: Understanding the *competitive structure* within a market is a critical factor in determining the success or failure of a business model, particularly in the context of OGS. For instance, an OGS provider entering the German market must navigate intense competition in both brick-and-mortar and online retail, as the grocery sector is largely dominated by a few major retail chains [99].

The *competitive structure* of a given market encompasses not only direct competition among existing players but also broader industry shifts, such as the emergence of new logistics models in the OGS sector [100]. On one hand, traditional brick-and-mortar retailers are expanding into OGS by leveraging their established physical infrastructure. On the other hand, new pure online grocery providers are entering the market, positioning themselves as direct competitors to these incumbent retailers [15]. The absence of a physical store network in pure online grocery models introduces new market dynamics that have the potential to disrupt existing structures. However, entering the market as a pure OGS provider presents significant challenges, as these firms must build new operational structures while competing against well-established retailers and ingrained consumer purchasing habits.

Moreover, economic downturns can further intensify competition within the market [101]. Given the already high level of competition in the grocery sector and the typically higher prices associated with OGS, periods of economic uncertainty can have particularly pronounced effects. For instance, during such times, consumers may increasingly shift back to shopping at brick-and-mortar discount retailers rather than using online grocery services.

3.1.3 Consumer-specific circumstances

Consumer-specific circumstances encompass all factors that influence potential consumers within a given market. Unlike *market-specific circumstances*, *consumer-specific circumstances* can vary significantly within the same market and may even be contradictory. Understanding these circumstances is essential for firms, as consumer characteristics play a pivotal role in analyzing purchasing behavior and predicting trends [102]. Additionally, consumer purchase behavior is a key determinant in

optimizing both current and future business performance [103]. To provide a structured approach, we differentiate between *consumer-specific circumstances* related to *consumer characteristics*—such as demographics and attitudes—and those associated with actual *purchase behavior*. This distinction is justified and examined in detail in the following sections within the context of OGS.

Consumer characteristics: Brüggemann and Pauwels [43] suggest that consumer characteristics can be assessed based on demographic factors and consumer attitudes within a specific market. The TPB posits that attitudes influence consumer behavior [35], while Punj [104] argues that demographic attributes such as education, income, and age moderate online purchasing behavior.

In the context of OGS, Brüggemann and Pauwels [43] find that online grocery shoppers tend to be younger, more technologically inclined, less price-sensitive, and more brand-conscious. Braun and Osman [105] further highlight that for consumers over the age of 50, factors such as home delivery, product variety, convenience, and curiosity are key motivators for OGS adoption. Additionally, they observe that regional product availability plays a significant role in encouraging older consumers to engage with OGS.

These differences in consumer characteristics have important implications for the effective implementation of OGS, particularly in the areas of app design, product assortment, and pricing strategies. To optimize adoption and engagement, OGS providers should account for shifts in consumer characteristics, including demographic factors, growing demand for convenience, technology anxiety, and changing attitudes toward sustainability.

Different types of crises can influence consumer characteristics in distinct ways. Majerova and Cizkova [106] provide evidence from the Czech market, showing that the positive trend for organic products observed before the 2008 financial crisis disappeared in its aftermath. In contrast, research on the COVID-19 pandemic reveals a different pattern, indicating that demand for organic food increased during this period [107]. These findings highlight that consumer characteristics can shape demand in different ways, particularly during crises. Understanding these dynamics related to consumer characteristics is especially important in emerging markets such as OGS, where the ability to adapt to the impacts of different crises is crucial for long-term success.

Purchase behavior: In addition to *consumer characteristics*, potential changes in consumer *purchase behavior* play a critical role in retailing, particularly in times of crisis. For example, Roggeveen and Sethuraman [108] predicted lasting transformations in the retail sector due to the COVID-19 pandemic. Empirical studies further support this notion, demonstrating that consumer behavior is influenced by macroeconomic factors such as GDP and income levels [82] as well as by crisis events like the COVID-19 pandemic [12].

Purchase behavior, as *a consumer-specific circumstance*, is particularly relevant in the context of OGS, an emerging market that continues to evolve. Kuikka et al.

[109] analyzed the performance of grocery retailers across pre-pandemic, pandemic, and post-pandemic periods, identifying significant shifts in OGS behaviors. These findings underscore the necessity of understanding *purchase behavior* to anticipate market dynamics and consumer adaptation to crises.

Beyond the impact of the pandemic, an important question arises regarding the relationship between stated preferences (attitudes) and revealed preferences (actual behavior) [110], particularly in the context of online versus offline shopping [111]. In periods of multiple crises and heightened economic and psychological uncertainty, shifts in consumer behavior are likely. Therefore, integrating purchase behavior insights is essential for shaping the future trajectory of OGS.

One critical aspect of *purchase behavior* is price sensitivity during economic downturns [62]. Consumers tend to shift towards lower-cost private label brands in recessions [112]. If OGS providers fail to anticipate this trend and adjust their product assortments accordingly, they risk losing a substantial portion of their customer base. Given that customer acquisition in OGS often requires significant investment, providers must ensure long-term customer retention to meet investor expectations.

Another key dimension of purchase behavior relates to the growing emphasis on sustainability, which has driven increased demand for organic products [113]. However, disparities in the availability of organic goods between online and offline distribution channels persist [111], alongside a rising consumer preference for vegan products [114]. As sustainability concerns continue to shape purchasing decisions, OGS providers must account for potential impacts of crises and strategically adapt their offerings to meet evolving consumer expectations.

3.2 Internal factors in online grocery shopping

3.2.1 Strategic positioning

According to Porter [54, p. 43], strategy is defined as "the creation of a unique and valuable position, involving a different set of activities." Building on this definition, strategy can be understood as encompassing all long-term decisions made by a firm to achieve a competitive advantage and drive positive outcomes. In examining strategy as an internal organizational factor, we differentiate among three origins of *strategic positioning*, as outlined by Porter [54]: *variety-based positioning*, *needs-based positioning*, and *access-based positioning*.

By distinguishing among these three strategic positioning approaches, firms can systematically evaluate and refine their market strategies, ultimately strengthening their long-term competitive position in the OGS sector. This differentiation is particularly relevant for OGS providers, as they must navigate an intensely competitive and rapidly evolving digital landscape. The following sections provide a detailed explanation of these different positioning strategies and highlight their specific relevance to the OGS market.

Variety-based positioning: Porter [54] defines *variety-based positioning* as the setup of product and service differentiation within an industry, encompassing strategies that create a unique selling proposition by distinguishing a firm from its competitors. While OGS does not face physical shelf limitations of traditional retail, the display space on digital devices—particularly mobile devices—during product selection presents a critical challenge [115, 116]. This raises important strategic considerations regarding *variety-based positioning* in OGS.

Although the 'online shelf' of groceries is theoretically boundless, the optimal assortment breadth required to effectively serve target customers and ensure OGS success remains uncertain. Since OGS operates through digital interfaces, typically mobile applications, displayed products and prices can be dynamically adjusted. However, this flexibility also presents strategic challenges regarding which products and variations an OGS provider should offer, necessitating careful operational planning. Achieving an effective balance between personalized product offerings and supply chain profitability is essential.

Despite the significant optimization potential offered by data generated within the app, profitability remains a central challenge for OGS providers [117]. One potential approach to enhancing *variety-based positioning* in a sustainable manner is leveraging AI for assortment optimization [118]. These data-driven insights can not only refine product selection strategies and improve personalization but also enable OGS providers to dynamically adjust their *variety-based positioning* in response to different economic conditions, such as periods of economic expansion or recession.

Needs-based positioning: Porter [54] defines *needs-based positioning* as the accommodation of diverse customer needs either within the same individual across various demands or among different customer cohorts. This approach is closely linked to segmentation strategies, enabling firms to tailor their products and services to specific consumer preferences using various methodologies [119]. In e-commerce, segmentation is particularly significant due to the vast amount of consumer data generated through online transactions [120], underscoring its critical role in OGS.

Needs-based positioning is particularly relevant for OGS providers, as it allows them to target specific consumer segments, such as time-sensitive shoppers with high convenience expectations, individuals with limited mobility, or sustainability-conscious customers. By addressing the distinct needs of these groups, OGS providers can enhance customer satisfaction and foster long-term loyalty. Brand et al. [121] identify five distinct segments among online grocery shoppers based on consumer attitudes, norms, beliefs, and perceptions, reinforcing the importance of considering consumer-specific contexts and systematic differences among customer cohorts. To further refine consumer-targeted strategies, Mergner et al. [123, 124] propose an analytical approach for assessing the impact of marketing strategies across different segments, offering valuable insights for practitioners in optimizing positioning strategies in retailing.

Beyond segmentation, personalization plays a crucial role in OGS. Unlike brick-and-mortar retail, OGS facilitates the collection of extensive consumer data, which can be leveraged to provide personalized offers and pricing, thereby enhancing the overall customer experience [122]. The aspect of *needs-based positioning* is particularly relevant during economically challenging periods, such as financial crises or pandemics, as price sensitivity increases [63] and consumers are more likely to shift their purchases toward lower-cost products at discount retailers.

Access-based positioning: In this strategic *internal factor*, the primary focus is on identifying and accessing potential customers. According to Porter [54], both mass-market and niche-market approaches can be effective and profitable. Building on this foundation, we argue that in the context of OGS, the strategic selection of target customer groups is a key determinant of long-term success. OGS providers must continuously evaluate which consumer segments to focus on and whether this targeting can support a sustainable and profitable business model.

A critical factor in this decision is the last-mile challenge [19, 125], which necessitates a substantial customer base to achieve economies of scale. Given the uncertain development of OGS and the distinct characteristics of online grocery shoppers compared to offline consumers [43], it remains unclear whether OGS providers should adopt a broad-market approach or strategically target specific consumer segments to enhance long-term sustainability. This strategic choice can significantly influence the viability of an OGS provider.

Furthermore, the decision to integrate or exclude quick commerce is a critical strategic consideration within OGS [126]. Quick commerce caters to a specific consumer segment and enables providers to respond rapidly to emerging demands. However, its implementation requires substantial financial investment, which can be particularly risky if demand projections and operational efficiencies are not carefully evaluated. During periods of uncertainty, particularly in times of multiple crises, consumers' willingness to pay for quick commerce services may decrease substantially, potentially jeopardizing the viability of such offerings.

3.2.2 Operational effectiveness

According to Porter [54], the foundations of strategic positions underpin *operational effectiveness*. The translation of strategy into action necessitates its operational implementation, considering the prevailing *environmental circumstances*. In the context of OGS, we present selected examples to illustrate key aspects of *operational effectiveness*. It is important to note that these examples serve as representative illustrations relevant to OGS, though additional factors may also contribute to an organization's *operational effectiveness* in this sector.

A critical factor in OGS is *logistics and supply chain management*, particularly regarding grocery fulfillment, which directly impacts service reliability

and efficiency. Additionally, *technology and IT infrastructure* play a vital role, especially when targeting a mass market (refer to *access-based positioning*). For instance, facilitating technology acceptance in OGS presents a challenge that necessitates strategic planning and effective implementation to optimize *operational effectiveness*. Given the highly competitive nature of the retail industry, particularly in the emerging OGS market, *user experience, customer service, and loyalty* are also crucial factors. The ability to retain customers through high service quality and personalized experiences can provide a significant competitive advantage. The following sections further elaborate on these key examples of operational effectiveness in OGS.

Logistics and supply chain management: One of the key operational challenges in OGS is *logistics and supply chain management*. Unlike traditional brick-and-mortar retail, where customers pick up products in-store, OGS often relies on home delivery, leading to additional logistics costs for retailers [18–20]. The need to maintain a cold chain for perishable goods further complicates logistics, increasing operational expenses for OGS providers [127]. However, certain efficiencies can offset these costs, such as a reduced need for premium store locations [128] and potentially lower labor costs compared to brick-and-mortar retailers [129]. Additionally, logistics costs can vary significantly among retailers, depending on their operational structures and strategic decisions [129]. Given the central role of supply chain management – particularly the delivery process – in OGS, retailers must carefully assess and optimize different supply chain models to enhance efficiency and cost-effectiveness [130].

Supplier relationships and procurement are also critical factors in OGS supply chain management [131]. Retailers with established brick-and-mortar operations can leverage existing infrastructure and supplier relationships to support their OGS initiatives. In contrast, new market entrants, particularly pure-play online retailers, face greater challenges in developing efficient supply chains [132]. For these firms, forming strategic partnerships with established offline retailers or logistics providers could be instrumental in building effective delivery networks and ensuring operational viability. Given the critical role of *logistics and supply chain management* in OGS, coupled with the vulnerability of supply chains during crises [133], this aspect becomes particularly essential for OGS operations in times of uncertainty.

Technology and IT infrastructure: *Technology and IT infrastructure* are critical components of operational effectiveness in OGS. A key distinction in OGS is the online ordering process, which takes place through digital devices. This characteristic introduces several unique challenges and opportunities, including the absence of a physical 'feel and touch' experience [134, 135], differences in product presentation (where the digital shelf is theoretically unlimited, but screen space is constrained), and the potential for dynamic pricing tailored to personalized offers in online retail

[136]. Additionally, recommendation agents can be leveraged to enhance the shopping experience and influence purchasing decisions [137].

For an OGS provider, ensuring a user-friendly and convenient technology interface is essential. Moreover, customer acceptance of algorithmic applications plays a crucial role; if consumers perceive these systems as intrusive or untrustworthy, it could lead to a rejection of the service or even boycotts of the OGS provider.

Furthermore, AI offers substantial potential for enhancing *operational effectiveness* in OGS. As OGS transactions occur entirely online, AI facilitates the continuous optimization of product assortments, allowing providers to tailor offerings to individual customer preferences and even adapt to context-specific needs (e.g., adjusting recommendations based on different time frames or product categories). Additionally, AI can be leveraged for consumer-centric inventory optimization in online retail [138] and for improving e-grocery order fulfillment, particularly in last-mile delivery [139].

Beyond individual consumer preferences, AI can also incorporate macroeconomic factors, such as economic growth, recessions, or inflation trends, into operational decision-making. By analyzing economic indicators, AI-driven systems can help OGS providers anticipate shifts in consumer behavior, adjust pricing strategies, and optimize assortments accordingly. This capability enables providers to mitigate uncertainties associated with economic downturns, such as recessions or rising inflation, ensuring greater resilience and stability in volatile market conditions.

User experience, customer service, and loyalty: *User experience, customer service, and loyalty* are critical success factors in OGS, particularly in times of crisis when consumer trust and reliability become even more essential. Research indicates that online grocery shoppers have distinct expectations regarding platform usability, customer support, and delivery reliability, which differ significantly from those in traditional retail [140].

A seamless and engaging *user experience* is essential for encouraging repeat usage. Anshu et al. [141] highlight that customers who experience seamless and personalized service are more likely to develop repeat purchase intentions. Similarly, Upadhyay et al. [142] examine the role of *user experience* in sustained engagement with mobile-based online food ordering, emphasizing the importance of personalized recommendations, location-based services, in-app and push notifications, and gamification techniques. These strategies not only enhance user engagement but also contribute to customer retention. Additionally, subscription models have proven effective in increasing customer loyalty, as they incentivize long-term participation in OGS [143, 144]. Furthermore, ensuring a positive *user experience*—particularly through accurate and timely delivery—is essential for building customer trust and fostering long-term retention. As highlighted by Morganosky and Cude [1], fulfilling these expectations enhances consumer confidence in OGS and reinforces perceptions of its reliability and efficiency. Especially during crises, when demand for

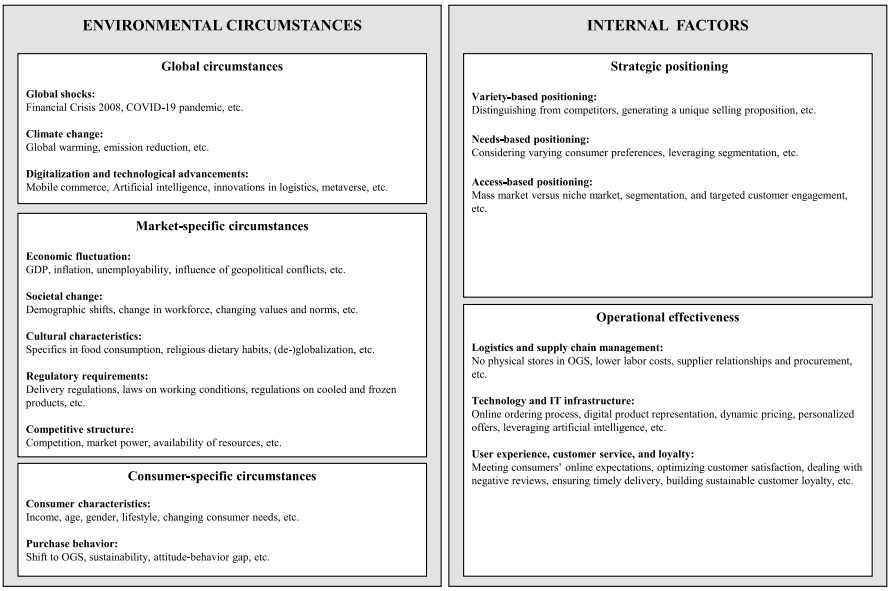

Fig. 2 Detailed overview of *environmental circumstances* and *internal factors*

reliable online grocery services surges, maintaining high service quality becomes even more critical.

Customer service is a critical factor in ensuring consumer satisfaction and fostering long-term engagement. Consistent and responsive support enhances brand loyalty, encouraging customers to remain with a particular provider [145]. Understanding the key drivers of customer satisfaction is especially important in the OGS sector, where service quality directly influences consumer trust and retention.

Lima et al. [145] analyze online reviews from ten pet food retailers, identifying several factors that shape customer satisfaction, including e-service quality, perceived health benefits, ingredient transparency, nutritional composition, and packaging. Beyond delivering high-quality service, OGS providers must also be equipped to handle negative online reviews, as these can significantly impact brand perception. Kim et al. [146] offer valuable insights into how industry practitioners can effectively address and respond to customer feedback, ensuring trust and credibility in a highly competitive market.

Finally, *customer loyalty* is a key determinant of long-term *operational effectiveness* in OGS. Given the competitive nature of this emerging market, providers often attempt to attract and retain customers through rapid delivery at competitive prices or aggressive promotional campaigns [147]. However, such strategies are unsustainable in the long term, as they typically involve high cash burn rates and are rarely profitable in the early stages of market entry [148]. Consequently, fostering sustainable *customer loyalty* is essential, particularly during economic downturns when shifting consumer spending habits make retention more challenging. A long-term approach that prioritizes consistent service quality, tailored user experiences, and

responsive customer service can strengthen brand loyalty and enhance an OGS provider's competitive position in an increasingly dynamic market.

Beyond these factors, other aspects of *operational effectiveness* in OGS may be relevant, including market entry strategies, financial management, competitor analysis, segmentation and targeting approaches, distribution optimization, channel consistency, and complaint management. These elements collectively contribute to the sustainable growth and competitive positioning of OGS providers, particularly in times of crisis when market stability and consumer confidence are increasingly fragile.

3.3 Synthesis of adapting to *environmental circumstances* and influencing *internal factors*

Figure 2 provides an overview of the previously developed conceptual framework, which encompasses *environmental circumstances* and *internal factors* within the context of OGS. The subcategories within each domain serve to illustrate key aspects attributed to specific areas. However, this classification is not exhaustive and can be evaluated and refined based on the specific requirements of an OGS under investigation.

The primary objective of this framework is to enable a comprehensive analysis of *environmental circumstances* and ensure their systematic consideration in the implementation of OGS. While *environmental circumstances* are external and beyond the direct control of the operating firm, *internal factors* can be actively managed by the organization. This framework provides a structured approach to help organizations adapt to *environmental circumstances* while shaping *internal factors* to enhance operational effectiveness.

4 Implications

4.1 Theoretical implications

The conceptual framework (see Fig. 1) is grounded in a broad theoretical foundation relevant to the management of OGS (refer to Table 1 and Appendix). It highlights both the necessity of adapting to external *environmental circumstances* and the ability to actively shape *internal factors*. By offering a more detailed classification of these elements, the framework enhances the theoretical understanding of OGS management. While existing theories examine the adoption and diffusion of technologies from both a macro-level perspective (see Table 2 in Appendix) and a micro-level perspective (see Table 3 in Appendix), no comprehensive conceptual framework specifically designed for managing OGS has been established. This study addresses this gap by developing a structured theoretical framework (Fig. 1) that can be adapted to the specific dynamics of OGS (Fig. 2).

Beyond OGS, the framework provides a foundational framework for systematically analyzing business activities, such as technology adoption and diffusion, across

various application areas. For OGS specifically, it offers valuable theoretical insights for a more structured and comprehensive approach to managing this sector. Future research should build upon this framework as a theoretical foundation for studies in the OGS domain, helping to position research within the broader landscape of OGS providers and distinguish it from related fields.

Unlike traditional industry analysis models such as Porter's Five Forces [25], which focus on competitive forces—including supplier power, buyer power, and the threat of new entrants—this framework uniquely integrates both external and internal factors. While Porter's model primarily assesses market pressures, it does not fully capture the operational complexities specific to OGS, such as supply chain logistics, technology infrastructure, and customer service requirements. This research contributes significantly to the theoretical understanding of OGS by extending established theories and developing a comprehensive framework that serves as a foundation for future studies.

4.2 Practical implications

This study provides actionable insights for OGS providers navigating a volatile and evolving market. A central focus is on understanding and adapting to external *environmental circumstances*—such as global supply chain risks, regulatory shifts, and changing consumer behavior—enabling firms to make strategic, evidence-based decisions. The uncertainties surrounding OGS, including its viability across different markets, consumer segments, and product categories, underscore the need for structured decision-making. To address these challenges, the proposed framework helps practitioners systematically assess and respond to market dynamics. For instance, considering market-specific factors such as cultural nuances allows to tailor their offerings and engagement strategies, enhancing both market penetration and customer loyalty.

Beyond external considerations, the framework emphasizes the development of robust *internal factors*, such as streamlined logistics, advanced technological systems, and efficient customer service, all of which contribute to operational excellence. Aligning short-term operational improvements with long-term strategic goals enhances efficiency and responsiveness, strengthening competitive positioning.

The rise of OGS is also reshaping the competitive landscape, creating new market opportunities, particularly in densely populated regions. Traditionally dominated by national retailers, grocery markets have presented high entry barriers for international firms. However, OGS is lowering these barriers, as seen in Germany, where new entrants like Picnic and Getir have challenged the dominance of established retailers controlling 75% of the food retail market [149]. Yet, the recent withdrawal of Getir from Europe illustrates the volatility of this market [23], highlighting the need for adaptable and resilient business models.

In summary, this study equips OGS providers with a comprehensive framework for navigating industry complexities. By addressing both *environmental circumstances* and *internal factors*, the framework supports firms in anticipating

challenges, capitalizing on opportunities, and building sustainable competitive advantages in the evolving OGS sector.

5 Conclusion

Managing OGS in a landscape shaped by economic, societal, and technological uncertainty requires a strategic, theoretically grounded approach that integrates external *environmental circumstances* with *internal factors*. This study provides a comprehensive foundation for both academic research and industry practice by combining theoretical perspectives with practical applications. It enhances understanding of how OGS providers can navigate the challenges of adapting to volatile external conditions while effectively managing internal operations.

The study makes a significant contribution to the literature by introducing a structured conceptual framework that categorizes *environmental circumstances* into *global*, *market-specific*, and *consumer-specific factors*, alongside internal dimensions such as *strategic positioning* and *operational effectiveness*. This classification offers a systematic and adaptable approach to addressing the complexities of OGS management, distinguishing it from traditional industry models that often overlook the interplay between external constraints and internal strategic choices.

For academic research, the framework serves as a theoretical foundation that bridges multiple perspectives on technology adoption, market dynamics, and strategic management, providing a structured basis for future studies in OGS and related digital retail environments. For practitioners, it offers a decision-making tool that helps organizations identify key influences, anticipate market shifts, and align their internal strategies accordingly. By highlighting the importance of adaptability, the framework supports firms in refining their competitive positioning, optimizing operational efficiency, and responding proactively to industry changes.

While businesses cannot eliminate uncertainty, they can better prepare for and manage it through structured decision-making and proactive strategic adjustments. The conceptual framework developed in this study provides a roadmap for organizations seeking to anticipate, analyze, and navigate both present and emerging challenges in the OGS market. As the industry continues to evolve, this framework remains adaptable, offering a scalable and dynamic tool for both theoretical exploration and real-world application in an increasingly complex retail landscape.

6 Directions for future research

The conceptual framework presented in this study establishes a robust and novel foundation for further research in OGS. Scholars can leverage this framework to contextualize and expand future research, testing its applicability to new business models and technological advancements. A qualitative research approach, such as expert interviews, could provide valuable insights into the framework's real-world relevance and adaptability. Additionally, case studies applying the framework to

various market contexts would further bridge the gap between academic theory and practical application.

Another promising avenue for future research involves exploring the role of sustainability in OGS. As highlighted by Sarkar et al. [150], regenerative marketing presents a compelling approach to ensuring long-term corporate viability. This concept is particularly relevant to OGS, as online grocery shoppers often prioritize environmental concerns and demonstrate higher purchase rates for organic and fair-trade products [43]. However, empirical research on integrating sustainability into OGS remains limited, particularly regarding its impact on product assortment, packaging, distribution, and the energy consumption required for cold and frozen goods. Future studies should investigate how OGS providers can integrate sustainability principles while maintaining cost efficiency and service quality.

Considering the current state of OGS research and the key dimensions outlined in Fig. 2, we propose the following future research directions categorized according to *global*, *market-specific*, and *consumer-specific circumstances*, as well as *strategic positioning* and *operational effectiveness:*

Global circumstances

- How do global shocks (e.g., financial crises, pandemics) impact OGS supply chains and consumer demand?
- What role do climate change policies play in shaping sustainable practices within OGS?
- How do digitalization and technological advancements (e.g., AI, mobile commerce, metaverse) influence the future of OGS?

Market-specific circumstances

- How do economic fluctuations (e.g., inflation, unemployment, geopolitical instability) affect consumer adoption and profitability in OGS?
- In what ways do societal changes (e.g., workforce transformation, shifting values and norms) influence OGS consumer preferences?
- How do cultural characteristics (e.g., religious dietary habits, globalization vs. deglobalization trends) shape demand for OGS services?
- What impact do regulatory requirements (e.g., delivery laws, labor regulations, food safety standards) have on OGS business models?
- How does competition between established retailers and new OGS entrants influence market power and resource availability?

Consumer-specific circumstances

- How do consumer characteristics (e.g., income, age, lifestyle) affect OGS adoption and retention rates?

- What factors contribute to the purchase behavior shift toward OGS, and how does the attitude-behavior gap influence OGS habits?
- What role does customer segmentation play in the strategic positioning and market success of OGS?

Strategic positioning

- In what ways can variety-based positioning serve as a strategic differentiation tool for OGS providers in comparison to traditional grocery retailers?
- How does needs-based positioning contribute to the development of strategies that effectively address diverse consumer preferences and segment-specific demands?
- How can access-based positioning strategies enhance market segmentation and improve customer engagement for OGS providers?

Operational effectiveness

- What are the most effective strategies for logistics and supply chain management in OGS, considering lower labor costs and supplier relationships?
- How can technology and IT infrastructure (e.g., AI, digital product representation, personalized pricing) enhance OGS efficiency and profitability?
- What strategies improve user experience, customer service, and loyalty in OGS, e.g., ensuring timely delivery and sustainable retention?
- How can personalized pricing and promotions enhance both customer satisfaction and operational efficiency?

These research questions underscore critical areas for advancing both academic understanding and practical applications in the evolving field of OGS. Given the persistent volatility of *environmental circumstances* and the uncertainty surrounding the future trajectory of OGS, comprehensive and well-structured research remains essential. By incorporating both external *environmental circumstances* and *internal factors*, future research can generate valuable insights that facilitate the ongoing development and adaptation of OGS in an increasingly dynamic and uncertain market environment.

Appendix

See Tables 2 and 3.

Table 2 Macro-level theories relevant to OGS

Theory	Key focus	Key variables	Summary	References
Political, Economic, Social, Technological, Environmental, and Legal Framework (PESTEL)	Macro-environmental analysis of industries	Political, Economic, Social, Technological, Environmental, Legal Factors	Examines external macro-level factors that influence industry development and market conditions	Aguilar [24]
Porter's Five Forces	Competitive market dynamics	Threat of New Entrants, Bargaining Power of Suppliers, Bargaining Power of Buyers, Threat of Substitutes, Industry Rivalry	Analyzes competitive forces that determine industry profitability and market structure	Porter [25]
Institutional Theory	Firms' adoption to external regulatory and social pressures	Regulative, Normative, Cognitive Pressures	Explains how businesses adapt to regulatory, social, and cultural expectations	DiMaggio & Powell [26]
Diffusion of Disruptive Innovation	Impact of disruptive innovations on industries	Sustaining vs. Disruptive Innovations	Explains how new market entrants disrupt established industries	Christensen [27]
Ecosystem Theory	Interdependence of firms, suppliers, and partners	Platforms, Network Effects, Complementary Assets	Examines how businesses create value through interconnected ecosystems of partners	Adner [28]

Table 3 Micro-level theories relevant to OGS

Theory	Key focus	Key variables	Summary	References
Diffusion of Innovations (DOI)	Innovation adoption at the consumer level	Relative Advantage, Compatibility, Complexity, Trialability, Observability	Describes how innovations spread through different adopter categories and the factors influencing adoption speed	Rogers [29]
Theory of Reasoned Action (TRA)	Predicting behavioral intentions	Attitude Toward Behavior, Subjective Norm	Explains how an individual's behavior is determined by their intention, which is influenced by attitudes and social norms	Fishbein & Ajzen [30]
Expectation-Confirmation Theory (ECT)	Post-adoption consumer behavior	Expectation, Confirmation, Satisfaction, Repurchase Intention	Analyzes how consumer expectations and experience impact satisfaction and continued usage	Oliver [31]
Network Externalities Theory	Value of a product/service increases with the number of users	Direct and Indirect Network Effects	Describes how the value of a product or service increases as more people use it	Katz & Shapiro [32]
Technology Acceptance Model (TAM)	Individual technology adoption	Perceived Usefulness, Perceived Ease of Use	Explains why and how consumers adopt new technologies based on their perception of usefulness and ease of use	Davis [33, 34]
Theory of Planned Behavior (TPB)	Consumer intention and decision-making	Attitude, Subjective Norm, Perceived Behavioral Control	Explains how attitudes, social pressure, and perceived control influence behavioral intentions	Ajzen [35]
Motivation-Opportunity-Ability Model (MOA)	Drivers of consumer behavior	Motivation, Opportunity, Ability	Explains how internal motivation, external opportunities, and personal abilities drive behavior	MacInnis et al. [37]
Resource-Based View (RBV)	Competitive advantage based on firm resources	Valuable, Rare, Inimitable, Non-Substitutable (VRIN)	Emphasizes how firms gain competitive advantages through unique, non-replicable resources	Barney [36]

Table 3 (continued)

Theory	Key focus	Key variables	Summary	References
Technology Acceptance Model 2 (TAM 2)	Extension of TAM with external influences	Perceived Usefulness, Perceived Ease of Use, Subjective Norms, Image, Job Relevance, Output Quality, Result Demonstrability	Expands TAM by incorporating social and cognitive influences on technology adoption	Venkatesh & Davis [38]
Unified Theory of Acceptance and Use of Technology (UTAUT)	Comprehensive model of technology adoption	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions	Integrates multiple acceptance models to provide a holistic understanding of technology adoption	Venkatesh et al. [39]
Habit Theory (HT)	Formation of automatic behavior	Repetition, Context Triggers, Ease of Use	Explains how repeated behavior in stable contexts leads to habit formation	Verplanken & Orbell [40]
Push–Pull-Mooring Model (PPM)	Switching behavior between alternatives	Push (Dissatisfaction with Offline Shopping), Pull (Attractiveness of Online Shopping), Mooring (Barriers to Switching)	Describes how dissatisfaction, benefits, and barriers influence switching decisions	Bansal et al. [41]
Technology Acceptance Model 3 (TAM 3)	Extension of TAM2 with emotional and control factors	Perceived Usefulness, Perceived Ease of Use, Subjective Norms, Perceived Behavioral Control, Computer Self-Efficacy, Perceived Enjoyment, Computer Anxiety	Further expands TAM by integrating emotional and control-related factors influencing technology adoption	Venkatesh & Bala [42]

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Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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