

ADOPTION OF SMART RETAIL TECHNOLOGIES IN EMERGING MARKETS: INSIGHTS FROM ROMANIA'S FMCG SECTOR

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Abstract: *This paper examines the adoption of smart retail technologies, with a particular focus on smart checkout systems, in the context of an emerging market, Romania's fast-moving consumer goods (FMCG) sector. Addressing the research questions "What are the key technologies underpinning smart checkout systems in contemporary retail environments?" and "What are the main challenges and limitations associated with their implementation?", the study aims to bridge existing gaps in the literature related to the organizational, operational, and contextual dimensions of these technologies. The research adopts an empirical, qualitative approach, combining documentary analysis with semi-structured interviews conducted among the largest FMCG retailer in Romania. This methodological triangulation enables both a strategic and operational perspective on technology adoption. The findings reveal that the implementation of smart checkout systems is strongly influenced by factors such as urban infrastructure, digital payment penetration, and store format, with retailers adopting a phased and data-driven deployment strategy. From a technological standpoint, the study confirms the integration of advanced solutions such as self-checkout kiosks, automation systems, and data-driven decision-making tools. In terms of challenges, the results highlight significant disparities in adoption across demographic groups, particularly regarding age and education, as well as operational constraints related to infrastructure dependency and customer readiness. Moreover, time efficiency emerges as a primary driver of consumer adoption, while system usability and digital literacy act as critical moderating factors. The study contributes to the limited body of empirical research on smart retail technologies in emerging markets and provides valuable insights for both academics and practitioners. For retailers, the findings offer guidance on aligning technological implementation with consumer characteristics and market conditions, while for researchers, they underscore the importance of context-sensitive analyses in understanding digital transformation in retail environments.*

Keywords: *Smart Check-out technologies; Romanian retail; emerging market; innovations in retail; fast-moving consumer goods sector*

JEL Classification: O31; O32; Q56

1. Introduction

In recent years, technology has become an integral part of consumers' everyday lives. The changes brought about by the COVID-19 pandemic have been particularly reflected in individuals' consumption behavior. Consequently, a significant increase in e-commerce activity has been observed, and companies that identified this trend and adapted to consumers' expectations and preferences have been able to strengthen their market position (National Institute of Statistics, 2025). At the same time, the return to "normality" has further transformed purchasing behavior, with consumers becoming increasingly independent and accustomed to managing their shopping activities autonomously, without substantial support from others.

The expansion of e-commerce trends was initially more visible in the fashion sector; however, consumer independence has become more pronounced in the fast-moving consumer goods (FMCG) sector. In response, some retailers capitalized on these behavioral shifts and implemented changes to their business models in order to better meet customer needs. These changes have been primarily driven by technological advancements.

Smart checkout systems, encompassing self-checkout kiosks and fully autonomous cashier-less stores, represent a critical component of this transformation. These systems aim to reduce friction in the purchasing process, enhance operational efficiency, and improve the customer experience through automation and data-driven decision-making (Agrawal & Mittal, 2024; Shamsul et al., 2024).

The evolution of checkout technologies reflects a broader shift toward digital integration in physical retail environments. Early systems relied primarily on barcode scanning and manual interaction, whereas contemporary solutions increasingly incorporate computer vision, deep learning, the Internet of Things (IoT), and other advanced technologies to enable seamless and contactless transactions (Falcão et al., 2021; Lee et al., 2022).

Starting from the premise that employees can be regarded as "internal customers" of an organization, the first retailer to implement such technologies in daily operations was the FMCG company with the largest number of employees. The objective was twofold: to simplify employees' tasks and to better address the needs and preferences of consumers.

Building on these considerations, a significant research gap emerges in relation to the limited focus on the organizational and operational implications of smart checkout systems. Specifically, there is a scarcity of research examining how retailers adopt, implement, and evaluate these systems in practice. Furthermore, there is insufficient empirical evidence within specific market contexts, as only a limited number of studies investigate smart checkout adoption at the national or regional level, particularly in emerging markets.

Similarly, there is a lack of information regarding consumer satisfaction with these innovations, particularly in the context of emerging markets such as Romania. At the same time, consumers have limited awareness of the strategic directions that retailers intend to pursue.

In response to these gaps, the present study aims to analyze the specific case of an emerging market, Romania, by focusing on the retailer with the largest number of employees. The novelty of this research lies in its methodological approach,

which combines documentary analysis with qualitative research, as well as in its examination of consumer satisfaction through discussions with company representatives.

Within this context, the research questions formulated are as follows: *“What are the key technologies underpinning smart checkout systems in contemporary retail environments?”* and *“What are the main challenges and limitations associated with the implementation of smart checkout systems?”*

2. Literature review

Digital transformation has significantly reshaped the retail sector, accelerating the adoption of self-service and automation technologies, particularly in the aftermath of the COVID-19 pandemic. A growing body of literature highlights that smart checkout systems, ranging from self-checkout kiosks to fully autonomous cashier-less stores, represent a key innovation within this transformation, aiming to enhance operational efficiency, reduce transaction time, and improve customer experience (Mahariq et al., 2025; Jhanjhi et al., 2025).

These systems are part of a broader shift toward “smart retail,” where artificial intelligence (AI), Internet of Things (IoT), and data analytics are increasingly integrated into physical retail environments (Manoj et al., 2025).

From a technological perspective, recent studies emphasize that contemporary smart checkout systems rely on a combination of advanced tools, including computer vision, mobile self-scanning, and deep learning algorithms. These technologies enable frictionless and contactless transactions, reducing reliance on human intervention and supporting real-time inventory and behavioral analytics (Marannan et al., 2025; Lycia et al., 2025).

Furthermore, modular and scalable system architectures have been identified as critical for enabling retailers to adapt these technologies across diverse store formats and markets (Marannan et al., 2025). Such developments align with the increasing demand for seamless omnichannel experiences, where physical and digital retail converge (Asif, 2025).

A substantial stream of research focuses on consumer adoption of self-checkout technologies. The Technology Acceptance Model (TAM) (Davis, 1986) and its extensions are frequently employed to explain user behavior, highlighting perceived usefulness, ease of use, and trust as key determinants (Nagi & Singh, 2025). Empirical findings suggest that convenience, reduced waiting times, and perceived control over the shopping process positively influence adoption and satisfaction (Jhanjhi et al., 2025; Lau & Zulkipli, 2025). However, factors such as perceived risk, lack of technological familiarity, and security concerns can hinder adoption, particularly in emerging markets (Chauhan et al., 2025).

In addition, recent studies underline the importance of service quality and system reliability in shaping customer satisfaction. For instance, Singh et al. (2025) demonstrate that perceived service quality in self-checkout systems significantly influences customer behavior, especially during periods of heightened health concerns, such as pandemics. Similarly, Lau and Zulkipli (2025) identify a strong positive relationship between system efficiency and customer satisfaction, emphasizing the importance of intuitive interfaces and minimal error rates. Nevertheless, some research also points to the “dark side” of self-service technologies, including user frustration, system failures, and reduced human

interaction, which may negatively affect the overall shopping experience (Naeem, 2025).

Another important dimension addressed in the literature concerns the organizational and operational implications of implementing smart checkout systems. While these technologies offer clear benefits in terms of cost reduction and efficiency, their adoption requires significant investment, changes in workforce structure, and new capabilities in data management and cybersecurity (Mahariq et al., 2025; Špička & Dvořáková, 2025). Retailers must also balance automation with the need to maintain customer engagement and trust, particularly among less tech-savvy consumer segments (Špička & Dvořáková, 2026). Moreover, internal stakeholders, including employees, play a crucial role in the successful implementation of these systems, as their acceptance and adaptation influence operational performance.

Despite the growing interest in smart checkout technologies, the literature reveals several limitations. First, most empirical studies are concentrated in developed economies, such as the United States, Japan, or Western Europe, with relatively limited research conducted in emerging markets (Ghazali et al., 2025; Asif, 2025).

This creates a gap in understanding how contextual factors, such as digital literacy, infrastructure, and cultural attitudes, affect adoption and satisfaction. Second, there is a lack of in-depth analysis regarding how retailers implement and evaluate these systems in practice, particularly from an organizational perspective. Existing studies tend to focus predominantly on consumer behavior, overlooking strategic and operational considerations (Mahariq et al., 2025).

Furthermore, while several studies examine adoption intention, fewer provide robust empirical evidence on long-term customer satisfaction and loyalty regarding smart checkout systems, especially in specific national contexts. For example, research conducted in emerging markets such as South Africa and Southeast Asia indicates that trust, perceived security, and technological readiness are critical but underexplored variables (Chauhan et al., 2025; Musa et al., 2025). This suggests the need for context-specific investigations that integrate both consumer and organizational perspectives.

In light of these findings, the existing literature supports the relevance of analyzing smart checkout systems within emerging retail markets. However, significant gaps remain regarding their practical implementation, impact on internal stakeholders, and influence on customer satisfaction in specific national contexts such as Romania. Addressing these gaps requires a comprehensive methodological approach that combines qualitative insights with empirical data, contributing to a more nuanced understanding of smart retail transformation.

3. Methodology

This study adopts a mixed qualitative research design, combining documentary analysis with primary qualitative data collection, in order to provide a comprehensive understanding of the implementation and implications of smart checkout systems within the Romanian retail sector.

The research is structured around two complementary components: (1) documentary research and (2) qualitative inquiry. This dual approach enables both contextual understanding and in-depth exploration of stakeholder perspectives, aligning with established methodological frameworks that advocate triangulation to enhance validity and robustness in social science research (Creswell & Creswell, 2017; Flick, 2022).

Also, the methodological approach is explicitly structured to address the two research questions because the alignment between research questions and methods ensures analytical coherence and enhances the explanatory power of the study, consistent with best practices in qualitative research design (Creswell & Creswell, 2017; Salmona et al., 2019).

The first stage of the study consists of documentary research focused on the analysis of secondary data sources. This includes company reports, industry publications, and publicly available information related to the Romanian retail market. Particular attention is given to the leading FMCG retailer in Romania, identified as the organization with the largest number of employees and among the first to implement smart checkout systems at scale.

Documentary analysis is employed to examine the evolution of the retailer's business model, the technological infrastructure underpinning smart checkout adoption, and the strategic motivations driving digital transformation. This method facilitates the contextualization of the case study within broader retail trends and supports the identification of key technological and organizational developments (Bowen, 2009).

The second stage involves qualitative research based on semi-structured interviews conducted with in-store personnel. This approach is selected due to its suitability for capturing detailed insights into experiences, perceptions, and operational challenges associated with smart checkout systems (Brinkmann & Kvale, 2014).

A purposive sampling strategy is employed to select participants from "super" retail stores located in major urban areas in Romania. The sample comprises approximately 100 respondents, ensuring a diverse representation of employees directly interacting with or affected by smart checkout technologies. Special emphasis is placed on individuals belonging to Generation X and Baby Boomer cohorts, as these groups may exhibit distinct attitudes toward technological adoption compared to younger generations (Venkatesh et al., 2012).

The interview protocol is designed to explore key themes such as perceptions of smart checkout systems, perceived benefits and limitations, operational challenges, and observed customer reactions and satisfaction levels.

By integrating documentary research with qualitative insights from internal stakeholders, this study addresses existing gaps in the literature related to the organizational and operational dimensions of smart checkout implementation. Furthermore, the focus on a specific emerging market, Romania, provides context-sensitive evidence, contributing to a more nuanced understanding of retail digitalization.

4. Results and discussions

The findings of this study provide a comprehensive understanding of the implementation and adoption of smart checkout systems within the Romanian retail sector, while simultaneously addressing the two research questions related to underlying technologies and implementation challenges.

The results indicate that the deployment of self-checkout systems followed a targeted and data-driven strategy, primarily concentrated in major urban centers such as Timișoara, Cluj-Napoca, Bucharest, and Iași. These locations are characterized by higher levels of economic development and digital infrastructure, which facilitate the integration of advanced retail technologies.

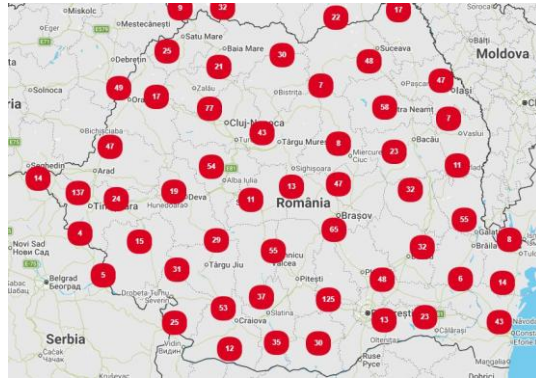


Figure 1: The territorial distribution of the retailer's stores
Source: (Profi, 2026)

A critical determinant in site selection was the prevalence of card-based payments, with a minimum threshold of 50% serving as a prerequisite for implementation. This finding highlights the interdependence between payment digitization and retail automation, supporting previous research which emphasizes that digital payment ecosystems are foundational for enabling frictionless retail technologies (Asif, 2025; Ghazali et al., 2025).

The large-scale rollout, approximately 1,200 self-checkout registers across 500 stores, demonstrates a significant organizational commitment to automation. The focus on medium-and large-sized “super” format stores suggests that retailers prioritize environments with high customer throughput, where efficiency gains are most impactful.

From a technological perspective (RQ1), these results confirm that smart checkout systems are not implemented uniformly but are instead aligned with store characteristics, transaction behaviors, and technological readiness. This reflects a broader trend in retail digitalization, where technological adoption is contingent upon contextual and infrastructural factors.

A key finding of this study is the dominant role of time efficiency in driving consumer adoption. Approximately 65% of respondents reported using self-checkout systems to avoid queues, while 11% indicated abandoning purchases due to long waiting times.

These results underscore the operational significance of checkout processes, positioning them as a critical determinant of customer satisfaction and retention. In line with the Technology Acceptance Model (TAM), perceived usefulness, particularly in terms of time savings, emerges as a primary driver of adoption (Venkatesh et al., 2012). Furthermore, the identification of abandoned purchases highlights the direct financial implications of inefficient checkout systems, reinforcing the strategic value of automation.

However, while self-checkout systems effectively address queue-related inefficiencies, they also introduce new challenges, including system usability issues and varying levels of customer readiness. This duality reflects the complexity of implementing retail technologies that must balance efficiency with accessibility.

The findings reveal significant heterogeneity in adoption patterns, particularly across generational and educational dimensions.

Younger consumers (Generation Z and Millennials) exhibit a higher degree of openness and adaptability, consistent with their greater exposure to digital technologies. In contrast, older cohorts (Generation X and Baby Boomers) demonstrate lower levels of engagement, often requiring additional support or expressing reluctance toward self-service systems.

Similarly, education level plays a crucial role in shaping adoption behavior. Respondents with higher education levels show the highest propensity to use self-checkout technologies, whereas only approximately 20% of individuals with elementary education reported using such systems.

These findings align with prior studies emphasizing the importance of digital literacy, cognitive familiarity, and technology readiness in influencing adoption (Nagi & Singh, 2025; Yeoh et al., 2025). From an implementation perspective (RQ2), these disparities represent a key challenge, as they necessitate inclusive system design, targeted user education, and hybrid service models that accommodate diverse customer segments.

The results highlight several operational challenges associated with the implementation of smart checkout systems due to customer heterogeneity, which requires tailored approaches to support different user groups. Also, the dependence on payment infrastructure is limiting implementation in areas with lower digital payment adoption and could appear a Risk of customer frustration, particularly among less technologically confident users.

At the same time, the findings confirm that when effectively implemented, smart checkout systems reduce congestion, enhance perceived control, and improve overall shopping efficiency.

This reinforces the notion that the success of such systems depends not only on technological sophistication but also on organizational alignment and user-centered design.

In conclusion, by combining insights from both research questions, the study demonstrates that the effectiveness of smart checkout systems is contingent upon the interaction between technology, context, and consumer characteristics. While advanced technologies enable automation, their impact is mediated by factors such as digital literacy, payment behavior, and demographic structure.

Thus, smart checkout systems should be understood not merely as technological innovations, but as socio-technical systems embedded within broader retail ecosystems.

5. Conclusions

This study set out to explore how smart checkout technologies are being adopted and implemented within the Romanian FMCG retail sector, offering insights into both technological developments and real-world operational challenges. The findings show that smart checkout systems are no longer experimental solutions, but rather an increasingly important component of modern retail strategies, particularly in urban areas where digital infrastructure and consumer readiness are more advanced.

A key conclusion of the research is that the successful implementation of these systems depends not only on the technologies themselves, but also on the context in which they are introduced. Factors such as payment behavior, store format, and customer demographics play a crucial role in shaping both adoption and effectiveness. While consumers are generally motivated by the convenience and

time-saving benefits of self-checkout systems, differences in age, education, and digital literacy create uneven adoption patterns. This highlights the importance of designing solutions that are accessible and intuitive for a broad range of users.

At the same time, the study shows that smart checkout systems bring both opportunities and challenges. On the one hand, they improve efficiency, reduce waiting times, and enhance customer autonomy. On the other hand, they may lead to frustration among less technologically confident users and require significant organizational adjustments, including employee training and infrastructure investments.

The implications of this research are relevant for multiple stakeholders. For retailers, the findings emphasize the need for context-aware implementation strategies, combining technological innovation with customer support and education. For researchers, the study contributes to the limited body of knowledge on smart retail technologies in emerging markets and highlights the importance of integrating both organizational and consumer perspectives in future research.

However, several limitations should be acknowledged. The study focuses on a single retailer, which may limit the generalizability of the findings. In addition, the qualitative nature of the research, while providing depth, does not allow for broad statistical generalization. Future research could expand the scope by including multiple retailers, employing quantitative methods, or conducting comparative studies across different emerging markets.

Building on the conclusions of this study and considering the evolving landscape of retail digitalization, several avenues for future research can be identified.

First, further investigation is needed into the potential implementation of fully autonomous (cashier-less) stores within emerging markets such as Romania. While current findings suggest a gradual transition toward automation, future studies could examine the feasibility of such systems over a medium-term horizon (3-5 years), with particular attention to the role of consumer acceptance, trust, and technological readiness in shaping adoption trajectories.

Second, there is a need for in-depth empirical research on the introduction of cashier-less retail environments in Romania, focusing on their impact on consumer behavior, employee roles, and overall shopping experience. Such studies could adopt longitudinal designs to assess changes over time, particularly in relation to customer satisfaction, loyalty, and perceived value.

Finally, interdisciplinary approaches that integrate perspectives from marketing, information systems, and organizational studies could provide a more comprehensive understanding of smart retail ecosystems, supporting the development of sustainable and inclusive innovation strategies in the retail sector.

References

1. Agrawal, S., & Mittal, D. (2024). Cashier-free checkout system: to improve in-store shopping experience. *International Journal of Retail & Distribution Management*, 52(5), 612-625. DOI:10.1108/IJRDM-09-2023-0539
2. Asif, M. (2025). *How integrating digital technologies into retail channels affect customer experience in emerging international markets*. Preluat de pe University of Eastern Finland: <https://erepo.uef.fi/server/api/core/bitstreams/a52e63f3-2b99-4cad-b07f-d8ef61cdb201/content>
3. Bowen, G. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27-40. DOI:10.3316/QRJ0902027

4. Brinkmann, S., & Kvale, S. (2014). *InterViews - Learning the Craft of Qualitative Research Interviewing*. SAGE Publishing.
5. Chauhan, M., Ligaraba, N., & Asher, U. (2025). Factors influencing the adoption intention of self-service checkout till points in South African grocery retail: the moderating role of perceived security measures. *The Retail and Marketing Review*, 21(2), 150-170. DOI:10.5281/zenodo.17347614
6. Creswell, J., & Creswell, J. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.
7. Davis, F. (1986). A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results. *Sloan School of Management, Massachusetts Institute of Technology*, 1-291.
8. Falcão, J., Ruiz, C., Bannis, A., Noh, H., & Zhang, P. (2021). ISACS: In-Store Autonomous Checkout System for Retail. *Proceedings of the ACM on interactive, Mobile, Wearable and Ubiquitous Technologies*, 5(3), 1-26. DOI:10.1145/3478086
9. Flick, U. (2022). *An Introduction to Qualitative Research* (ed. 7th). SAGE Publications.
10. Ghazali, F., Karim, R., Wahid, S., & Naseri, R. (2025). Smart Retail, Smarter Decisions: Conceptualizing the Antecedents of Consumer Intention to Use Intelligent Retail Systems. *International Journal of Art and Design*, 9(2), 125-135. DOI:10.24191/ijad.v9i2/SI-3.8834
11. INS. (2025, 12 04). *Impactul pandemiei COVID-19 asupra implementării Strategiei Naționale pentru Dezvoltarea Durabilă a României 2030*. <https://insse.ro/cms/files/POCA/Impact-COVID-SNDDR2030.pdf>
12. Jhanjhi, N. U., Mahariq, M. H., Arnaout, W., Muiz, M. Y., Yuan (Isaac), K. C., Cheng, B., & Sabeel, T. (2025). Enhancing Retail Efficiency: Optimizing Self-Checkout Systems for a Seamless Shopping Experience. *TechRxiv*, 1-14. DOI:10.36227/techrxiv.175234472.20931823/v1
13. Lau, Y., & Zulkipli, H. (2025). The Relationship Between Self-Checkout Quality and Customer Satisfaction at AEON Malaysia. *Research in Management of Technology and Business*, 6(1), 138-150.
14. Lee, R.-Y., Chai, T.-Y., Chua, S.-Y., Lai, Y.-L., Wai, S., & Haw, S.-C. (2022). Cashierless Checkout Vision System for Smart Retail using Deep Learning. *Journal of System and Management Sciences*, 12(4), 232-250. DOI:10.33168/JSMS.2022.0415
15. Lycia, J., Dewiyanti, K., Andriana, M., & Wijaya, M. (2025). Understanding the Drivers of Intention to Use Tag Reader-Based Self-Checkout Systems (SCOs) for Digital Optimization in Retail Industry. *2025 14th International Conference on System Modeling & Advancement in Research Trends (SMART)* (pg. 343-349). Moradabad, Uttar Pradesh, India: IEEE. DOI:10.1109/SMART66937.2025.11389478.
16. Mahariq, M. H., Arnaout, W., Muiz, M. Y., Yuan (Isaac), K. C., Buo (Caleb), K. C., Sabeel, T., & Amin, N. A. (2025). Enhancing Retail Efficiency: Development and Evaluation of a Self-Checkout System. *Preprints*, 1-10. DOI:10.20944/preprints202504.0761.v1.
17. Manoj, G., Ramya, K., Lavanya, B., Shaju, G., Selvi, R., & Gnanasekaran, C. (2025). *ATMs to AI: The Evolution of Self-Service Technology in Retail and Beyond*. In B. Verma, M. Schulze, T. Olubiyi, & K. Upreti, Practical Applications of Self-Service Technologies Across Industries (pg. 227-254). IGI Global Scientific Publishing.
18. Marannan, N., Kurbonov, M., Jurayev, K., & Ugli, Y. (2025). Scalable POS and Self-Checkout Solutions for Global Retail. *2025 International Conference on*

Sustainability, Innovation & Technology (ICSIT) (pg. 1-5). Nagpur, India: IEEE. DOI:10.1109/ICSIT65336.2025.11293902.

19. Musa, A., Inzen, L., Lazuardi, M., & Sanny, L. (2025). Factors that Influence the Adoption of RFID as an Independent Self-Checkout System. *2025 4th International Conference on Digital Transformation and Applications (ICDXA)* (pg. 1-6). Semarang, Indonesia: IEEE. DOI:10.1109/ICDXA69105.2025.11329579

20. Naeem, M. (2025). Emerging trends in global E-retailing: exploring the dark side of scan and go in-store technologies in consumer shopping journeys. *International Marketing Review*, 42(2-3), 249-282. DOI:10.1108/IMR-06-2023-0110

21. Nagi, M., & Singh, S. (2025). *The Future of Retail: A Technology Acceptance Model Analysis of Self-checkout*. În A. Hamdan, Integrating Artificial Intelligence, Security for Environmental and Business Sustainability (pg. 31-40). Springer.

22. Profi. (2026). *Magazinele Profi*. Preluat de pe Profi.ro: <https://www.profi.ro/magazine/>

23. Salmona, M., Lieber, E., & Kaczynski, D. (2019). *Qualitative and Mixed Methods Data Analysis Using Dedoose - A Practical Approach for Research Across the Social Sciences*. SAGE Publishing.

24. Shamsul, S., Ali, M., Abdul-Rashid, A., & Ghaleb, A. (2024). Development of a Novel Noise Reduction Algorithm for Smart Checkout RFID System in Retail Stores. *Computers, Materials and Continua*, 80(1), 1277-1304. DOI:10.32604/cmc.2024.049257

25. Singh, G., Slack, N., & Sharma, S. (2025). Influence of supermarket self-checkout service quality, customer vulnerability and risk perception during emerging pandemics on Australian customer behaviour. *The TQM Journal*. DOI:10.1108/TQM-06-2024-0213

26. Špička, J., & Dvořáková, M. (2025). Differential effects of AI self-checkout implementation on VIP versus regular B2B retail customers. *The International Review of Retail, Distribution and Consumer Research*, 1-23. DOI:10.1080/09593969.2025.2601999

27. Špička, J., & Dvořáková, M. (2026). The Impact of Self-Checkout Technology on Shopping Behavior in B2B Retail: Evidence From Point-Of-Sale Transaction Data. *Journal of Consumer Behaviour*, 1-30. DOI:10.1002/cb.70121

28. Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36(1), 157-178. DOI:10.2307/41410412