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PROSPECTS AND TRENDS IN THE MANAGEMENT OF SMALL AND MEDIUM-SIZED ENTERPRISES IN LOGISTICS

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Purpose: This paper examines global logistics trends and evaluates their adoption among Polish SMEs. The theoretical part reviews literature on contemporary SME challenges, while the empirical part is based on desk research and four case studies.
Design/methodology/approach: A qualitative approach was applied, combining analysis of international and national reports with case studies.
Findings: The study confirms the growing impact of digitalization, automation, AI, e-commerce, paperless logistics, and ecological transformation on SMEs in Poland. Digital tools, automation, and e-commerce are adopted most rapidly, while AI, IoT, and sustainable fuels face financial and skills-related barriers. Case studies illustrate that innovations enhance efficiency, service quality, and competitiveness.
Research limitations/implications: Due to reliance on a limited set of reports and case studies, the research is exploratory in nature.
Practical implications: Polish SMEs can adopt advanced logistics solutions and trends, but the pace of transformation depends on resources, digital competences, and managerial strategies.
Originality/value: By integrating global trends with local practices, this paper contributes to a deeper understanding of logistics transformation in SMEs.
Keywords: logistics; SMEs; digitalization; automation; AI; e-commerce; sustainability; case study.
Category of the paper: Research paper.

1. Introduction

Small and medium-sized enterprises (SMEs) form the backbone of the Polish economy. According to the *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce* (PARP), enterprises generate 74.1% of national GDP, with SMEs contributing 46.6% and

microenterprises nearly 28%. SMEs employ 6.9 million people, including over 4.3 million in microenterprises (Zakrzewski et al., 2025). Their scale underscores their central role in value creation and employment, as well as their importance for studies on competitiveness and economic resilience.

Today, SMEs operate in a turbulent environment shaped by globalization, ecological transition, inflationary pressures, and the rapid technological progress of Industry 4.0. In such conditions, firms increasingly search for new sources of competitive advantage (Kożak-Siara, Olak, 2022; Zakrzewska-Bielawska, Piotrowska, 2022). Logistics is widely recognized as one of these sources – not merely an operational function, but a strategic domain of value creation and customer engagement (Christopher, 1993; Matwiejczuk, 2013, 2021; Sandberg, Abrahamsson, 2011).

Globally, logistics is shaped by a dynamic set of emerging concepts and trends (Kovács, Kot, 2016; Malagón-Suárez, Orjuela-Castro, 2023). In this paper, logistics trends are defined as specific technological, organizational, and environmental developments that translate global megatrends such as digitalization, sustainability, and globalization into supply chain practice (Pęciak, 2016). Their diffusion into Polish SMEs, however, is often constrained by financial, organizational, and competence-related barriers. This study explores the extent to which global logistics trends are being adopted in Poland and how they influence SME development opportunities.

The theoretical section outlines the role of SMEs in the economy and highlights logistics as a source of competitive advantage. The empirical section applies desk research and case studies of Polish SMEs to assess the degree of adoption of modern logistics solutions.

2. SMEs: Challenges, opportunities, and threats - A literature review

As highlighted in the literature, SMEs constitute the core of national economies and serve as a vital source of innovation and flexibility in adapting to market change. In most countries, they generate a substantial share of GDP and play a stabilizing role during crises by mitigating the effects of recession and maintaining business continuity (Mardikaningsih et al., 2022; Senin et al., 2024; Nesterowicz, 2020; Odorzyńska, 2000; Reswita et al., 2021). In the Polish context, SMEs account for nearly half of gross value added and employ the majority of the workforce in the enterprise sector (Drożdżyński, 2021). Their centrality makes them an important subject of research, increasingly examined across diverse streams of management literature.

Recent studies emphasize that SMEs, like larger corporations, operate in a dynamic and complex environment shaped by globalization, ecological transition, inflationary pressures, and rapid technological change under the Industry 4.0 paradigm. These megatrends – together with rising consumer expectations and sustainability imperatives – create both opportunities and risks (Capurro et al., 2024; Gajdzik et al., 2021). Opportunities include digitalization and technological transformation, which improve operational efficiency and expand market reach, while barriers involve limited digital skills, financial constraints, and cybersecurity risks (Iyelolu et al., 2024; Rupeika-Apoga et al., 2022). Digital transformation therefore requires not only investment in infrastructure but also the upskilling of employees and managers to integrate both hard and soft competences (Zamani, 2022).

Another theme gaining prominence for SMEs is ESG, encompassing environmental, social, and governance issues (Cahyono et al., 2024; Jin, 2025; Mućko et al., 2021). Scholars note the close link between ESG requirements and digitalization, as digital tools enable more effective monitoring and reporting of sustainability indicators (Chen, Wang, 2024).

The literature identifies several key trends shaping the SME environment. These include digitalization and process automation, particularly in logistics operations, which reduce costs and enhance efficiency (Rupeika-Apoga et al., 2022); the green transition, driven by environmental regulations (Kadłubek et al., 2022); and intersectoral collaboration, which facilitates the exchange of knowledge and resources (Pańka, 2022). Innovation – whether product, process, organizational, or marketing – remains a cornerstone of SME competitiveness (Kott, 2020). Studies during the pandemic further demonstrated that innovation was critical to organizational resilience, enabling firms to adapt business models swiftly to new conditions (Adam, Alarifi, 2021).

Overall, the literature consistently highlights the growing importance of digital and managerial competences as prerequisites for innovation and change management. The SME sector thus emerges as a highly diverse and dynamic research domain, where local and global challenges intersect, and adaptability and innovativeness are decisive for long-term development.

One domain where global trends exert particular influence on SMEs is logistics. As Kovács and Kot (2016) argue, globalization, shorter product life cycles, and rising customer expectations are transforming logistics processes. New supply chain models such as Lean, Agile, and Hybrid Supply Chains enable more flexible responses to environmental shifts. This flexibility is reinforced by Logistics 4.0 – the adaptation of Industry 4.0 principles to supply chain management – through the integration of technologies that shorten reaction times and enhance responsiveness (Malagón-Suárez, Orjuela-Castro, 2023). For SMEs, these developments offer both opportunities to boost efficiency and competitiveness, and risks of marginalization if adaptation does not occur.

3. Research method

As noted in the introduction, the aim of this study is to examine how and to what extent Polish enterprises are adapting global logistics trends and how these processes influence their development. The research employs a mixed-method approach, combining the analysis of secondary data sources (desk research) (Topolski et al., 2023) with a qualitative analysis in the form of case studies of selected Polish firms.

In the first stage, a desk research analysis was conducted, focusing on industry and institutional reports: *DHL Logistics Trend Radar 7.0* (DHL, 2025), *OECD Financing SMEs and Entrepreneurs 2024* (OECD, 2024), *GS1 Poland 2024* (GS1, 2025), *Capgemini Integrated Annual Report 2024* (Capgemini, 2025), and the *Report on the State of the SME Sector in Poland 2025* prepared by PARP (Zakrzewski et al., 2025). This analysis enabled the identification of key trends shaping contemporary logistics at the global level (DHL, OECD, GS1, and Capgemini reports) and the national level (PARP report), as well as the classification of the main categories and types of trends.

In the second stage, a case study analysis was undertaken to illustrate how global trends are being implemented in the practice of Polish SMEs. Four companies representing different industries were selected: BWS Expo (exhibition services), Frisco.pl (online retail, e-grocery), Martex Logistics (distribution of spare parts), and Goliard (food production). Data for the case studies were drawn from industry reports, descriptions of technological implementations published by solution providers, and press and trade publications.

The triangulation of sources – international reports, national reports, and case studies – provided a more comprehensive picture of the phenomenon under investigation and allowed for a comparison of identified trends with actual implementation practices.

4. Emerging Logistics Trends – Evidence from Desk Research

4.1. Global Logistics Trends

The *DHL Logistics Trend Radar*, considered the most influential foresight report in the logistics sector, identifies in its latest edition 7.0 (2024/2025) forty logistics trends grouped into four areas: social and business, technological, environmental, and regulatory (DHL, 2024). The report highlights both entirely new trends and those redefined from earlier editions (DHL, 2025). New entries include *E-commerce Evolution* (multichannel retail, social commerce, parcel lockers, PUDO, and multi-carrier services), *AI Ethics* (responsible AI deployment with emphasis on transparency and data protection), *Green Urban Transformation* (zero-emission zones, micro-hubs, fleet electrification), *Workforce Focus*

(upskilling, reskilling, adapting jobs to automation), and *Audio AI* (voice-based technologies in logistics and warehousing) (DHL, 2024).

Redefined trends include *Generative AI*, which replaces *AI & Analytics* by extending beyond predictive models to scenario generation and customer service content; *Computer Vision*, applied in 2D code scanning, product recognition, and real-time quality control, replacing the broader *IoT* and *Automation* categories; and *Advanced Analytics*, integrating big data, prediction, and decision intelligence to support operations, superseding the earlier *Big Data* focus. Other updated directions include *Sustainable Fuels* (biofuels, hydrogen, synthetics) replacing *Alternative Drives*, and *Renewable Energy Infrastructure* (PV farms, storage systems, charging networks) replacing the more generic *Green/Alternative Energy Sources* (DHL, 2024).

The *GS1 Poland Report 2024* stresses the growing role of 2D codes (QR, DataMatrix) enabling product lifecycle traceability and the *Digital Product Passport* (mandatory from 2027 for batteries, later textiles and steel). It also highlights reusable packaging and deposit systems (DRS), paperless logistics through standardized digital documentation, and enhanced product safety in pharmaceuticals and food, where GS1 tools support expiry control and recalls. ESG reporting remains a key challenge (GS1, 2025).

The OECD Financing SMEs and Entrepreneurs 2024 report points to the green transition as a major direction, requiring investment in low-emission transport, renewable energy, and circular economy models. Firms are urged to electrify fleets, expand charging infrastructure, and adopt sustainable fuels while also leveraging fintech solutions to finance digitalization and automation. Alternative financing models such as factoring and leasing are emphasized as tools for fleet modernization. The report stresses the need to strengthen resilience to geopolitical, energy, and trade crises through financial diversification, while also underlining the role of ERP, IoT, and AI systems in boosting efficiency and meeting ESG requirements (OECD, 2024).

Finally, *the Capgemini Integrated Annual Report 2024* notes that global supply chains are entering a new phase marked by agility, sustainability, and AI adoption. AI applications include predictive analytics, real-time shipment monitoring, resource optimization, and transparency enhancement. Robotics, especially AI-supported cobots, are highlighted as drivers of flexible automation and safety. Cybersecurity is identified as another critical area, where AI supports threat prediction and infrastructure protection. In addition, climate tech – Including renewable energy, e-mobility, energy storage, and carbon-reduction solutions – emerges as a foundation of sustainable logistics (Capgemini, 2025). A synthesis of the main directions emerging from the analyzed reports is presented in Table 1.

Tabele 1.
Contemporary Trends in Logistics: A Comparative Perspective

Category	Trend	Relevance for SMEs
AI and Digitalization	Generative AI	Decision automation, cost reduction, new planning opportunities.
	Advanced Analytics	Support for operational decision-making, better data utilization.
	AI & Agile Supply Chains	Increased flexibility and resilience of supply chains.
	AI in Cybersecurity	Protection of systems and data.
	Digital Financial Services	Access to innovative financing instruments for logistics.
Sustainable Logistics	Sustainable Fuels	Emission reduction, but high fleet transition costs.
	Renewable Energy Infrastructure	Support for RES in logistics, long-term energy cost reduction.
	Green Urban Transformation	Adaptation to zero-emission zones, eco-friendly image.
	Climate Tech	Implementation of low-emission technologies, potential for funding.
	ESG and Reporting	Mandatory reporting, challenging for SMEs but crucial for cooperation with large firms.
Transparency and Data	2D Codes	Digital identification, transparency for customers.
	Digital Product Passport	EU requirement, new opportunities and obligations for firms.
	Computer Vision	Product recognition, quality control.
Automation and Robotics	Robotics and Cobots	Warehouse automation, improved efficiency.
	Audio AI	Voice assistants supporting employees.
Finance and Business Models	Alternative Financing	Factoring, leasing as opportunities for logistics growth.
	Deposit Return Systems (DRS)	Circular economy, new recycling models.
	Reusable Packaging	Waste reduction, long-term savings.
Competences and Workforce	Workforce Focus	Need for training and adapting human resources to automation.

Source: author's own elaboration based on desk research.

The comparison indicates that contemporary logistics trends encompass technological and digital domains as well as environmental, organizational, and financial aspects. For SMEs, this implies the need to simultaneously comply with sustainability requirements, implement digital innovations, and enhance workforce competences. While this poses a significant challenge, it also creates opportunities to strengthen competitiveness.

4.2. SME Logistics in Poland: Trends and Prospects

Global logistics trends are increasingly permeating the practices of Polish SMEs, as confirmed by the latest PARP report (2025). Although logistics is not the main focus of the report, the analysis allows the identification of several trends directly relevant to this domain. A central direction is the digitalization of processes, including the implementation of ERP systems, electronic document circulation, e-commerce solutions, and supply chain integration. Digitalization enhances operational efficiency and enables better alignment of services with customer needs. The report also highlights the importance of artificial intelligence and the Internet of Things, though their adoption in Poland remains limited – only 5.9% of SMEs use AI compared to the EU average of 13.5%, and 18.7% use IoT against the EU

average of 28.7%. This reflects both a technological gap and a significant growth potential in shipment monitoring, demand forecasting, and transport route optimization.

Another noticeable trend is the growing role of paperless logistics and remote work. In 2024, nearly 90% of firms provided employees with access to ICT resources, and an increasing number adopted electronic document workflows, improving information flows and reducing operational costs. Cybersecurity is likewise a critical area: 94.1% of SMEs apply ICT safeguards and over half conduct educational programs, which is particularly important for protecting data and logistics systems.

Eco-innovation and the circular economy also represent key directions. Poland still belongs to the group of "catching-up countries" (EU Eco-Innovation Index: 69.7 points compared to the EU average of 127.5), yet the adoption of circular practices – recycling, reusable packaging, and waste reduction – is gaining importance in logistics. Financial barriers remain the main constraint: rising capital costs and stricter credit requirements limit investments in renewable energy, electromobility, and process automation.

In sum, the PARP report indicates that the future of logistics in Polish SMEs will be shaped by digitalization, AI and IoT adoption, paperless logistics, enhanced cybersecurity, and eco-innovation. At the same time, limited access to finance slows the pace of transformation, leading to gradual and selective implementation of innovations.

To capture the relationship between global logistics trends and the situation of SMEs in Poland, Table 2 presents a comparative overview of the most important trends, their characteristics, and their national perspective.

Tabele 2.
Comparison of Global and Polish Logistics Trends

Global Trend	Description of the Global Trend	Perspective in Poland (PARP, 2025)
Generative AI	Decision automation, demand forecasting, route planning, customer service.	Low adoption of AI – only 5.9% of SMEs in Poland use AI compared to the EU average of 13.5%.
Advanced Analytics	Decision intelligence and real-time prediction.	ERP systems and process digitalization (e.g., document workflows) increasingly introduced.
E-commerce Evolution	Omnichannel retail models, integration of social commerce, parcel lockers.	Dynamic e-commerce growth, particularly in FMCG and urban logistics.
Green Urban Transformation	Zero-emission zones, micro-hubs, fleet electrification.	Eco-innovation and CE are developing, but Poland remains below the EU average in the eco-innovation index.
Sustainable Fuels	Development of biofuels, hydrogen, and synthetic fuels.	Limited adoption due to investment costs and low infrastructure availability.
Renewable Energy Infrastructure	PV farms, charging stations, energy storage.	Growing interest in RES, but financial constraints slow investment pace.
Paperless Logistics	Digitalization of documents and fully digitized processes.	Wider implementation of e-documents; 90% of firms provide remote access to resources.
Computer Vision	Automated product recognition, 2D code scanning, quality control.	GS1 technologies expanding – 2D codes and Digital Product Passport (DPP).
Cybersecurity	Securing data and systems in digital logistics.	94.1% of SMEs apply ICT safeguards, 57% conduct educational programs.
Climate Tech/ESG	Emission-reducing technologies and ESG reporting.	Low awareness and readiness among SMEs; need for education and reporting support.

Source: author's own elaboration based on desk research.

The comparison shows that although many global trends are reflected in Polish SMEs, their implementation varies in pace and scale. The most evident challenges relate to investment financing and the low adoption of digital and environmentally sustainable technologies.

5. Global Logistics Trends in Polish SMEs: case studies

Case studies of selected Polish enterprises help to illustrate how global logistics trends are reflected in the practice of domestic SMEs. These examples demonstrate that even medium-sized firms operating in diverse industries can successfully implement advanced technological solutions that not only enhance operational efficiency but also strengthen competitive advantage.

The first example is **BWS Expo**, an exhibition industry firm that implemented a Warehouse Management System (WMS) together with Zebra Technologies hardware. The aim was to automate warehouse operations and improve material flow management. The results proved significant – logistics service time was reduced by around 35% and errors decreased by 85%. The company gained greater process transparency and higher service quality through faster order fulfillment (Piskorek, 2025). This case aligns with global trends in automation and robotics, advanced analytics, computer vision, and digital documentation, showing that medium-sized firms can effectively adopt solutions once associated primarily with large corporations.

The second case concerns **Frisco.pl**, one of Poland's largest online supermarkets in the e-grocery segment. In response to growing demand for online shopping, the company invested in logistics automation and AI-based solutions. A particularly innovative project is *Friscoach* – a generative AI shopping assistant that recommends meals based on customer preferences and budget, automatically generating shopping lists. These implementations have enabled the company to maintain order completeness above 97% and on-time delivery at 93.5%, while improving service personalization (Frisco, 2024; Sołowiej, 2025). The Frisco.pl case illustrates global trends such as e-commerce evolution, generative AI, and advanced analytics, highlighting how Polish SMEs in e-commerce can leverage digital solutions to enhance both efficiency and customer experience.

The third case involves **Martex Logistics**, a spare parts distributor. As part of its *Smart Warehouse 2025* program, the company implemented the AutoStore system, enabling fully automated storage and retrieval of goods. Based on a modular grid of racks operated by mobile robots, AutoStore increased operational efficiency fivefold, accelerated order fulfillment, and improved warehouse ergonomics. The investment resulted in faster, more reliable operations with measurable benefits (Element Logic Poland, 2025). This case reflects global trends in automation and robotics, agile supply chains, and green urban logistics transformation,

showing that medium-sized enterprises can adopt enterprise-class solutions and achieve rapid returns on investment.

The final example is **Goliard**, a Polish pasta producer that introduced *Comarch ERP XL* with the *Comarch WMS* module and Business Intelligence tools. The aim was to integrate sales, warehouse, and production processes and transition fully to digital documentation. The system enabled automated process linking, optimization of shipment preparation (time reduced by approx. 25%), and improved inventory control. By eliminating paper-based workflows, the company achieved greater process consistency and management transparency (Comarch S.A., 2019). This case exemplifies global trends in advanced analytics, paperless logistics, and adaptive supply chains, illustrating that digital transformation offers SMEs in manufacturing a tangible pathway to efficiency and competitiveness.

6. Discussion

The analysis of four case studies (BWS Expo, Frisco.pl, Martex Logistics, and Goliard) demonstrates that Polish SMEs are implementing a wide range of logistics solutions aligned with the global trends identified in the desk research. All examples confirm that technological innovations – ranging from WMS systems and automation to robotics and artificial intelligence – are becoming increasingly accessible, enabling firms to improve efficiency, reduce errors, and ultimately enhance competitiveness. Although such implementations often require substantial investment, the cases show that returns can be both tangible and rapid, with additional benefits including improved customer service quality, stronger process control, and compliance with legal and environmental requirements. This suggests that Polish SMEs not only adopt global solutions but also adapt and further develop them to fit local market conditions. A comparative overview of the implementations, their outcomes, links to global trends, and implications for Polish SMEs is presented in Table 3.

The synthesis of global trend analyses (DHL, GS1, OECD, Capgemini) with the conditions of Polish SMEs (PARP, 2025) and case study evidence (BWS Expo, Frisco.pl, Martex Logistics, Goliard) points to a clear convergence of development directions, while also revealing a persistent "implementation gap." Polish firms increasingly follow global trajectories: digitalization and automation of operations, the spread of AI and advanced analytics, greater transparency in supply chains (2D codes, DPP), paperless logistics, and the integration of environmental objectives into operational practices.

Tabele 3.
Logistics Implementations in SMEs: Links to Global Trends and Implications

Company	Implementation	Outcomes	Links to Global Trends	Implications for SMEs
BWS Expo	WMS system + Zebra Technologies devices	Process time -35%, errors -85%, improved inventory control	Computer Vision, Advanced Analytics (DHL); Automation (Capgemini); Paperless Logistics (GS1)	Even medium-sized firms can successfully implement WMS-class systems
Frisco.pl	Automation + AI (Friscoach – generative AI)	Order completeness >97%, on-time delivery ~93.5%, personalized shopping	E-commerce Evolution, Generative AI (DHL); Advanced Analytics (Capgemini, OECD)	AI enhances efficiency and customer loyalty in e-commerce
Martex Logistics	AutoStore system (intralogistics robotics)	5x efficiency, faster order processing, improved ergonomics	Automation and Robotics (Capgemini); AI & Agile Supply Chains; Green Urban Transformation (DHL)	Medium-sized firms can invest in enterprise-class robotics
Goliard	Comarch ERP XL + WMS + BI	Shipment preparation time -25%, greater process consistency	Advanced Analytics (DHL); Paperless Logistics (GS1); AI & Agile Supply Chain (Capgemini)	Digitization of production processes increases control and competitiveness

Source: own elaboration based on case study results.

The case studies show that even medium-sized enterprises are adopting solutions once typical of large corporations: BWS Expo and Goliard integrate WMS and paperless workflows, Frisco.pl combines automation with generative AI in customer service and demand planning, and Martex Logistics improves productivity through AutoStore robotics and redesigned intralogistics processes. These practices correspond closely with the redefined DHL trends (2024/2025), shifting from broad categories such as Big Data/IoT to high-value applications including Generative AI, Computer Vision, Advanced Analytics, Sustainable Fuels, and renewable energy infrastructure.

At the same time, barriers slow the pace of transformation. PARP (2025) highlights the low share of SMEs using AI and limited adoption of IoT, reflecting skills shortages and weak data quality. Rising capital costs and collateral requirements further constrain investments in renewable energy, electromobility, and automation (OECD, 2024). As a result, implementations are often fragmented, while sustainable competitive advantage requires technology integration with processes and data management across the decision cycle.

Regulatory and environmental pressures are also intensifying. ESG requirements, digital product passports, and transparency systems are becoming prerequisites for participation in supply chains (GS1, 2025; OECD, 2024), while in Poland there remains a knowledge and reporting gap among SMEs. Simultaneously, the focus is shifting from generic “green energy” concepts to practical installations such as PV systems, energy storage, and charging infrastructure, aligning with DHL’s redefined trends and delivering tangible operational cost savings.

From a managerial perspective, three conclusions emerge. First, transformation depends on a structured data model (GS1 standards, ERP/WMS/TMS integration), without which AI and analytics cannot deliver lasting value. Second, the greatest benefits stem from process design rather than isolated technology adoption – as shown by Martex Logistics or the ERP/WMS integrations at BWS Expo and Goliard. Third, investment in skills (upskilling/reskilling) and change management is essential for moving from pilots to scaled implementation. Given financial constraints, flexible instruments (leasing, factoring, "as-a-service" models) play a critical role, while public policy support is needed to foster data integration, green infrastructure, and simplified ESG reporting for SMEs.

However, achieving these managerial priorities is far from straightforward, as SMEs must also contend with a wider range of barriers that extend beyond financial limitations and skills gaps. Beyond the financial and skills-related constraints highlighted earlier, SMEs face a broader set of challenges that significantly influence the adoption of technologies such as AI and IoT. Cultural barriers – including organizational inertia, employee resistance to automation, and a lack of trust in algorithmic decision-making – often slow down digital transformation. Organizational factors such as insufficient leadership commitment, fragmented decision-making processes, and inadequate change management structures further exacerbate these issues. Regulatory complexity, including data protection laws, cybersecurity requirements, and evolving ESG standards, also creates uncertainty that discourages investment. Furthermore, the relative importance of individual global logistics trends varies for Polish SMEs: digitalization, automation, and e-commerce represent immediate priorities due to their lower entry barriers and quick returns on investment, whereas advanced analytics and AI, despite their long-term strategic potential, require greater resources and capabilities. Sustainable fuels and IoT, while still emerging, are expected to grow in significance as regulatory pressure intensifies and supply chains become more data-driven. This prioritization provides a more nuanced understanding of transformation pathways and highlights the need for tailored support mechanisms.

7. Conclusions

The analysis indicates that logistics is becoming one of the key areas of transformation for small and medium-sized enterprises in Poland. Global trends such as artificial intelligence, advanced analytics, automation and robotics, digital transparency, and the green transition define the framework for modern supply chain development. Polish SMEs are gradually adopting these solutions, as confirmed by both institutional reports and practical implementation cases.

The case studies demonstrate that technological innovation is not reserved for large corporations – medium-sized enterprises such as BWS Expo, Frisco.pl, Martex Logistics, and Goliard are also able to effectively adapt solutions in automation, generative AI, and process digitalization. The outcomes include substantial improvements in efficiency, error reduction, greater process transparency, and enhanced customer satisfaction.

At the same time, report findings reveal a persistent gap between global development trajectories and their actual implementation in Poland. Low adoption of AI, limited infrastructure for sustainable transport, and difficulties in financing green and digital transformation mean that implementations are often selective and fragmented. This suggests that systemic support will be essential for further development of the sector: standardized data solutions (e.g., 2D codes, digital product passports), improved access to capital, and educational programs aimed at strengthening digital and managerial competences in SMEs.

The overarching conclusion is that the future of logistics in Polish SMEs will be determined by their ability to integrate digitalization and automation with the requirements of sustainable development. Success will be achieved by those enterprises that go beyond ad hoc investments and implement coherent logistics strategies built on data, processes, and people. The integration of these three elements – technology, organization, and competences – will ultimately shape the competitiveness of Polish firms in the global economy.

While this study provides important insights into the transformation of logistics in Polish SMEs, it does not exhaust the topic — on the contrary, it opens up new questions and areas for further exploration. Future research could examine more deeply the interplay between organizational culture, regulatory environments, and technology adoption in SMEs, as well as the long-term impacts of prioritizing specific logistics megatrends on firm performance. Comparative studies across sectors or countries would also offer valuable insights into best practices and context-specific strategies for accelerating digital and green transformation in small and medium-sized enterprises.

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