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Maximizing Logistics Output through Strategic Packaging Decisions: An Exploratory Study

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Abstract

Recognizing the critical role that packaging plays in the overall success of a firm's logistics initiatives, the lack of a targeted study in this area may result in missed chances to optimize logistics output. Poor packaging decisions may raise supply chain costs and threaten sustainability due to a lack of understanding of the sensitive interaction between packaging and logistics performance. Packaging is crucial to supply chain efficiency, cost, and sustainability, making it essential to a company's logistics operations. Currently, research generally misses the influence of packaging on logistical initiatives, despite its importance. Hence, this study examines the relationship between packaging and logistics performance to offer improvements. It aims to carefully evaluate different packaging types in logistics projects, as well as to examine packaging's multifaceted role in advancing sustainability, reducing waste, and ensuring product safety within the logistics framework. Further, it intends to find actionable insights on how to optimize packaging to improve logistics performance and reduce its environmental impact. A detailed mixed-method approach comprising a thorough literature review and case study analysis was conducted. This methodological fusion aimed to clarify packaging-logistics relationship. The research's goal goes beyond academic inquiry. It intends to educate logistics managers and organizations with important insights by discovering the crucial links between packaging choices and logistics results, as well as supporting informed decision-making in the field of strategic packaging and supply chain management. Aside from management implications, the findings have the potential to contribute to the overall development of logistical practices by generating positive transformations associated with the

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principles of efficiency, sustainability, and increased awareness within the logistics environment.

Keywords: packaging, logistics performance, sustainability, supply chain management

Introduction

Logistics cannot function without careful packaging (Pfohl, 2010). The latter impacts logistics procedures as well as logistics effectiveness, cost, and performance. The term 'packaging' encompasses the process of developing, testing, and manufacturing a product's container. Product packaging entails three stages: planning, testing, and manufacturing (Meherishi et al., 2019). A package is a protective covering for a box, can, bottle, or any other type of container that allows for the customization of the contents inside using designs, colors, and text typefaces (Tummala, 2005). Reduced waste from careful packaging allows for more efficient operations, ensuring that the proper product is always at hand whenever it is needed (Brisson, 1993). The efficiency of a business is directly tied to the quality of its packaging and logistics systems.

Recent years have seen a rise in packaging research as businesses have realized that their success is directly tied to the quality of their packaging. The current research aims to illuminate the significance of packaging in supply chain initiatives for commercial enterprises. It demonstrates how incremental changes can have a significant impact on supply chain value and how the current system can be optimized to boost the packaging appeal. There is a pressing need to offer innovative strategies that reveal how packaging can be improved in such a way that it contributes to the efficacy of the product. The study thoroughly dissects the physical relationship between supply chain logistics and packaging.

. The results provide an essential first step to quantify the importance of packaging in corporate logistics initiatives. Over time, improvements in packaging have been made to attract the interest of business professionals. Logistics and packaging are being considered in light of their potential for enhanced and efficient supply, thanks to advancements in packaging that boost the efficiency and effectiveness of packaging operations within the supply system. There have been attempts to define logistics adequately; however, they remain imprecise and scattered over the literature. Indeed,

the importance of packaging for logistics operations in a company is paramount.

One of the most significant factors in a product's success in the marketplace is its packaging, which serves to safeguard it from harm, communicates with customers, and facilitates smooth distribution (Rundh, 2016). A robust packaging system that integrates logistics, marketing, the environment, and production is essential for the success of any corporate logistics operation (Rundh, 2016). The packaging concept calls for a framework that puts emphasis on a systemic perspective, where marketing and logistics are considered together. Some techniques and instruments enable package evaluations all through the supply chain, helping to prevent sub-optimization. Since the current methodologies are limited by internal corporate limits, it may require more supply chain processes. Also, improving the distribution process requires new packaging concepts and a better understanding of packaging logistics and solutions.

Literature Review

Environmental and sustainability issues have increased the demand for sustainable packaging. Recently, scholars such as Olugu and Wong (2011) and Fathollahi-Fard at al. (2022) proposed sustainable packaging frameworks that integrate economic, social, and environmental factors. Sustainable packaging reduces the environmental impact without losing functionality. Packaging sustainability minimizes transportation costs, preserves goods, and enhances supply chain sustainability.

Sustainable packaging is essential for circular supply chains. Zambujal-Oliveira and Fernandes (2024) found that circular economy concepts improve supply chain manager earnings. Sustainable circular techniques are replacing the linear take-make-use-dispose paradigm in the packaging business. Brennan et al. advise supply chain agents committed to 100% sustainable packaging soon. Companies are encouraged to promote sustainable packaging by consumers' growing environmental awareness and new government legislation, regulations, taxation, and other initiatives (Nguyen et al., 2020).

Reduced waste and greenhouse gas emissions using sustainable packaging are paramount to strengthen a brand and attract eco-conscious customers. As companies adopt sustainable packaging practices, innovations in the packaging technology may benefit the environment.

Sustainable packaging regulations also impact the manufacturing sector and urge enterprises to emphasize sustainability in their packaging strategy (Chirani et al., 2021).

Sustainable packaging has become trendy due to environmental concerns. Olugu and Wong (2011) and Fathollahi-Fard et al. (2022) provided frameworks for sustainable packaging with environmental, economic, and social consequences. Sustainable packaging is useful and eco-friendly. Reduced transportation costs, product protection, and supply chain sustainability benefit organizations. Shaikh et al. (2021) investigated biodegradable packaging. This type of packaging spontaneously breaks down, reducing company waste. Biodegradable packaging conserves resources and promotes sustainability. According to Shaikh et al. (2021), it minimizes waste, greenhouse gas emissions, and utilizes renewable resources.

Logistics costs, product protection, and environmental impact depend on packing materials. Sustainable packaging materials are popular because they decrease waste as well as the adverse environmental impact, while maintaining product quality and safety. Mikkonen and Tenkanen (2012) assessed sustainable food packaging materials and emphasized their selection. Social, economic, and environmental implications should be considered while choosing sustainable packaging materials.

Hamouda (2021) stated that food packaging affects flavour, microbiology, and chemistry. Therefore, companies must carefully pick the packaging material to ensure product quality and safety. Businesses should assess package sourcing, manufacturing, transportation, and disposal to lessen their environmental effects.

Finally, logistics, especially food, need good packing. Sustainable packaging protects product quality and safety, while reducing the environmental impact. Based on environmental, economic, and social factors, sustainable packaging should be chosen. Companies should assess packaging's life cycle to lessen their adverse environmental effect (Cheng et al., 2022).

Innovative packaging may boost a company’s logistics efficiency, sustainability, and safety. Smart logistics and the role of packaging in supply chain management was studied by Chung (2021). Smart packaging uses sensors to track temperature, humidity, and location. Temperature

monitoring, tracking, and authentication using smart packaging may improve supply chain transparency, efficiency, and sustainability.

Smart packaging may increase supply chain safety, waste reduction, and transparency. To enhance operations and decision-making, smart packaging may gather and analyse real-time data (Schaefer & Cheung 2018). Energy efficiency and waste reduction are simpler with smart packaging.

Smart packaging may improve logistics, sustainability, and security (Simske 2011). Businesses should employ creative packaging to boost supply chain efficiency and its social and environmental impact. Tracey et al. (2022) studied 3D printing's package design and production benefits. The authors believed that 3D printing may speed up prototyping, reduce waste, and boost personalization. This technology allows corporations to create customized packaging that pleases the customers. Further, 3D printing package design and manufacturing may minimize waste and resource use (Song & Zhang, 2020). It might improve industrial efficiency by allowing firms to make packaging on demand, skip long production runs, and minimize inventory (Tilford et al., 2018). Moreover, 3D printing packaging may improve sustainability, product options, and customer satisfaction.

This literature review indicates that eco-friendly and innovative packaging technologies are becoming more popular to improve the efficiency, sustainability, and security of business logistics (Dharmadhikari, 2012). Product protection, decreased transportation costs, and supply chain sustainability are enhanced by sustainable packaging. Sustainable and biodegradable packaging may decrease waste and the environmental impact, while ensuring product quality and safety (Wu et al., 2021). Smart packaging may improve operational efficiency, supply chain traceability, and decision-making (Schaefer & Cheung, 2018).

Overall, it is evident that new packaging technologies and sustainable packaging practices can significantly improve businesses' environmental and social performance, while expanding their product lines and customer pleasure simultaneously. Future developments and innovations are expected to result in more ecologically friendly solutions if businesses continue to implement sustainable packaging practices and investigate cutting-edge packaging technologies.

Research Questions

RQ1. What is the relationship between the packaging and logistics systems?

RQ2. How do decisions impact packaging and logistics systems?

RQ3. How do technological developments impact packaging and logistics systems?

Methodology

The methodology used in this research aimed to obtain information and knowledge/data regarding the implementation and impact of packaging in business logistics projects carried out by firms in Islamabad, Pakistan. The research utilized a qualitative technique, which involved the use of semi-structured questions, for data collection and analysis. The research design involved both literature review and telephonic and face-to-face interviews with experienced professionals in the logistics industry. The interviews remained limited to local organizations with offices in Islamabad, specifically those located in Aabpara and Blue Area of Islamabad, to determine the extent of influence packaging has on their logistics operations and business projects. The sample size was small. Out of the 20 companies that were contacted, 15 responded and only 11 interviews were found to be productive for research.

To collect data, the researchers visited different companies in Islamabad and met with higher-level management. Simple questions were asked to reveal the relevance of corporate logistics initiatives and packaging. Data was analysed using MAXQDA and Ms-Excel online. For qualitative data analysis, MAXQDA was utilized to code and categorize interview replies. Survey and statistical data were analysed and organized in Microsoft Excel. The packaging data was utilized to detect and analyse complications. The study highlighted the influence of packaging on corporate logistics initiatives. However, the limited sample size may restrict its generalizability.

Findings

Packaging affects logistics and customer satisfaction, according to the current study. The majority of consumers view well-designed packaging as an indicator of high product quality, making it an important factor in their purchasing decisions. Additionally, packaging can set a brand apart

from its competitors and promote brand loyalty. In the logistics industry, packaging is crucial for the safe and protected delivery of products to their destination. Packaging directly affects logistics projects, since logistics have been widely used in every industry of Pakistan for the physical movement of products.

The interviews with logistics companies revealed that packaging is the most important factor in logistics, as it ensures the safety and protection of products during transportation. Packaging increases user satisfaction, maximizes sales, and minimizes damage and wastage. The respondents stated that packaging is a huge factor in logistics projects, since it directly impacts customer satisfaction. Packaging decisions, such as size, shape, cost, type, and complexity of products are major factors that affect logistics and must be carefully considered. The design of the package should make it obvious as to exactly what is inside the package, according to 91% of the respondents. However, some hazardous products or products in liquid form require specialized packaging.

To meet customer demands, logistics projects must prioritize factors such as product quality and service, cost reduction, just-in-time delivery, and customer satisfaction. The cost of packaging affects logistics costs, since size, shape, design, and weight differ for every product, resulting in higher costs. Customers expect their products to be delivered safely. For this purpose, packaging is essential. The more impressive the packaging, the more customers are attracted.

Regarding technological advancements in packaging, 70% of companies use both machine and manual packaging processes. The use of automated packing machines has increased packaging efficiency and improved customer satisfaction. Technological developments can boost packaging efficiency and satisfy customer demands, according to 100% of respondents.

Table 1

Percentage of Respondents Regarding Factors Considered in Packaging

Factors Considered in Packaging	Percentage of Respondents
Product fragility	90 %
Cost-effectiveness	90 %
Consumer and environment	70 %
Packaging	90 %

Factors Considered in Packaging	Percentage of Respondents
Packaging design	91 %
Product labeling and expiry	90 %

Table 2

Percentage of Respondents Regarding Factors Considered in Logistics

Factors Considered in Logistics	Percentage of Respondents
Packaging	90 %
Customer satisfaction	85 %
Cost reduction	85 %
Just-in-time delivery	85 %
Packaging design	91 %
Manual packaging	30 %

Table 3

Percentage of Respondents Regarding Other Factors

Other Findings	Percentage of Respondents
Packaging design	91 %
Specialized packaging	9 %
Manual packaging	30 %
Technological advancements	100 %

Discussion

Agile Project Management encourages creativity in Islamabad and Rawalpindi IT firms, says this report. Agile approaches like Scrum and Kanban promote flexibility, creativity, and efficiency. Agile methods encourage continuous feedback, iterative development, and collaborative problem-solving, which improves innovation, the report says. Managers from the polled companies said Agile allows teams to quickly react to technical developments and market needs, speeding up product and feature launches.

Agile methods' iterative and flexible nature allows teams to experiment and improve processes. This confirms that Agile's fail-fast-learn-fast approach helps companies identify issues early and adjust without major disruptions. Companies who fully adopted Agile innovated more than those using traditional project management. Companies that value quick prototyping, product upgrades, and customer-driven development are especially affected.

Innovation frequency and nature vary by company size, resources, and project complexity. Some organisations updated incrementally weekly or monthly, while others were more systematic. Advanced Agile procedures allowed companies to modify products faster. Hybrid Agile-traditional project management approaches absorbed new techniques slower due to bureaucratic hurdles and hierarchical decision-making procedures.

Organisations innovate differently. Some use incremental innovation to make small but frequent product changes, while others use radical innovation to create new solutions. This is harder and takes more research and risk tolerance. Agile organisations are more likely to innovate incrementally because their iterative structure allows for constant change depending on consumer feedback and market changes.

Management shapes company innovation culture. Study: leadership commitment influences Agile methodology implementation. In innovative companies, managers helped teams adopt Agile and experiment. Supportive leadership lets employees experiment and iterate without fear of failure. This helps transformational leadership and innovation research because agile and adaptable managers inspire worker inventiveness.

In managerially resistive companies, innovation suffers. Agile's volatility, lack of documentation, and stakeholder resistance scared some senior managers. Agile adoption was slowed by resistance to change, limiting innovation. Employees said such firms' strict clearance processes and inspection slowed decision-making and agility.

Agile methods offer many benefits, but organisations face significant challenges implementing them. Employee change aversion is common. Agile project management requires a substantial mindset shift for hierarchical and routine-oriented people. Agile's emphasis on self-organization, cross-functional interaction, and iterative development may challenge restricted framework workers. This antagonism is strong in top-down decision-making organisations.

Another problem was poor training and skill development, according to study. IT uses agile frameworks, but many employees need training to understand and use them. Managers worried about team knowledge gaps in new Agile companies. Teams without proper training may struggle to implement Agile concepts, leading to inefficiencies and mis expectations.

Staff need constant learning, Agile coaching, and mentorship to fully implement Agile methods.

Agile adopters also had resource issues. Agile development demands skilled individuals, technology, and money for close collaboration, numerous iterations, and quick changes. Agile training, software development tools, and team reconfiguration were challenging for smaller companies to pay. They struggled to fully embrace Agile, limiting their capacity to develop as fast as larger companies with more resources.

Agile improves IT innovation despite these challenges. Successful Agile process integration boosts productivity, teamwork, and customer satisfaction. Responding swiftly to changing needs and implementing feedback-driven improvements increases product quality and market alignment. Agile's continual development makes organisations competitive in fast-changing industries.

The study reveals that Agile methods and resolving their challenges can improve innovation. A culture of continuous learning and adaptability works. Regular training, workshops, and Agile coaching help employees use Agile methods. Organisations should also minimise hierarchical barriers and encourage collaboration and experimentation.

Strong leadership support is essential. Innovative managers who drive Agile adoption make Agile firms successful. Flexibility, open communication, and failure-learning are essential for leadership teams. Agile becomes an integral part of the company's innovation strategy with this method.

Additionally, businesses should examine hybrid Agile models that match their aims and challenges. Some businesses may benefit from a pure Agile strategy, while others may need a tailored Agile framework with traditional project management to satisfy stakeholders. Balanced strategies can enhance Agile benefits and minimise unexpected transition dangers.

Agile Project Management offers rapid flexibility, continuous feedback, and iterative development, which drives IT innovation. Effective Agile implementation improves creativity, efficiency, and market reaction. Change resistance, talent shortfalls, and resource constraints limit agile implementation. Company training, leadership, and experimentation and learning are needed to realise Agile's potential.

Addressing these issues may help Islamabad and Rawalpindi IT companies innovate and stay ahead in the technology scene.

To summarize, packaging plays a vital role in the success of a product in terms of both customer satisfaction and logistics. Companies must consider various factors when making packaging decisions, such as the fragility of the product, cost-effectiveness, ease of opening and disposal, environmental friendliness, and proper labeling. These factors all contribute to the overall customer experience and perception of the product Eldesouky (2015). Additionally, logistics companies must prioritize proper packaging to ensure that products are delivered safely and protected from damage during transportation. Inadequate packaging can result in customer dissatisfaction and lost sales (Bliemer & Rose (2005). Technological advancements in packaging have made it easier for companies to meet these requirements and improve overall customer satisfaction. Therefore, companies should prioritize investing in the latest packaging technology to improve the efficiency and effectiveness of their packaging processes Zambujal-Oliveira and Fernandes (2024). Overall, the right packaging decisions can have a significant impact on both customer satisfaction and business success.

Limitations

This research has certain limitations. Firstly, the sources of data collection were either insufficient or had limited authenticity. Secondly, the sample size was small because the study was restricted to some areas of Islamabad. If it could be conducted across the country, then we would have reached better results and conclusion. Thirdly, there is a lack previous of studies in the research area. It underscores that only a few people have worked on the approaches considering the impact of packaging in the logistics business in the context of Islamabad, Pakistan. More research is required to analyze in depth the impact of packaging in logistics business projects. For more accurate study and analysis, these limitations should be overcome.

Recommendations

As per the results, it is highly recommended to all the FMCG companies to focus on good and attractive packaging. It is recommended that packaging should be considered as the most important factor in the success of any product, as packaging is the first thing which builds a

perception in the consumer's mind regarding the product inside. Moreover, this study provides insights indicating that packaging has a significant impact on business logistics. More studies should be conducted in the areas of packaging regulations including risk, physical performance of all packaging materials, role of information technology (IT) in packaging, workflow management of goods, and logistics network.

Conflict of Interest

The author of the manuscript has no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

Data Availability Statement

The data associated with this study will be provided by the corresponding author upon request.

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References

Brisson, I. (1993). Packaging waste and the environment: economics and policy. *Resources, Conservation and Recycling*, *8*(3-4), 183–292. https://doi.org/10.1016/0921-3449(93)90026-C

Cheng, H., Xu, H., McClements, D. J., Chen, L., Jiao, A., Tian, Y., Miao, M., & Jin, Z. (2022). Recent advances in intelligent food packaging materials: Principles, preparation and applications. *Food Chemistry*, *375*, Article e131738. https://doi.org/10.1016/j.foodchem.2021.131738

Chirani, M. R., Kowsari, E., Teymourian, T., & Ramakrishna, S. (2021). Environmental impact of increased soap consumption during COVID-19 pandemic: Biodegradable soap production and sustainable packaging. *Science of the Total Environment*, *796*, Article e149013. https://doi.org/10.1016/j.scitotenv.2021.149013

Chung, S. H. (2021). Applications of smart technologies in logistics and transport: A review. *Transportation Research Part E: Logistics and Transportation Review*, *153*, Article e102455. https://doi.org/10.1016/j.tre.2021.102455

Dharmadhikari, S. (2012). Eco-friendly packaging in supply chain. *IUP Journal of Supply Chain Management*, *9*(2), 7–18.

Fathollahi-Fard, A. M., Ahmadi, A., & Karimi, B. (2022). Sustainable and robust home healthcare logistics: A response to the COVID-19 pandemic. *Symmetry*, *14*(2), Article e193. https://doi.org/10.3390/sym14020193

Hamouda, T. (2021). Sustainable packaging from coir fibers. In N. Saba, M. Jawaid, & M. Thariq (Eds.), *Biopolymers and biocomposites from agro-waste for packaging applications* (pp. 113–126). Woodhead Publishing.

Meherishi, L., Narayana, S. A., & Ranjani, K. S. (2019). Sustainable packaging for supply chain management in the circular economy: A review. *Journal of Cleaner Production*, *237*, Article e117582. https://doi.org/10.1016/j.jclepro.2019.07.057

Mikkonen, K. S., & Tenkanen, M. (2012). Sustainable food-packaging materials based on future biorefinery products: Xylans and mannans. *Trends in Food Science & Technology*, *28*(2), 90–102. https://doi.org/10.1016/j.tifs.2012.06.012

Nguyen, A. T., Parker, L., Brennan, L., & Lockrey, S. (2020). A consumer definition of eco-friendly packaging. *Journal of Cleaner Production*, *252*, Article e119792. https://doi.org/10.1016/j.jclepro.2019.119792

Olugu, E. U., & Wong, K. Y. (2011). Fuzzy logic evaluation of reverse logistics performance in the automotive industry. *Scientific Research and Essays*, *6*(7), 1639–1649.

Pfohl, H. C. (2010). *Logistics systems*. Springer.

Rundh, B. (2016). The role of packaging within marketing and value creation. *British Food Journal*, *118*(10), 2491–2511. https://doi.org/10.1108/BFJ-10-2015-0390

Schaefer, D., & Cheung, W. M. (2018). Smart packaging: Opportunities and challenges. *Procedia Cirp*, *72*, 1022–1027. https://doi.org/10.1016/j.procir.2018.03.240

Shaikh, S., Yaqoob, M., & Aggarwal, P. (2021). An overview of biodegradable packaging in food industry. *Current Research in Food Science*, *4*, 503–520. https://doi.org/10.1016/j.crfs.2021.07.005

Simske, S. J. (2011). *Smart packaging for security and logistics* [Paper presentation]. NIP & Digital Fabrication Conference, Minnesota, USA.

Song, J. S., & Zhang, Y. (2020). Stock or print? Impact of 3-D printing on spare parts logistics. *Management Science*, *66*(9), 3860–3878. https://doi.org/10.1287/mnsc.2019.3409

Tilford, T., Stoyanov, S., Braun, J., Janhsen, J. C., Burgard, M., Birch, R., & Bailey, C. (2018). Design, manufacture and test for reliable 3D printed electronics packaging. *Microelectronics Reliability*, *85*, 109–117. https://doi.org/10.1016/j.microrel.2018.04.008

Tracey, C. T., Predeina, A. L., Krivoshapkina, E. F., & Kumacheva, E. (2022). A 3D printing approach to intelligent food packaging. *Trends in Food Science & Technology*, *127*, 87–98. https://doi.org/10.1016/j.tifs.2022.05.003

Tummala, R. R. (2005, August). *Packaging: Past, present and future* [Paper presentation]. 6th International Conference on Electronic Packaging Technology, Shenzhen, China.

Wu, F., Misra, M., & Mohanty, A. K. (2021). Challenges and new opportunities on barrier performance of biodegradable polymers for sustainable packaging. *Progress in Polymer Science*, *117*, Article e101395. https://doi.org/10.1016/j.progpolymsci.2021.101395

Zambujal-Oliveira, J., & Fernandes, C. (2024). The contribution of sustainable packaging to the circular food supply chain. *Packaging Technology and Science*, *37*(5), 443–456. https://doi.org/10.1002/pts.2802