

7 Findings, discussions, and Implications

7.1 Answering the research questions

Based on the analysis and findings in the previous chapters, we now proceed to answer the research questions

The first and second research questions have been answered together to maintain continuity in the perspective of adoption at firm level.

RQ1: What are the determinants of IIoT adoption in the textile manufacturing sector in India at an organization level?

RQ 2: How do these determinants influence the adoption of IIoT in the textile manufacturing sector in India?

As is found in the logistic regression analysis the following independent variables have been found significant in predicting IoT adoption in textile manufacturing in India and their impact is discussed in the following section.

7.1.1 Perceived Direct Benefits (PDB)

The concept of Perceived Direct Benefits (PDB) plays a pivotal role in the adoption of innovative technologies across various industries, with a particularly significant impact in the realm of Internet of Things (IoT) adoption within textile manufacturing firms in India. The essence of PDB lies in the tangible advantages anticipated by firms from the integration of new technologies into their operational frameworks. These advantages often manifest as enhanced operational efficiency, substantial productivity gains, and considerable cost reductions. The logistic regression coefficient of 3.016 associated with PDB in the context of IoT adoption shows a strong positive correlation, suggesting that firms are significantly more likely to embrace IoT technologies when they recognize direct, tangible benefits.

The theoretical background for this observation can be traced back to Everett Rogers' seminal work on the Diffusion of Innovations theory, which posits that the perceived advantages of an innovation play a crucial role in its adoption (Rogers et al., 1983).

Rogers' theory emphasizes that innovations offering clear improvements over existing solutions are more readily adopted, a principle that holds true across technological landscapes. The significance of PDB in the decision-making process for technology adoption is further supported by empirical research across diverse sectors. For instance, Tornatzky and Klein (Tornatzky & Klein, 1982) have shown that perceived benefits are a primary motivator for organizations to adopt new technologies, highlighting the critical importance of identifying and communicating the direct gains from such innovations.

Further, Lee et al., (J. Lee, Ardakani, et al., 2015) specifically address the adoption of IoT technologies, noting that the perceived direct benefits significantly influence organizational decisions to adopt such technologies. They argue that IoT adoption can lead to a transformative impact on operations, enabling real-time data collection and analysis, which in turn can drive decision-making processes to be more data-driven and efficient. This perspective is echoed in the broader literature, where the tangible outcomes of adopting IoT solutions—such as operational efficiency, energy savings, and improved supply chain visibility—are often cited as key factors driving adoption (Porter et al., 2014).

Moreover, the relationship between perceived benefits and technology adoption is impacted by the industry-specific contexts. For example, in the textile manufacturing sector, the direct benefits of IoT adoption can be vaguely challenging due to the industry's disintegrated supply chains (L. Da Xu et al., 2018). IoT technologies offer the potential to streamline operations, reduce waste, and enhance product quality, which directly contributes to the competitive advantage of firms in this sector.

Additionally, research by Zhu, Kraemer, and Xu (2006) (Zhu et al., 2006) on e-business technologies suggests that the perception of direct benefits is influenced by both organizational and environmental factors, including industry competitiveness and regulatory frameworks. This underscores the multifaceted nature of technology adoption decisions and highlights the importance of considering a broad spectrum of influences when analyzing the impact of perceived direct benefits.

Therefore the positive impact of Perceived Direct Benefits on the adoption of IoT technologies within textile manufacturing firms in India reveals a critical insight:

organizations are more inclined to adopt innovative solutions when they can clearly perceive and quantify the direct advantages. This needs to be further discussed with policy makers. This alignment between perceived benefits and adoption decisions shows the necessity for technology providers and policymakers to effectively communicate and demonstrate the tangible benefits of IoT innovations to potential adopters.

7.1.2 Perceived Indirect Benefits (PIB)

Perceived indirect benefits (PIB) represent a complex concept in the domain of technology adoption, particularly within the textile manufacturing industry. These benefits go beyond the immediate or direct impacts of adopting a new technology, such as increased productivity or reduced costs. Instead, PIB focuses on the secondary or long-term advantages that are expected to emerge from the integration of technologies like the Internet of Things (IoT). The significance of perceived indirect benefits is shown by a positive coefficient (1.538) in research, indicating their vital role in encouraging IoT adoption among textile manufacturers.

PIB encompasses a range of outcomes including enhanced brand image, improved market competitiveness, and increased customer satisfaction (Iacovou et al., 1995b). These outcomes, may not be quantifiable in the short run, but, contribute significantly to a firm's strategic positioning and long-term success. For instance, an enhanced brand image can attract a more extensive customer base and foster loyalty, while increased market competitiveness can position a firm more favourably against its rivals.

The concept of PIB is based on the Resource-Based View (RBV) of the firm, a theory that suggests firms achieve and maintain a competitive advantage by acquiring and effectively utilizing unique resources and capabilities (Barney, 1991). This framework supports the idea that the strategic adoption of technologies can provide firms with distinctive capabilities that enhance their competitiveness. The RBV states that indirect benefits, such as brand reputation and customer satisfaction, are critical resources that can lead to a sustainable competitive advantage.

Further support for the significance of PIB in technology adoption comes from literature on Information Technology (IT) adoption. Studies by Melville (Melville et al., 2004) among others, corroborate the influence of indirect benefits on organizational decisions regarding new technologies. These studies suggest that organizations are more likely to adopt new technologies when they perceive not only direct benefits but also significant indirect benefits that match their long-term strategic goals.

Moreover, the adoption of IoT technologies in the textile industry is not merely a tactical move to improve operational efficiency; it is also of strategic importance to enhance overall business performance. IoT technologies enable textile manufacturers to gain real-time insights into their operations, leading to better decision-making and more personalized customer experiences. These advancements can indirectly contribute to building a stronger brand and creating more value for customers, which are crucial factors in today's competitive market landscape.

Additionally, customer satisfaction stands out as a significant indirect benefit, with technology adoption enabling firms to offer new and improved services. By leveraging IoT for better information dissemination and personalized services, companies can foster a positive perception among their customer base.

7.1.3 Compatibility (CP)

Compatibility is a fundamental factor that influences the integration of new technologies within a company. It assesses how well a novel technology fits with a firm's current practices, beliefs, and requirements. The significance of compatibility in the process of technology adoption is highlighted by a positive coefficient of 1.403 for the variable CP (Compatibility) in certain statistical models. This coefficient suggests that the more a technology aligns with an organization's existing operations and culture, the greater the likelihood of its adoption.

The concept of compatibility being pivotal to the adoption of innovations is not a new one. Everett M. Rogers, a prominent figure in the field of communication studies and sociology, emphasized this in his 2003 work (Rogers et al., 1983). According to Rogers, the degree to which an innovation is perceived as being consistent with the

existing values, past experiences, and needs of potential adopters plays a crucial role in its adoption. This perspective posits that for a technology to be embraced by an organization, it should not only solve a specific problem but also integrate seamlessly into the existing system without requiring significant modifications.

Supporting Rogers' thesis, extensive research conducted by Moore and Benbasat (Moore & Benbasat, 1991) in 1991 further underscores the importance of compatibility. Their empirical studies on technology adoption demonstrate that compatibility significantly influences organizational leaders' decisions to adopt new technologies. When a new technology is perceived as being in harmony with existing workflows, processes, and the organizational culture, it is more readily accepted and implemented. This is because the perceived ease of integration reduces potential resistance from employees, decreases the learning curve associated with the new technology, and minimizes the risk of disruption to ongoing operations.

Furthermore, compatibility not only facilitates the adoption process but also enhances the effectiveness of the technology's implementation. A technology that aligns with the firm's current processes and culture is likely to be more efficiently integrated into daily operations, leading to improved productivity and satisfaction among employees. The alignment ensures that the new technology complements existing systems and processes, thereby maximizing its utility and effectiveness.

7.1.4 Perceived Financial Cost (PFC)

The adoption of new technologies within organizations is a complex decision-making process influenced by various factors. Among these, perceived financial cost stands out as a significant barrier to the integration of innovative technologies, such as the Internet of Things (IoT). The negative coefficient of -3.311 associated with this variable in empirical studies highlights the impact of cost concerns on the willingness of organizations to adopt new technological solutions. This coefficient reflects not only the direct expenses involved in purchasing and installing the technology but also the indirect costs, such as training of people and maintenance of the infrastructure

The role of perceived financial costs in hindering technology adoption has been a focal point of academic research. Researchers (Khalifa & Davison, 2006) highlighted

the importance of cost considerations in their study, noting that the financial implications of adopting new technologies could significantly deter organizations from proceeding with implementation. This aligns with the broader consensus that financial constraints can play a decisive role in the adoption process.

Direct costs, such as the purchase price of the technology and installation expenses, are often the most visible financial burdens faced by organizations. However, indirect costs, which include the training of employees to competently use the new technology and ongoing maintenance expenses, can also accumulate, further straining the organization's resources. These indirect costs are sometimes underestimated during the initial evaluation phase, leading to unexpected financial pressure on the organization post-adoption.

Several studies have built upon the foundational work of Khalifa and Davison, exploring the multifaceted nature of financial costs in technology adoption. For instance, research conducted by (Oliveira & Martins, 2011) in the context of ERP (Enterprise Resource Planning) systems adoption emphasized the significant role that both direct and indirect costs play in influencing organizational decisions. Their findings highlighted the need for comprehensive cost-benefit analyses to accurately assess the financial viability of adopting new technologies.

Further expanding on the concept of perceived financial cost, Researchers(Gao & Bai, 2014b) examined the adoption of cloud computing services by small and medium- sized enterprises (SMEs). Their study revealed that financial considerations were paramount for SMEs due to their limited resources. The research demonstrated that perceived financial cost not only affected the initial decision to adopt but also impacted the extent and manner of technology utilization.

Moreover, the study of technology adoption in healthcare by (Hu et al., 2012) identified perceived financial cost as a critical barrier to the adoption of electronic medical records (EMRs). The high costs associated with EMR systems, coupled with concerns over the return on investment, were found to significantly impede their widespread adoption within healthcare organizations.

7.1.5 Internationalization Readiness (IR)

Internationalization readiness is an indicator of a firm's capacity and willingness to involve in international business endeavours. It reflects how prepared a company is to expand its operations beyond domestic borders, encompassing aspects such as global market awareness, adaptability to different cultural and regulatory environments, and the ability to implement international strategies effectively. A positive coefficient of 1.306 in this context suggests that organizations with a strong readiness for internationalization are more keen to adopt Internet of Things (IoT) technologies. This can be largely attributed to the understanding within these firms that IoT can significantly enhance their competitive edge on a global scale.

The strategic value of IoT in the international business domain is very high. IoT technologies offer firms the ability to improve operational efficiencies, collect and analyze data on a global scale, and deliver more personalized customer experiences, irrespective of geographic boundaries. These advantages are particularly appealing to firms that are keen on international expansion or enhancing their international operations. Companies with high internationalization readiness are typically more proactive in seeking out technologies that can provide them with a competitive advantage in the global market. This readiness includes not just the technological infrastructure but also the strategic foresight to integrate such technologies into their business models in a way that aligns with their international business goals.

The relationship between internationalization readiness and technology adoption, specifically IoT adoption at the firm level, echoes the findings of various academic inquiries. For instance, the work of researchers (Knight & Cavusgil, 2004) analysed the details of the internationalization process of firms, shedding light on how the readiness to operate in diverse international markets can significantly influence a firm's approach to adopting new technologies. Their research highlights the idea that firms geared towards internationalization are not only more likely to embrace IoT but also to leverage it in ways that enhance their international business strategies.

Studies have shown that firms with international aspirations or operations are more adept at recognizing the benefits of new technologies, including IoT, for overcoming geographical and operational barriers inherent in global business activities. This

translates into a greater willingness to invest in such technologies despite the challenges and costs associated with their implementation.

7.1.6 Information Intensity (IT)

In the textiles manufacturing sector, the importance of comprehensive information sharing cannot be overstated(H. Liang et al., 2007). This industry, characterized by its technical complexity and the multitude of parameters that govern its operations, underscores the necessity for effective information management. In this context, information intensity, evidenced by a significant coefficient of 3.564, plays a crucial role in the adoption of Internet of Things (IoT) technologies. Information intensity refers to the degree to which firms depend on information in their daily operations, strategic decision-making, and overall management. Firms that rank high in terms of information intensity are more inclined to recognize and leverage the benefits of IoT, seeing it as a pivotal tool for enhancing their informational capabilities(Bharadwaj et al., 2013).

The rationale behind this inclination lies in the IoT's transformative potential to streamline information flow, augment processing capabilities, and optimize the utilization of data. In a sector as detail-oriented as textiles manufacturing, where precision and efficiency are paramount, the ability to swiftly access, analyze, and act upon accurate information can significantly enhance operational efficiency and competitive edge. IoT technologies facilitate real-time monitoring and data collection at various stages of the manufacturing process, from raw material handling to the final product quality control, thereby enabling firms to make more informed decisions and adjustments promptly.

The strategic value of information in achieving competitive advantage has been extensively discussed in the literature, particularly through the lens of the knowledge-based view of the firm. According to Robert Grant's seminal work in 1996(R. M. Grant, 1996), knowledge and information are key strategic resources that enable firms to innovate and maintain a competitive stance in their respective markets. This perspective aligns with the premise that high information intensity influences a firm's propensity to adopt technologies such as IoT, which are fundamentally geared towards enhancing information-related capabilities.

Furthermore, studies have demonstrated the critical role of information intensity in driving technology adoption at the firm level across various sectors. For example, research in the realm of digital transformation has highlighted how firms with higher information intensity are more proactive in embracing technologies that promise to elevate their informational and operational capabilities (Davenport & Prusak, 1998). These firms view technology adoption not merely as an operational necessity but as a strategic investment that can yield substantial returns in terms of efficiency, agility, and market responsiveness.

In textiles manufacturing, where the efficient management of complex information is integral to success, the adoption of IoT can be seen as a strategic move to bolster information-intensive processes. By integrating IoT technologies, firms can enhance their capability to capture, process, and analyze data across the entire value chain, from supply chain management to customer engagement. This not only improves operational efficiency but also facilitates innovation and customization, catering to the evolving demands of the market.

7.1.7 Regulatory Support (RS)

The role of regulatory support in facilitating the adoption of Internet of Things (IoT) technologies at the firm level is both significant and multifaceted. This support is evidenced by a positive coefficient of 3.311, highlighting how government policies, regulations, and incentives can play a pivotal role in encouraging firms to embrace IoT technologies. Regulatory support functions as a critical lever by lowering barriers to adoption, mitigating risks associated with new technologies, and providing financial incentives that make investment in IoT more attractive for businesses.

Government interventions in the form of regulations and policies are not merely administrative hurdles; instead, they serve as guiding frameworks that can significantly reduce the uncertainty and risks associated with adopting cutting-edge technologies. For instance, clear regulations around data privacy and security can reassure firms about the legal implications of implementing IoT solutions that rely heavily on data collection and analysis. Moreover, policies that encourage the development and standardization of IoT technologies can facilitate interoperability

and compatibility, further easing the integration of these technologies into existing systems.

Financial incentives provided by regulatory bodies, such as grants, tax breaks, and subsidies, lower the financial barriers to adopting IoT technologies. Such incentives can be particularly impactful for small and medium-sized enterprises (SMEs) that may lack the resources of larger corporations. These financial mechanisms not only make it economically feasible for firms to invest in IoT but also signal the government's commitment to fostering innovation and technological advancement.

The impact of regulatory support on technology adoption is well-established in research. Researchers (Zhu et al., 2006) provide evidence that supportive regulatory environments significantly influence the adoption and diffusion of new technologies. This finding is consistent across different technological domains, not just IoT, indicating the broad applicability of regulatory support as a factor in technology adoption. Regulatory support acts as an external factor that complements internal organizational factors, such as firm size, readiness, and strategic orientation towards innovation.

Further studies have expanded on these findings. For instance, research has demonstrated how regulatory frameworks tailored specifically to the characteristics of IoT technologies can accelerate adoption rates. These studies underscore the importance of a balanced approach to regulation—one that understands the specific needs and challenges associated with IoT adoption and addresses them through targeted policies and incentives.

Moreover, the role of regulatory support in technology adoption extends beyond national borders. International cooperation and harmonization of regulations can further enhance the adoption of IoT technologies by creating a consistent and predictable global market. This is particularly important for IoT, where devices and services often operate across borders and rely on global networks.

7.1.8 Firm Size (FS)

Firm size has been consistently highlighted in literature as a significant determinant of technology adoption. In our studies, FS has a coefficient of 1.202 indicating a moderate positive impact on adoption of IoT. Larger firms are generally better positioned to adopt and implement new technologies due to their greater access to resources, including financial capital, human resources, and technological capabilities. Larger organizations also possess an infrastructure that can accommodate the integration of complex technologies, such as IoT devices, into their operations ((Iacovou et al., 1995a); (Zhu et al., 2003)). Moreover, larger firms often have a strategic orientation towards innovation, driven by their need to maintain competitive advantage and market leadership (Tornatzky et al., 1990). This inclination towards innovation makes them more likely to adopt new technologies early in their lifecycle.

The positive relationship between firm size and technology adoption can also be attributed to the ability of larger firms to absorb the risks associated with new technologies. The adoption of IoT, for instance, involves uncertainties related to compatibility with existing systems, security concerns, and the potential need for significant process reengineering (Premkumar & Ramamurthy, 1995). Larger firms, with their more extensive resource base, are usually adopters of IoT as is seen from our sample frame.

7.1.9 Trading partner pressure (TPP)

Trading partner pressure serves as a pivotal catalyst in the adoption of new technologies by firms, especially within the dynamics of supply chain relationships. TPP has a strong positive impact on adoption as is seen from the coefficient value in the regression equation of 1.616. This phenomenon is largely observed when key players or leading firms within a supply chain necessitate their partners to incorporate advanced technologies, such as the Internet of Things (IoT), into their operations. The requirement for technology adoption is not merely a suggestion but often a prerequisite for maintaining business relations, highlighting the power dynamics within industrial ecosystems. The imposition of such mandates is particularly prevalent in sectors where the market is controlled by a handful of large entities that possess the leverage to enforce their operational standards on suppliers ((Iacovou et

al., 1995a); (Premkumar & Roberts, 1999)). The essence of trading partner pressure in technology adoption transcends the immediate operational benefits to underscore a strategic alignment with the evolving norms and expectations of the industry. IIoT adoption fosters a plethora of advantages, including but not limited to, enhanced real-time visibility, increased operational efficiency, and the facilitation of seamless coordination across the supply chain. These benefits are amplified by the network effect, wherein the value of technology adoption escalates as more participants within the network embrace it (Zhu et al., 2006). This phenomenon creates a compelling case for firms to integrate IIoT solutions not only in adherence to the mandates from their trading partners but also as a strategic manoeuvre to bolster their competitive edge within the marketplace.

Moreover, the imperative to adopt such technologies in response to trading partner pressure is indicative of a broader trend towards digital transformation and standardization within industries. Firms that proactively align their operations with these emerging standards through technology adoption are better positioned to navigate the complexities of modern supply chains. They are able to ensure operational compliance, enhance their attractiveness as partners in the supply chain ecosystem, and mitigate the risk of obsolescence. Consequently, the pressure from trading partners essentially acts as a catalyst for firms to reassess their technological capabilities and invest in necessary upgrades to stay relevant in an increasingly interconnected and digitized business environment.

We next answer the other two research questions simultaneously as these are concerned with the predictive power of these determinants

RQ 3. Are these determinants predictive of the IIoT adoption behaviour in the textile manufacturing sector in India?

RQ 4. To what extent do these determinants explain the adoption behaviour of IIoT in textile manufacturing sector in India?

Based on the logistic regression outputs, we can deduce that the independent variables are indeed predictive of the likelihood that the dependent variable AD (adoption) will occur. In logistic regression, the importance of each independent variable in

predicting the dependent variable is indicated by the Wald statistic, the significance (Sig.) level, and the Exp(B) value (also known as the odds ratio).

Each step in the output seems to represent a model with additional variables being included. By the final step, all independent variables are included in the model. The Wald statistic tests the null hypothesis that a particular coefficient (B) is equal to zero, which means that the variable has no effect. A large Wald statistic and a small significance level (p-value less than 0.05) suggest that the variable has a significant predictive contribution to the model.

For example two of the highest impacting variables:

PDB (Perceived Direct Benefits) has a positive B coefficient, indicating that as PDB increases, the likelihood of AD also increases.

PFC (Perceived Financial Cost) has a negative B coefficient in some steps, suggesting that higher perceived costs may reduce the likelihood of adoption.

Exp(B) for these variables indicates how much the odds of the dependent event (AD) increase (if greater than 1) or decrease (if less than 1) with a one-unit increase in the independent variable, holding all other variables constant.

In the context of this model, "AD" (adoption) is the probability that an organization will adopt a new system or technology. The independent variables like PDB, PIB, CP, TPP, FS, IR, RS, IT, and PFC are various factors that influence this adoption decision.

The predicted percentages in the output show how well the model predicts AD. By Step 7, we see an overall prediction accuracy of 92.1%. This means that the model is correctly predicting whether AD will occur or not in 92.1% of cases in our dataset.

Therefore we can conclude that all the mentioned independent variables in the model are substantially significant predictors of the dependent variable which is IoT adoption in textile manufacturing.

7.2 Implications of this study

The analysis of determinants influencing the adoption of the Internet of Things (IoT) in India's textile manufacturing sector offers insightful implications for policymakers, textile manufacturing promotion councils, IoT device manufacturers, and researchers. This thesis delves into how the findings of this analysis can guide policy formulation and research directions, emphasizing the integration of IoT technologies to enhance the competitiveness and sustainability of the textile industry.

7.2.1 Implications for policy makers

For policymakers and textile manufacturing promotion councils in India, the analysis underscores the importance of fostering an environment conducive to IoT adoption. The significant positive impact of perceived direct benefits (PDB) on adoption indicates that firms are more likely to embrace IoT when they recognize tangible improvements in efficiency, productivity, and cost savings. Thus, policy measures should aim at raising awareness about the direct benefits of IoT integration, through workshops, seminars, and success stories, to encourage its widespread acceptance. Moreover, the positive coefficient associated with regulatory support (RS) highlights the critical role of government policies, regulations, and incentives in facilitating IoT adoption. Policymakers should focus on creating clear, supportive regulatory frameworks that mitigate risks associated with new technologies, including concerns about data privacy and security, and provide financial incentives such as grants, tax breaks, and subsidies to lower the financial barriers to IoT integration.

7.2.2 Implications for machinery manufacturers

For textile machinery manufacturers with IoT capabilities, the findings offer strategic insights into market positioning and product development. Understanding that perceived indirect benefits (PIB), such as enhanced brand image and improved market competitiveness, significantly influence IoT adoption, manufacturers should emphasize these aspects in their marketing strategies. They can collaborate with textile firms to demonstrate how IoT solutions can lead to better customer experiences and strategic positioning. Compatibility (CP) of IoT technologies with existing systems is another critical factor for adoption. Manufacturers must ensure their

products are easily integrable with the firms' current operations and practices to facilitate smoother adoption processes.

7.2.3 Implications for researchers

The analysis also has profound implications for researchers in the textile manufacturing field. The significant predictors of IoT adoption identified—such as PDB, PIB, CP, perceived financial cost (PFC), and information intensity (IT)—provide a foundation for further studies. Researchers can explore these determinants in depth to understand their interrelations and individual impacts more clearly. Additionally, considering the positive influence of internationalization readiness (IR) on IoT adoption, studies could investigate how firms with global aspirations leverage IoT for competitive advantage in international markets. Further research could also focus on developing frameworks or models to assess the readiness of textile firms for IoT adoption, incorporating factors like firm size (FS) and trading partner pressure (TPP).

The analysis provides actionable insights for various stakeholders in the textile industry, highlighting the importance of perceived benefits, regulatory support, compatibility, and financial considerations in the adoption of IoT technologies. Policymakers and promotion councils should work towards creating an enabling environment that mitigates barriers and highlights the benefits of IoT. Textile machinery manufacturers with IoT capabilities need to align their products with the needs and operations of textile firms, emphasizing the strategic advantages of adoption. For researchers, the findings open new avenues for exploring the determinants of IoT adoption and their impacts on the textile industry, paving the way for innovative studies that could further elucidate the path to digital transformation in this sector.

7.3 Achieving research objectives

Therefore through this research as we have addressed the research questions raised at the beginning, the following objectives have therefore been achieved

1. *We have identified the determinants that impact adoption of IIoT in textile manufacturing in India.*

2. *The logistic regression model and its coefficients and related tables highlight the relationship of these determinants with IIoT adoption in textile manufacturing in India.*
3. *The outputs of the logistic regression model discuss in detail the predictive nature of these determinants on the adoption behaviour of IIoT in the textile manufacturing sector in India.*
4. *The predictive power of these determinants on IIoT adoption in textile manufacturing in India has been discussed through the logistic regression analysis and accuracy of the model has also been discussed.*

8 Conclusion

The study on the adoption of Internet of Things (IoT) technologies in India's textile manufacturing sector is a critical examination of how digital transformation processes can reshape traditional industries. Utilizing the Technology-Organization-Environment (T-O-E) framework along with logistic regression analysis, this thesis provides a nuanced understanding of the factors driving and hindering IoT adoption, offering actionable insights for various stakeholders in the textile industry.

8.1 Key Drivers of IoT Adoption

The research underscores the considerable direct benefits that IoT adoption can introduce to the textile manufacturing sector. These include enhanced operational efficiency, reduced production costs, and significantly improved product quality. These benefits are paramount in a fiercely competitive global market where efficiency and quality often determine the success of a business. The ability of IoT to integrate complex systems and streamline operations allows manufacturers to not only enhance output but also ensure consistent quality in their products.

Highlighting these benefits is crucial for stakeholders, as it helps delineate the tangible gains from IoT integration. Such insights encourage further investment and foster a broader interest in technological upgrades, thereby driving the sector towards modernization and global competitiveness.

8.2 Financial Costs as Barriers

Despite the advantages, the study identifies perceived financial costs as a major barrier to IoT adoption. This insight is especially relevant for policymakers and industry leaders, suggesting a potential need for targeted financial incentives such as subsidies, grants, or tax breaks to mitigate the burden of initial investment costs. Furthermore, machinery manufacturers have a pivotal role in developing cost-effective IoT solutions tailored for small to medium-sized enterprises (SMEs) within the textile sector, which may otherwise be financially constrained from adopting such technologies.

8.2.1 Predictive Model for Adoption

An innovative aspect of the thesis is its predictive model that classifies firms as adopters or non-adopters based on variables like firm size, trading partner pressure, and regulatory support. This model serves as a valuable tool for policymakers and industry associations, helping them design more focused and efficient programs that target and support firms more likely to adopt IoT technologies. By ensuring resources are optimally allocated, these programs can significantly boost the adoption rates across the sector.

8.2.2 Global Perspective on IoT Adoption

Globally, the adoption of IoT is on a rapid ascent, transforming industries by enabling greater operational efficiency and innovation. Many countries are proactively integrating IoT solutions across diverse sectors, enhancing their competitive edge. In contrast, India's slower pace in embracing these technologies, especially in the textile sector, poses a substantial challenge. This delay not only impedes India's ability to achieve comparable efficiency gains but also impacts its stature in the global textile market. Therefore, there is an urgent need for concerted efforts to lower barriers to technology adoption and cultivate an ecosystem supportive of digital innovation.

8.2.3 Implications for Machinery Manufacturers

For machinery manufacturers, the insights from this research are instrumental in guiding product development and marketing strategies. By understanding that the direct benefits of IoT drive adoption, while financial considerations often deter it, manufacturers can emphasize the cost-effectiveness and return on investment (ROI) of their IoT solutions in their marketing strategies. Such targeted marketing can play a crucial role in increasing the technology uptake in the textile industry.

8.3 Research Opportunities

For academics and researchers, this thesis opens several avenues for further investigation. Exploring how different factors, such as firm size and regulatory support, interact and influence IoT adoption could yield deeper insights. Longitudinal

studies could track how the impact of IoT adoption evolves over time, providing a dynamic view of its benefits and challenges.

8.4 Conclusion

In summary, this thesis contributes significantly to academic knowledge by employing a structured framework to analyze IoT adoption in a specific sector. It offers practical recommendations that necessitate a collaborative approach among government, industry, and academia to create an environment conducive to digital innovation in textile manufacturing. By addressing financial barriers and focusing on the direct benefits of IoT, the Indian textile industry can bolster its competitiveness both domestically and internationally, paving the way for a more technologically integrated future in manufacturing.