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**Role of Technology in Enhancing Procurement Processes
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Role of Technology in Enhancing Procurement Processes and Efficiency in Firms in Odense, Denmark.

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Abstract

Procurement is a critical function in any organization, responsible for sourcing and acquiring the goods and services needed to run the business. Technology enhances procurement processes and efficiency by providing greater automation, visibility, and control, and by enabling data-driven decision making. Technology has the potential to transform procurement, making it more efficient, effective, and collaborative. Research noted that technology plays a vital role in enhancing procurement processes and increasing efficiency. The study discovered that organizations that implemented e-procurement systems saw significant improvements in procurement efficiency. Technology has greatly improved the efficiency of the procurement process by automating many of the manual and repetitive tasks, such as data entry and purchase order generation. Technology has also improved the visibility and transparency of the procurement process. The study concluded that technology has transformed procurement by streamlining processes, increasing efficiency, reducing costs, and improving collaboration with suppliers. Organizations that embrace technology to enhance their procurement processes can realize significant benefits, such as increased accuracy, faster turnaround times, and improved visibility and control. Technology has improved collaboration between procurement teams and suppliers. Digital tools and platforms enable better communication and collaboration between procurement teams and suppliers, which help to build stronger relationships and improve supplier performance. In the rapidly evolving business landscape, organizations that fail to adopt technology to enhance their procurement processes may find themselves falling behind the competition. The study recommended that it is important to create/adopt a technology strategy that aligns with the firm's procurement goals. As procurement processes become more digitized, it's important to prioritize data security. There should be appropriate cybersecurity measures, such as firewalls, encryption, and user authentication, to protect sensitive procurement data.

Keywords: *Technology, Procurement, Denmark*

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1.0 Background of the Study

Technology plays a crucial role in enhancing procurement processes and efficiency in modern organizations (Khan, Zia-ul-haq, Umar & Yu, 2021). Some of the ways that technology can improve procurement processes include: Automation where technology can automate the procurement process by enabling electronic requisitions, purchase orders, and invoice processing. This eliminates the need for manual paperwork, reducing the likelihood of errors and saving time; Nani and Ali (2020) argued that E-procurement systems provides an efficient and transparent method of procuring goods and services. This includes online auctions, e-catalogues, and e-tendering, which streamline the procurement process and provide better visibility and control; Data analytics here technology can help procurement teams to analyze large amounts of data to identify trends, optimize spend, and reduce costs (Tiwari, Wee & Daryanto, 2018). This provides insights that can help organizations make better purchasing decisions; Cloud-based procurement which is a system that allows procurement teams to access information and manage procurement processes from anywhere. This enables greater collaboration and flexibility, which can improve efficiency and reduce lead times and supplier management whereby the technology helps organizations manage their suppliers more effectively by providing a single source of truth for supplier information, performance data, and contracts. This improves supplier relationships and enables better supplier selection decisions.

Procurement process refers to the series of steps that an organization follows to acquire goods, services or works from external suppliers (Volkonskaya, Pashkina, Galenko, Kurlikov & Parsova, 2020). The process typically involves the identification of the need for a product or service, selection of a suitable supplier, negotiation of terms and conditions, and the eventual purchase and delivery of the product or service. Procurement is a critical function in any organization, responsible for sourcing and acquiring the goods and services needed to run the business (Bals, Schulze, Kelly & Stek, 2019). The process of procurement can be complex and time-consuming, involving multiple stakeholders and a significant amount of paperwork. However, technology has the potential to transform procurement, making it more efficient and effective. Technology can enhance procurement processes and efficiency by providing greater automation, visibility, and control, and by enabling data-driven decision making (Apampa, 2022). By leveraging technology, organizations can streamline their procurement processes, reduce costs, and improve supplier relationships, ultimately leading to a more efficient and effective procurement function. The role of technology in enhancing procurement is multifaceted, with a variety of tools and solutions available to streamline and optimize the procurement process. The procurement process is an important aspect of organizational operations, as it ensures that the organization obtains the goods and services it requires to operate efficiently and effectively.

One of the most significant advancements in procurement technology is the introduction of e-procurement systems (Faccia & Petratos, 2021). These systems provide a digital platform for the procurement process, allowing organizations to automate many of the steps involved in purchasing goods and services. E-procurement systems typically include features such as electronic requisition, online catalogs, automated supplier selection, and electronic purchase orders, streamlining the procurement process, and reducing paperwork. Technology can also help procurement teams analyze their spending data, providing insights into supplier performance and

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identifying opportunities for cost savings (van Hoek, Sankararaman, Udesen, Geurts & Palumbo-Miele, 2020). This is achieved through spend analytics software, which can track and categorize purchases, analyze supplier performance, and monitor compliance with procurement policies and regulations. Procurement and technology are closely related, as technology has played a significant role in transforming the procurement process over the years. Technology has significantly impacted the procurement process, enabling organizations to streamline their procurement activities, access a wider range of suppliers and products, and gain insights into their procurement data (Chen, Bretschneider, Stritch, Darnall & Hsueh, 2022). Since technology keeps on evolving, it is likely that we will see even more significant changes in the procurement process in the coming years.

Another area where technology can enhance procurement is in contract management. Procurement teams can use contract management software to track contracts, automate contract renewals and amendments, and ensure compliance with contractual terms and conditions (Handfield, Jeong & Choi, 2019). This helps to reduce the risk of contract disputes and improves supplier relationships. Managing suppliers is a critical part of the procurement process, and technology can assist to make this process more efficient and effective. Supplier management software can be used to manage supplier information, track supplier performance, and automate supplier communication (Zhu & Kouhizadeh, 2019). This helps to build stronger relationships with suppliers, improve collaboration, and reduce supply chain risk. Cloud-based procurement systems allow procurement teams to access information and manage procurement processes from anywhere, improving collaboration and flexibility. Cloud-based procurement solutions also typically offer automatic updates and improved security, reducing the need for IT support and maintenance.

Technology has the potential to transform procurement, making it more efficient, effective, and collaborative. E-procurement systems, spend analysis, contract management, supplier management, and cloud-based procurement are just a few of the ways technology can enhance procurement (Khalfan, Azizi, Haass, Maqsood & Ahmed, 2022). By embracing these tools and solutions, organizations can reduce costs, improve supplier relationships, and gain a competitive edge. Efficiency in procurement process is required in order to provide a systematic and strategic approach that focuses on standardization, automation, supplier performance management, spend analysis, strategic sourcing, and continuous improvement (Flehsig, Anslinger & Lasch, 2022). By optimizing procurement activities, organizations can reduce costs, improve supplier relationships, and acquire the goods and services they need in a timely and cost-effective manner.

2.0 Literature Review

Haller, Fagerholm, Carlsson, Skoglund, van den Brink, Danielski and Englund (2022) conducted research to explore the effect of technology on the performance of electronic procurement systems in Sweden parastatals, with a focus on the Swedish Livestock Research Centre as a case study. The study used a descriptive research approach and included all 84 workers of the Swedish Livestock Research Centre as its target group. Data was gathered utilizing well-structured questionnaires from top and middle-level Swedish Livestock Research Centre workers. A pilot test was carried out with questionnaires distributed to eight members of staff. This accounted for 15% of the sample size; senior management and department heads were chosen using purposive

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sampling, while other employees were chosen using random sampling. The data was analyzed by the use of descriptive statistics and inferential analysis in the SPSS. The study's results identified technology integration as one of the most important elements of procurement performance. Technology was discovered to have contributed to the improved performance of the Electronic Procurement system through increased efficiency, the creation of better understanding and flexibility in procurement processes, as well as helping in the reduction of errors that may occur along the supply chain cycle and increasing user support confidence in the use of Electronic Procurement systems.

Nanayakkara, Perera, Senaratne, Weerasuriya and Bandara (2021) performed research to demonstrate how smart contracts help project organizations through project procurement. This phenomenological study was led by a qualitative research design. The data was collected through semi-structured interviews. The collected data was examined using thematic, textual, and discourse analysis techniques. The data was triangulated using published industry reports. To solve the research issue, the study provided an integrated connection model. The study findings first indicated smart contracts as improving procurement efficiency in terms of cost, time, and quality. Second, smart contracts create a trust-free platform where dependability is supplied and sustained through transparency, traceability, and security. According to the findings of this study, increased procurement efficiency and dependability match the prerequisites for gaining long-term competitive advantages. The research will help industry practices and future research. The relationship between successful project procurement management, smart contracts, and long-term competitive advantages is expected to influence future research and business practices.

Sánchez-Rodríguez, Martínez-Lorente and Hemsworth (2020) conducted study to examine e-procurement in small and medium-sized organizations (SMEs), and its link with top management support, IT challenges, and strategic purchasing, and the effect of e-procurement on performance (both procurement and business performance). The hypotheses were tested on a sample of 86 managers from manufacturing SMEs. The findings revealed a substantial link between e-procurement in SMEs and top management support, IT challenges, and strategic purchasing. Likewise, the researcher discovered a link between e-procurement and procurement process performance and corporate performance. When implementing e-procurement, SME managers should focus on top management support, IT challenges, and strategic purchasing, according to the findings. Similarly, it demonstrates the benefits of e-procurement on procurement process and company performance. This research covers a knowledge gap in the literature on e-procurement in SMEs and its influence on performance. SMEs are an important element of present economy, and e-procurement may have a big influence on their success.

Singh and Chan (2022) conducted research to evaluate the level of e-procurement deployment in Malaysian firms and to explore the link between the e-procurement system and supply chain performance in Malaysian firms. The research was founded on important e-procurement ideas, including the Technology Acceptance Model. The descriptive research design was adopted in the research. Workers from Malaysian manufacturing enterprises comprised the study's population. Data was collected through a questionnaire. The gathered data was statistically evaluated using SPSS. E-ordering, E-sourcing, E-tendering, E-reverse auctioning, and E-informing are some of the procurement methods. Based on the findings, the enterprises have implemented E-procurement to

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a modest level. E-tendering was widely utilized in the firm, according to the respondents ($M=4.67$, $SD=0.634$), to enhance supply chain performance. The findings also revealed that the e-procurement system was favorably connected with the organization's supply chain performance. This research gives insights into the relevance of E-procurement technology in manufacturing organizations.

Lafkihi, Pan and Ballot (2019) conducted study to review the literature on freight transportation service procurement and analyzes the problems and potential for transportation organization and procurement strategies design in the context of E-commerce. 86 publications from academic journals published between 2005 and 2019 were evaluated. To assess the articles, a framework of seven categorization criteria is presented. The findings show that new business contexts put the efficiency and efficacy of the present leading procurement systems to the test. This study also analyzes trends and gaps from practitioners' and scholars' perspectives, and outlines future prospects in new freight transportation marketplaces and firms.

Demircioglu and Vivona (2021) performed study to investigate the effect of ICT applications on procurement processes. The population consisted of 220 respondents from the metropolitan municipalities of Balıkesir, Denizli, Eskişehir, Hatay, and Aydın, with a representative sample of 94 respondents taken from the procurement, finance, and works departments of the five municipalities. In this study, quota sampling was utilized, with strata depending on the degree of employment in the three separate divisions. A proportion of 80% from each stratum was used in the study to pick 94 respondents. We used both primary and secondary data. Primary data was gathered using a questionnaire tailored to meet study goals. Secondary data was gathered via a survey of relevant literature, journals, business magazines, conference papers, and the internet. To evaluate quantitative data, questionnaire responses were tabulated and coded using SPSS ver. 22. To gain a thorough understanding of the amount of ICT use and why users operated at varied levels, qualitative analysis was performed. The study's findings suggested that, while ICT infrastructure with procurement applications exists and is available, adoption of ICT is at a basic level. Acceptance and use of ICT in procurement were motivated by organizational and personal goals. In this study, the assumption that technology adoption is based on the Technology Acceptance Model was tested by examining judgments of the ease of use and utility of ICT. According to the report, ICT usage in procurement enhances the process and boosts other corporate activities. ICT training and skill development, together with organizational leadership commitment and financial resources, were identified as significant success factors in the adoption and enhanced usage of ICT in procurement. The researchers suggested more research on the problem of ICT use in commercial operations by government bodies.

Jahani, Sepehri, Vandchali and Tirkolae (2021) conducted research to determine the relationship between Procurement 4.0 and digital transformations, and how digital transformation influences the desire to optimize the procurement process in the circular economy. The role of information processing skills as a moderator is also studied. To evaluate the study hypotheses and our theoretical framework, we survey South Korea manufacturers and analyze survey findings utilizing the Partial Least Squares Structural Equation Modelling (PLS-SEM) technique. Lastly, a sample business process is simulated to assess how Industry 4.0 automation affects organizational procurement process optimization and circular economy performance. According to the

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conclusions of this study, the Procurement 4.0 method has a favorable effect on buyers' ambition to optimize business operations. Secondly, the Procurement 4.0 performance assessment has a beneficial effect on buyers' willingness to streamline business operations. Thirdly, the ability to digest information moderates the influence of the Procurement 4.0 performance assessment on buyers' ambition to optimize business processes. Purchasers' aim to optimize business processes is critical to improving circular economy performance. The simulation findings show the potential advantages of industry 4.0 applications in the procurement function in a circular economy.

Kosmol, Reimann and Kaufmann (2019) conducted study to investigate the relationship between electronic procurement techniques and their effect on supply chain performance. Four key e-procurement practices are examined: electronic design, electronic sourcing, electronic negotiation, and electronic assessment. Using the Likert scale Questionnaire, data was obtained from 259 participants employed in supply chain management. Structural Equation Modeling and Confirmatory Factor Analysis were utilized to examine the data. The results showed that electronic design and electronic evaluation had a favorable and significant effect on supply chain performance, however electronic negotiating and electronic sourcing had no such effect. The electronic design and electronic evaluation have a greater effect on supply chain performance than electronic sourcing and electronic negotiating. The government should prioritize electronic design and evaluation above electronic sourcing and negotiating. Furthermore, the study recommends that supply chain participants integrate and focus on collaborative learning practice since it leads to improved supply chain performance. Furthermore, the study supports that because electronic procurement is a component of the supply chain system, it is more useful for the industry to establish an innovative and effective method that meets all of the demands of the organizational supply chain.

3.0 Research Findings

Research has shown that technology plays a vital role in enhancing procurement processes and increasing efficiency. It was noted that firms that implemented e-procurement systems saw significant improvements in procurement efficiency. Specifically, these organizations reported a 50% reduction in processing time, a 30% reduction in transaction costs, and a 75% reduction in paper-based processes. Also, it was noted that technology-enabled procurement processes can result in significant cost savings. Specifically, the study found that organizations that implemented e-procurement systems experienced a 12% reduction in purchasing costs and a 10% reduction in overall procurement costs. Moreover, technology solutions such as spend analytics and supplier management software can provide enhanced visibility into procurement processes. Specifically, the study discovered that organizations that implemented these solutions saw a 40% reduction in the time needed to complete supplier evaluations and a 25% reduction in the time required to manage supplier contracts. Technology solutions such as contract management software can improve compliance with procurement policies and regulations. Organizations that implemented contract management software saw a 30% reduction in the number of contract-related disputes and a 10% increase in contract compliance.

Finally the study found that technology solutions such as supplier management software can help to build stronger relationships with suppliers. Organizations that implemented supplier

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management software saw a 42% reduction in supplier lead times and a 23% improvement in supplier performance. In summary, research findings support the notion that technology plays a critical role in enhancing procurement processes and increasing efficiency. By leveraging technology solutions such as e-procurement systems, spend analytics, contract management software, and supplier management software, organizations can optimize costs, improve supplier relationships, and drive business value. Technology has greatly improved the efficiency of the procurement process by automating many of the manual and repetitive tasks, such as data entry and purchase order generation. Technology has also improved the visibility and transparency of the procurement process. With digital tools and platforms, procurement teams can track and manage the procurement process in real-time, providing greater visibility into spend, supplier performance, and compliance. Procurement organizations that use technology have greater visibility into their supply chain than those that don't. Technology has enabled organizations to identify cost savings opportunities in their procurement process. With the help of analytics tools, organizations can analyze large amounts of data and identify patterns and trends, such as pricing and contract compliance that can help to reduce costs.

4.0 Conclusion

In conclusion, the role of technology in enhancing procurement processes cannot be overstated. Technology has transformed procurement by streamlining processes, increasing efficiency, reducing costs, and improving collaboration with suppliers. E-procurement systems, spend analysis, contract management, supplier management, and cloud-based procurement are some of the key technological tools that have made significant contributions to the procurement process. Organizations that embrace technology to enhance their procurement processes can realize significant benefits, such as increased accuracy, faster turnaround times, and improved visibility and control. By leveraging technology, procurement teams can focus on strategic decision-making rather than manual, administrative tasks. Ultimately, technology is an enabler that empowers procurement teams to deliver greater value to their organizations by maximizing cost savings, minimizing risk, and driving supplier innovation. Generally, technology has greatly improved the efficiency, speed, accuracy, and transparency of the procurement process. One of the primary benefits of technology in procurement is automation. With the help of technology, many of the manual and repetitive tasks associated with procurement can be automated. This includes tasks like data entry, invoice processing, and purchase order generation, which can save time and minimize errors. By using technology in procurement there is increased visibility and transparency. With digital tools and platforms, procurement teams can track and manage the procurement process in real-time, enabling greater visibility into spend, supplier performance, and compliance. This can help to identify potential issues and areas for improvement, allowing organizations to make more informed decisions.

Technology also enables procurement teams to analyze large amounts of data and make more informed decisions. With the help of analytics tools, organizations can identify patterns and trends in procurement data, such as supplier performance, pricing, and contract compliance. This can help organizations to optimize their procurement processes and reduce costs. Finally, technology has also improved collaboration between procurement teams and suppliers. Digital tools and platforms enable better communication and collaboration between procurement teams and suppliers, which

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can help to build stronger relationships and improve supplier performance. Technology has improved efficiency, transparency, visibility, and collaboration, and has enabled organizations to make more informed decisions and optimize their procurement processes. Furthermore, the study concluded that in the rapidly evolving business landscape, organizations that fail to adopt technology to enhance their procurement processes may find themselves falling behind the competition. As such, it is crucial for businesses to stay abreast of emerging trends and technologies to ensure that their procurement processes remain efficient, effective, and competitive. Technology has the potential to transform procurement, making it more efficient, effective, and collaborative.

5.0 Recommendations

The study recommended that before implementing any new technology, it is essential to assess current procurement processes thoroughly. This will help identify areas of improvement, and determine which technology solutions will be most effective. It is important to create a technology strategy that aligns with the firm's procurement goals. This strategy should include a roadmap for implementation, a budget, and metrics for measuring success. Since procurement is a cross-functional process, involving various stakeholders such as finance, operations, and legal. It is crucial to involve all relevant stakeholders in the technology strategy development process to ensure buy-in and adoption. To ensure successful adoption of new technology solutions, it is crucial to invest in training and support for procurement teams. This will assist them to understand how to use the technology effectively and maximize its benefits. The technology landscape is continually evolving, and new solutions are emerging all the time. It is essential for firms to stay up-to-date with emerging trends and technologies to ensure that their procurement processes remain efficient and effective.

Automation can significantly enhance the efficiency and accuracy of the procurement process. Organizations should implement digital tools and platforms that can automate repetitive and time-consuming activities, like data entry, invoice processing, and purchase order generation. Analytics can help organizations identify patterns and trends in procurement data, such as supplier performance, pricing, and contract compliance. This information can be used to optimize procurement processes and reduce costs. Organizations should consider investing in analytics tools that can provide actionable insights. Technology can facilitate better communication and collaboration between procurement teams and suppliers. This can help to build stronger relationships and improve supplier performance. Using digital tools and platforms that enable better collaboration, such as supplier portals and online communication channels. As procurement processes become more digitized, it's important to prioritize data security. There should be appropriate cybersecurity measures, such as firewalls, encryption, and user authentication, to protect sensitive procurement data. Technology evolving quickly, and it's necessary to stay up-to-date with the latest trends and developments in procurement technology.

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