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Artificial Intelligence Implementations in E-Procurement for Supply Chain & ERP Within Business & Organizations

Paper Prepared by:

USAMA MUHAMMAD FATHY ABD EL HAMID METWALLY

Under Supervision of:

Dr. ATEF TAYH NOUR EL DIN RASLAN

Usama Muhammad Fathy ABD EL HAMID METWALLY
Department of Software Engineering, Faculty of Graduate Studies for Statistical Research (FGSSR)
Cairo University
Giza, Egypt
Student ID: 202105934
usama.muhammad.fathy@gmail.com
Orcid: 0009-0002-9173-8096

***Abstract*— The integration of AI into e-procurement represents a significant technological advancement. AI enhances e-procurement processes by but not limited to (Supplier Selection and Evaluation, Predictive Analytics for Demand Forecasting, Automated Procurement Processes, Spend Analysis , Natural Language Processing (NLP) for Contract Management , Supply Chain Risk Management , Predict Purchase Order Delays, Commodity Tracking and Predictions, Supply Chain Disruption Alerts, Chatbots and Virtual Assistants, Dynamic Pricing and Negotiation, Fraud Detection and Prevention, Ethical Sourcing and Sustainability) AI-driven e-procurement enables organizations to make data-driven decisions, improve supplier relationships, and enhance operational performance. This research demonstrates important AI implementations can be done in the E-Procurement creating the AI rules and recommendations, allowing the business & organizations. This research contributes to study and propose the implementations of AI in E-Procurement integrating & combining both technical and business aspects to achieve optimum usage of new technology in the modern business challenges. Future research could explore expanding more implementations of AI in the E-procurement either enhancing the process or combining external source data such Stock Market data and financial data from the firmed resources achieving cost savings and improve spend management according to the fluctuations of stock market item prices or share price for suppliers and organizations**

***Keywords*—software engineering, Artificial Intelligence, E-Procurement, Supply chain SCM, Enterprise Resource Planning ERP.**

1. Introduction

The integration of AI into e-procurement represents a significant technological advancement. AI enhances e-procurement by:

- **Supplier Selection and Evaluation:** Analyzing large datasets to identify optimal suppliers based on criteria like price, quality, delivery performance, and compliance history.
- **Demand Forecasting:** Predicting future procurement needs through machine learning models analyzing historical data, market trends, and external factors.
- **Spend Analysis:** Processing and analyzing procurement data to identify spending patterns, detect normal and anomalies, and uncover cost-saving opportunities.
- **Contract Management:** Assisting in drafting, reviewing, and managing contracts to ensure compliance and timely renewals or expirations.
- **Risk Management:** Assessing and monitoring supplier risks by analyzing factors such as financial stability and geopolitical events.
- **Process Automation:** Automating routine procurement tasks, reducing manual effort, and minimizing errors.

2. Background

AI-driven e-procurement enables organizations to make data-driven decisions, improve supplier relationships, and enhance operational performance.

2.1. E-Procurement

E-procurement, or electronic procurement, refers to the use of digital technologies to manage the procurement process, encompassing activities such as purchasing goods and services, selecting suppliers, and managing supplier relationships. The primary goal of e-procurement systems is to streamline and automate these processes, leading to increased efficiency, cost savings, and enhanced transparency. Key components include electronic catalogs, e-tendering, e-auctions, and electronic invoicing.

Organizations adopt e-procurement to optimize supply chain operations, reduce procurement cycle times, and achieve significant cost reductions. Digital tools enable better data management, improved communication with suppliers, and more effective compliance monitoring. Strategic benefits of e-procurement include enhanced transparency through clear and auditable procurement trails, improved supplier management, cost efficiency via reduced transaction costs and bulk purchasing, and faster procurement cycles through streamlined approval processes.

2.2. Artificial Intelligence (AI)

Artificial Intelligence (AI) encompasses technologies that enable machines to mimic human intelligence, including learning, reasoning, problem-solving, and decision-making. AI technologies such as machine learning, natural language processing, computer vision, and robotics are increasingly integrated into business processes, leading to automation, improved decision-making, and new data insights.

AI has transformed functions across marketing, finance, human resources, and supply chain management, resulting in significant improvements in efficiency, accuracy, and strategic decision-making.

3. Related Work

In the Literature Review and related work section, this paper will summaries previous studies on AI in e-procurement, each including objectives, results, recommendations, researcher's name, year of publication, these summaries provide insights into various aspects of AI in e-procurement, showcasing different methodologies and findings from recent studies. Adjustments can be made based on specific focus areas or additional studies:

3.1. Study 1: " Artificial intelligence and machine learning in purchasing and supply management: A mixed-methods review of the state-of-the-art in literature and practice " [1]

- **Researcher:** Jan Martin Spreitzenbarth,Christoph Bode, Heiner Stuckenschmidt.
- Journal: Science Direct
- **Year of Publication:** 2024

Objectives: The main objective of this inductive review is to explore literature and practice with a focus on relevant use cases that will not only have an impact on procurement operations, but also on the entire organization, external partners, and society.

Results: Major finding of this review that there is still a lack of common definitions for the application of AI and ML.

3.2. Study 2: " Corruption in public procurement: Can e-procurement and artificial intelligence make a difference in Africa? " [2]

- **Researcher:** Mutasim Mohamed Elhassan Gadour.
- Journal: QScience Connect
- **Year of Publication:** 2024

Objectives: This paper aims to assist public procurement practitioners, government entities, and funding organizations in a better understanding of the technology role, including public e-procurement and AI, in their efforts to minimize the scourge of corruption in public procurement.

Results: E-procurement and AI are amongst the most significant technological advancements in public procurement in recent times. When implemented appropriately, with a sound reform agenda in place, and a proper legislative and regulatory framework, e-public procurement and AI can achieve certain objectives, including reducing corruption and costs, and increasing transparency.

3.3. Study 3: " ARTIFICIAL INTELLIGENCE (AI) BASED CONTRACTS PROCUREMENT: EXAMINING THE INFLUENCE OF BIG DATA, MACHINE LEARNING, INTERNET OF THINGS, EMPLOYEE SKILLS & RESOURCES AND LEADERSHIP ON PROCUREMENT COST REDUCTION " [3]

- **Researcher:** Omar Al-Sadhan, Muhammad Awais Bhatti.
- **Journal:** ORESTA Operational Research in Engineering Sciences - Journal of Management and Engineering.
- **Year of Publication:** 2023

Objectives: This study aims to examine the impact of big data, machine learning, personnel, IoT skills, and artificial intelligence in procurement contracts that impact cost savings and improve enterprise performance and productivity by automating previously labor-intensive processes or tasks.

Results: The study's findings demonstrated the importance of big data analytics, the Internet of Things, and digital skills for employees.

3.4. Study 4: " ARTIFICIAL INTELLIGENCE-BASED PROCESS AUTOMATION IN E PROCUREMENT " [4]

- **Researcher:** HAYAT EL ASRI, LAILA BENHLIMA
- **Journal:** Journal of Theoretical and Applied Information Technology
- **Year of Publication:** 2022

Objectives: This paper, which provides a systematic literature review on the use of AI in e-procurement, aims at synthesizing, analyzing, and discussing how AI has been used up till now in different e-procurement processes, like bidding and negotiation, and the extent to which it helped in automating the procedure(s).

Results: Of all the research studies used in this SLR, very few referred to the AI algorithms used in the worked-out solutions, which might be a deliberate act on the part of the researchers for confidentiality purposes. Algorithms that can be used abound, but a specific allusion to the relevant ones might have been very beneficial as it sets a trend for specialists interested in this field to pursue and build on previous works and the accumulated expertise over the years.

3.5. Study 5: "Robotic Process Automation in purchasing and supply management: A multiple case study on potentials, barriers, and implementation" [5]

- **Researcher:** Christian Flechsig, Franziska Anslinger, Rainer Lasch
- **Journal:** Science Direct
- **Year of Publication:** 2022

Objectives: Based on a multiple case study including 19 organizations of the public and private sector, this paper narrows that gap and presents comprehensive insights into potentials, barriers, suitable processes, and best practices and components for RPA implementation.

Results: The findings indicate that adoption depends on the organizations' digital procurement readiness and maturity. Application areas of RPA enlarge with increasing experience and range from transactional and operative tasks within the procure-to-pay process to more strategic use cases in sourcing and supply relationship management. Potentials mainly comprise employee reliefs, cost savings, and increased operational efficiency and quality.

3.6. Study 6: " The Impact of Intelligent Process Automation on Purchasing and Supply Management " [6]

- **Researcher:** Christian Flechsig.
- Journal: Springer
- **Year of Publication:** 2021

Objectives: The Covid-19 pandemic drives the need for Intelligent Process Automation (IPA). However, the technology's adoption for purchasing and supply management (PSM) is still in the initial stage and has hardly been explored. Therefore, this empirical multiple case study builds on 19 organizations, including private and public procurement departments, consultancies, and IPA providers, to examine the impact of IPA on the PSM function.

Results: The findings provide comprehensive insights and reveal suitable operational and strategic application areas as well as several benefits related to IT systems and data, operational efficiency, process quality, and employee satisfaction. The study also identifies various technological, organizational, and environmental challenges that need to be overcome for further IPA adoption.

3.7. Study 7: "Artificial Intelligence in Purchasing: Facilitating Mechanism Design-based Negotiations" [7]

- **Researcher:** Ines Schulze-Horn,Sabrina Hueren,Paul Scheffler &Holger Schiele
- Journal: Tandf Online
- **Year of Publication:** 2020

Objectives: The application of mechanism design theory in negotiations gained enhanced attention. While such approaches can result in high-cost reductions, mechanism design-based negotiations are very complex. The paper aims at answering the question whether artificial intelligence (AI) can facilitate the execution of mechanism design-based negotiations.

Results: The results indicate that the application of AI can indeed facilitate the execution of mechanism design-based negotiations and help overcoming bounded rationality problems. Even more, AI might be a game changer for the purchasing function.

4. Research Plan

4.1. Objectives of the Research

- **Primary Objective**
  - Provide solution for "Supplier Selection Evaluation" AI implementation case in e-procurement
  - Analysis & recommendations for other AI implementation cases in e-procurement.
- **Secondary Objectives**
  - Present the impact of AI technologies on e-procurement practices & putting trust in AI and systems to avoid the impacts of human resources head hunting on business daily processes, This is one of the important objectives of the organizations now according to the rapid turnover of employees and high competition between companies in same industry, Which some time leaves the organizations with un trained staff or out of the business industry staff

with no high experience in the field which surely affect the progress of the business across many aspects " Quality , Cost , Compliance … etc.)

4.2. Research Questions

- **Main Research Questions**
  - How does AI improve efficiency in e-procurement processes by proposing implementation cases of AI in e-procurement
- **Subsidiary Questions**
  - What are the specific AI technologies currently used in e-procurement?
  - How do different sectors perceive the benefits of AI in e-procurement?
  - What ethical considerations arise from AI adoption in e-procurement?

4.3. Literature Review

- Summarize existing studies on AI in e-procurement, including objectives, results, and recommendations (Will be detailed ion related work section)

4.4. Problem Definition

While e-procurement systems have brought considerable efficiencies and cost savings to organizations, still the integration of AI in e-procurement is not fully used for further transform procurement processes. However, there is a gap in understanding the practical implications, benefits, and challenges of implementing AI in e-procurement. This research addresses the need to explore how AI can optimize procurement functions, improve decision-making, and mitigate risks, providing specific implementation cases for AI in e-procurement to leverage AI effectively in their procurement strategies.

4.5. Methodology

- **Research Design**
- **Data Collection**
- **Data Analysis**
- **Ethical Considerations**

4.6. Research Limitations

- **Scope Limitation**
  - In this study we will limit access to specific AI implementation cases in e-procurement.
  - Data collected by online surveys and analysis.

4.7. Importance of the Study

  - By exploring the intersection of these fields, the research provides valuable insights for businesses seeking to enhance their procurement processes through AI

5. Research Assumptions

These assumptions provide a foundation for the research design and help ensure that the research is focused and manageable. The key assumptions for this study on AI in e-procurement are as follows:

5.1. Relevance of AI in E-Procurement

It is assumed that AI technologies are relevant and applicable to e-procurement processes. This assumption underlies the premise that AI can significantly impact procurement functions and that there is value in studying these implementation cases.

5.2. Access to Knowledgeable Participants

It is assumed that the IT professionals participating in the surveys have sufficient knowledge and experience with e-procurement, Information Technology and Artificial Intelligence to provide accurate and insightful information. Their expertise is critical for gathering meaningful data.

5.3. Availability and Accuracy of Data

The study assumes that the data collected through surveys, and case studies will be available and accurate. It is assumed that participant will provide honest and comprehensive answers.

5.4. Generalizability of Findings

It is assumed that the findings from the selected sample of businesses and professionals can be generalized to a broader context. While the study may focus on specific sectors, it is assumed that the insights gained will be applicable to other organizations considering AI in e-procurement.

5.5. Stability of E-Procurement and AI Trends

It is assumed that the trends and practices observed during the research period will remain relatively stable. While AI and e-procurement are rapidly evolving each day and many software houses develop new implementation cases.

5.6. Willingness to Share Information

It is assumed that participants will be willing to share information about their experiences with AI in e-procurement. This includes discussing both successes and challenges openly, which is essential for a balanced analysis.

These assumptions help define the scope and context of the study, ensuring that the research is focused and that potential limitations are acknowledged.

6. Research Methodology

6.1. Research Design

This study employs a mixed-methods research design, combining both qualitative and quantitative approaches. This design allows for a comprehensive analysis of the application of AI in e-procurement, capturing both numerical data and in-depth insights from industry professionals.

6.2. Data Collection Methods

6.2.1. Primary Data Collection

- **Surveys:** A structured survey to IT professionals across various industries to gather quantitative data on the current use of AI in e-procurement, perceived benefits, and challenges.
- **Case Studies:** A set of proposed AI implementation cases across different e-procurement products.

6.2.2. Secondary Data Collection

- **Literature Review:** An extensive review of existing literature, including academic papers, industry reports, and case studies, will be conducted to establish a theoretical foundation and identify research gaps.
- **Case Studies:** Detailed case studies of organizations that have successfully implemented AI in their e-procurement processes will be analyzed to understand best practices and lessons learned.

6.3. Data Analysis Methods

6.3.1. Quantitative Data Analysis

- **Statistics:** Basic statistical techniques will be used to summarize the survey data.

6.3.2. Qualitative Data Analysis

- **Analysis:** Qualitative data from case studies will be analyzed to identify trends in current AI in e-procurement solutions.

6.4. Ethical Considerations

Ethical considerations are paramount in this research to ensure the integrity and credibility of the study. The following measures will be taken:

- **Confidentiality:** The confidentiality of all participants will be maintained. and results will be reported in an aggregated form to prevent identification of individual participants.
- **Data Security:** Collected data will be securely stored and only accessible to the research team.
- **Transparency:** The research process, including data collection and analysis methods, will be transparently documented to ensure reproducibility and credibility.

6.5. Justification of Methodology

The mixed-methods approach is justified as it allows for a holistic understanding of AI in e-procurement. Quantitative data provides a broad overview of current practices and trends, while qualitative data offers deeper insights into AI implementations in e-procurement. This combination enhances the validity and reliability of the findings, providing a robust basis for recommendations.

7. Research Cases: AI Implementations in E-Procurement in Supply Chain & ERP

Paper primary objective is to propose a solution for "Supplier Selection and Evaluation [8]" using AI implementations to dynamically adjust weights for evaluation criteria based on current business priorities & market conditions, Beside the primary objective of the paper, The secondary objective is to present the impact of other AI technologies and implementation cases on e-procurement practices including (Predictive Analytics for Demand Forecasting [9], Automated Procurement Processes [10], Spend Analysis [11], Natural Language Processing (NLP) for Contract Management [12], Supply Chain Risk Management [13], Chatbots and Virtual Assistants [14], Dynamic Pricing and Negotiation [15], Fraud Detection and Prevention [16], Ethical Sourcing and Sustainability [17]).

7.1. Supplier Selection and Evaluation [8]

Using AI in supplier / contractor selection evaluation can significantly enhance the accuracy, efficiency, and flexibility to business and market changes for the procurement process. AI technologies, such as machine learning, natural language processing (NLP), and predictive analytics, can analyze large datasets, identify patterns, and provide insights that traditional or fixed methods might miss for putting a fixed weight for supplier evaluation criteria.

Evaluation Parameter	Weight	Supplier A	Supplier B	Supplier C	Supplier A %	Supplier B %	Supplier C %
Quality	30%	100%	50%	75%	0.003	0.0015	0.00225
Cost	20%	50%	100%	75%	0.001	0.002	0.0015
Delivery Time	20%	100%	100%	100%	0.002	0.002	0.002
Financial Stability	10%	100%	100%	100%	0.001	0.001	0.001
Technical Capability	10%	100%	100%	100%	0.001	0.001	0.001
Customer Service	5%	100%	100%	100%	0.0005	0.0005	0.0005
Compliance	3%	100%	100%	100%	0.0003	0.0003	0.0003
Innovation	2%	100%	50%	50%	0.0002	0.0001	0.0001
Total Score					90%	84%	87%

Table 1 - Supplier Evaluation Parameters Fixed Weight example

7.2. **Implementation:** Machine learning algorithms analyze historical procurement data, supplier performance metrics, and business priorities / market trends to identify the best suppliers and to dynamically adjust weights for evaluation criteria based on current business priorities (factors such as cost-saving goals, quality improvement, supply chain resilience) and market conditions (factors such as economic trends, geopolitical events, supply chain disruptions) instead of fixed weight for each parameter.

7.3. Steps to Implement AI in Supplier Evaluation:

7.3.1. Data Collection and Integration

- **Gather Data**: Collect data from various sources such as ERP systems, e-procurement databases, supplier performance records, financial reports, and third-party data providers, putting into consideration data integration to standardize data from different sources, ensuring a comprehensive dataset for evaluation.

7.3.2. Preprocessing and Cleaning Data

- **Data Cleaning**: Clean and preprocess data, handling missing values, outliers, and inconsistencies, making sure to normalize data to ensure comparability across different metrics "different material types, material groups and different LOBs" and sources.
- **Data Segmentation**: This is important to have different supplier evaluation strategies according to Line of Business in the company and according to material types or groups or even for local and foreign supplying sources.

7.3.3. Define Evaluation Criteria

- **Standard Criteria**: Quality, cost, delivery performance, financial stability, technical capability, customer service, compliance, innovation.

- **Additional Criteria**: AI can help identify additional relevant criteria by analyzing historical data of supplier blockage reasons or rejected quality reasons or rejected payment reasons for example.

7.3.4. Machine Learning Models for Evaluation

- **Training Models**: Train machine learning models using historical supplier performance data to predict future performance and risks.
    - **Regression Models**: Predict continuous outcomes like delivery times or defect rates according to physical and quality inspection results or even batch recall.
    - **Classification Models**: Classify suppliers into categories such as high-risk, low-risk, preferred, etc.

7.3.5. Natural Language Processing (NLP)

This is important to not only depends on user evaluations for suppliers and receipts and to compare it to actual agreements

- **Text Analysis**: Apply NLP to analyze unstructured data from supplier communications, contracts & reviews.
- **Document Analysis**: Extract key information from contracts and compliance documents to ensure adherence to standards.

7.3.6. Predictive Analytics

- **Risk Prediction**: Use predictive analytics to identify potential risks associated with suppliers, such as financial instability or geopolitical issues.
- **Performance Forecasting**: Predict future performance trends based on historical data.

7.3.7. Scoring and Ranking

- **Weighted Scoring**: Create the dynamic based formula and & use AI to dynamically adjust weights for evaluation criteria based on current business priorities and market conditions.
- **Composite Score**: Calculate a composite score for each supplier, combining various performance metrics and criteria.

7.3.8. Real-Time Monitoring and Alerts

- **Continuous Monitoring**: Implement AI-powered systems to continuously monitor supplier performance and external factors in real-time.
- **Alerts and Notifications**: Set up alerts for significant changes or changes approval or potential risks, enabling proactive management.

Example: SAP Ariba Strategic & SAP Ariba Central Procurement uses AI to assess supplier risk and performance, recommending the most reliable and cost-effective suppliers based on data analysis. [8]

Case Reference: https://www.sap.com/mena/products/spend-management/supplier-lifecycle.html

7.4. Predictive Analytics for Demand Forecasting [9]

Implementation: AI-driven predictive analytics models forecast future demand for products and services, optimizing procurement planning and inventory management.

Example: SAP Ariba uses AI to predict demand fluctuations, helping companies adjust their procurement strategies to avoid overstocking or stockouts. [9]

Case Reference:
https://help.sap.com/docs/SAP_ANALYTICS_CLOUD/42093f14b43c485fbe3adbbe81eff6c8/22ad1d4a648d4800b76347a0551d4071.html

7.5. Automated Procurement Processes [10]

Implementation: Robotic Process Automation (RPA) automates routine procurement tasks such as purchase order creation, invoice processing, and contract management.

Example: SAP Ariba Integration with ERP & SAP Ariba Buying automate repetitive procurement tasks, reducing processing times and minimizing human error. [10]

Case Reference: https://www.sap.com/documents/2022/12/04da9147-567e-0010-bca6-c68f7e60039b.html

7.6. Spend Analysis [11]

Implementation: AI-powered spend analysis tools categorize and analyze expenditure data, identifying cost-saving opportunities and procurement inefficiencies.

Example: Coupa's software for Spend Analysis leverages AI to analyze spending patterns, helping businesses make data-driven decisions to optimize procurement costs. [11]

Case Reference: https://www.coupa.com/products/spend-analysis

7.7. Natural Language Processing (NLP) for Contract Management [12]

Implementation: NLP algorithms extract and analyze key terms, clauses, and obligations from procurement contracts, ensuring compliance and identifying potential risks.

Example: Icertis Contract Intelligence uses NLP to scan and interpret contract documents, providing insights into contractual obligations and compliance issues. [12]

Case Reference: https://www.icertis.com/learn/what-is-contract-intelligence/

7.8. Supply Chain Risk Management [13]

Implementations: Help streamline supply chain risk management

Example: Resilinc's software [13]

- Resilinc's RiskShield uses AI to track supplier risks in real-time, alerting procurement managers to potential disruptions and enabling proactive risk management by their AI systems which continuously monitor supplier-related data from various sources (e.g., news, financial reports, social media) to detect and mitigate risks in the supply chain.
- **Regression Models: Predict Purchase Order Delays**
  - The AI that goes into our Purchase Order Delivery Delay Prediction Engine is a type of predictive model called a regression model. This engine leverages AI to identify how a supplier will perform by analyzing past events and on-time delivery data.
- **Time Series Forecasting: Commodity Tracking and Predictions**
  - In Resilinc's software , The CommodityWatchAI component is a predictive algorithm that combines forecasting and Resilinc's data analysis to predict commodity price fluctuations and supply constraints. This allows companies to see what is in demand, source alternative materials, and negotiate new contracts with suppliers at opportunistic price points according to historical market patterns, the system predicts optimal times to either place procurement orders or exercise patience, waiting for more favorable conditions.
- **Classification Models: Supply Chain Disruption Alerts**
  - Resilinc uses classification models to determine whether or not news can be considered a supply chain disruption. EventWatchAI—Resilinc's supply chain disruption alert platform— monitors text-based electronic media worldwide 24/7, from over 104 million sources in 108 languages. Today, using AI, Resilinc monitor and alert customers about disruption risks.
  - Use Case for AI Recommendation Models in Supply Chain Risk Management:
    - When a primary supplier faces an unexpected challenge, the ability to swiftly identify and connect with alternate suppliers becomes not just a strategic advantage but a necessity. AI assist in analyzing the quantity confirmation patters for a solo or a fixed supplier to mitigate the risk of shortage delivery in the near future.

Case Reference: https://www.resilinc.com/blog/ai-supply-chain-risk-management-5-models/

7.9. Chatbots and Virtual Assistants [14]

Implementation: AI-driven chatbots and virtual assistants handle procurement inquiries, assist with order tracking, and provide support to suppliers and buyers.

Example: IBM's Watson Assistant is used by various companies to streamline procurement support, offering real-time assistance and reducing response times. [14]

Case Reference: https://www.ibm.com/products/watsonx-assistant

7.10. Dynamic Pricing and Negotiation [15]

Implementation: AI algorithms dynamically adjust pricing based on market conditions, demand, and supplier interactions, and can even conduct negotiations.

Example: SAP Ariba's AI-driven platform facilitates dynamic pricing and automated negotiations, helping companies secure better deals with suppliers. [15]

Case Reference: https://community.sap.com/t5/spend-management-blogs-by-sap/dynamic-pricing-based-on-quantity-and-validity-periods-in-cif-catalog/ba-p/13528541

7.11. Fraud Detection and Prevention [16]

Implementation: AI systems analyze transaction data to detect anomalies and patterns indicative of fraudulent activities in procurement processes.

Example: AppZen uses AI to audit procurement transactions in real-time, identifying potential fraud and ensuring compliance with procurement policies, not only AppZen but also SAP Ariba invoicing uses three-way matching and vendor invoice submission to prevent invoice and expense fraud [16]

Case Reference: https://www.appzen.com/use-cases/prevent-invoice-and-expense-fraud/

7.12. Ethical Sourcing and Sustainability [17]

Implementation: AI tools assess suppliers' environmental and social governance (ESG) performance, ensuring ethical sourcing and sustainability in procurement decisions.

Example: SAP Ariba uses AI to evaluate suppliers' sustainability practices, helping companies make informed decisions that align with their corporate social responsibility goals. [17]

Case Reference: https://community.sap.com/t5/spend-management-blogs-by-sap/improving-corporate-value-through-sustainable-procurement/ba-p/13577740

8. Research Survey

8.1. Survey Summary

The purpose of this survey is to gather actual data for the research study titled "Artificial Intelligence in E-Procurement for SCM & ERP within Business & organizations." The survey aims to collect insights from IT professionals regarding the adoption and the feedback they got from Procurement team, challenges, and benefits of integrating artificial intelligence (AI) technologies in e-procurement processes. By capturing a broad range of perspectives and experiences, the survey seeks to:

1. **Assess Current AI Adoption**: Determine the extent to which AI technologies are currently being utilized in e-procurement across various industries and organizational sizes.
2. **Identify Challenges and Benefits**: Explore the key challenges organizations face when implementing AI in e-procurement, as well as the benefits they observe from its adoption.
3. **Evaluate Impact on Procurement Efficiency**: Understand how AI impacts specific aspects of e-procurement, including process efficiency, supplier selection accuracy, cost savings, risk management, and decision-making.
4. **Gather Future Prospects and Recommendations**: Collect opinions on the future improvements AI can bring to e-procurement and gather recommendations for organizations considering AI implementation.

The data obtained from this survey will provide a comprehensive overview of the current landscape of AI in e-procurement, highlighting both successes and areas needing improvement. These insights will contribute to the development of actionable recommendations for businesses looking to leverage AI for enhanced procurement processes, thereby advancing the field of e-procurement and AI integration.

8.2. Survey Questions

Survey: Impacts of using **Artificial Intelligence in E-Procurement for Business & Organizations**

- **What is your job title?**
- **How many years of experience do you have in your field?**
- **Which industry does your organization belong to?**
- **How many employees does your organization have?**
- **Is your organization currently using e-procurement processes?**
- **If yes, how long has your organization been using e-procurement?**
- **Is your organization currently using AI in its e-procurement processes?**
- **If yes, which AI technologies are being used? (Select all that apply)**
  - **Machine Learning**
  - **Natural Language Processing (NLP)**
  - **Robotic Process Automation (RPA)**
  - **Predictive Analytics**
- **How long has your organization been using AI in e-procurement?**
- **Could you please mention which platform your organization is currently using for e-procurement?**
- **To what extent has AI improved the following aspects of e-procurement in your organization? (Rate on a scale of 1-5, with 1 being 'Not Improved' and 5 being 'Greatly Improved')**
  - **Efficiency of procurement processes**
  - **Accuracy in supplier selection**
  - **Cost savings**
  - **Risk management**
  - **Inventory management**
  - **Decision-making**
- **What challenges has your organization faced in implementing AI in e-procurement? (Select all that apply)**
  - High implementation costs
  - Lack of technical expertise
  - Resistance to change
  - Data privacy concerns
  - Integration with existing systems
- **What benefits has your organization observed from using AI in e-procurement? (Select all that apply)**
  - **Reduced processing times**
  - **Enhanced data analysis capabilities**
  - **Improved supplier relationships**
  - **Increased accuracy and reliability**

- Better risk assessment

- **On a scale of 1-5, how satisfied are you with the overall impact of AI on your organization's e-procurement processes? (1 being 'Not Satisfied' and 5 being 'Highly Satisfied')**
- **Do you think your organization will increase its investment in AI for e-procurement in the next 3-5 years?**
- **What future improvements do you believe AI can bring to e-procurement in your organization?**
- **What recommendations would you give to other organizations considering implementing AI in their e-procurement processes?**
- **Please provide any additional comments or insights regarding AI in e-procurement**

8.3. Survey Responses Analysis

Survey Analysis: Responses are based on **high qualified participants and managerial levels in both companies or organizations during 2024**

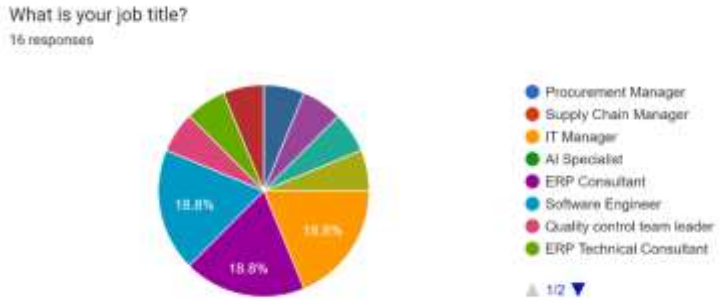

Figure 1 - Survey Responses Analysis - Job Title

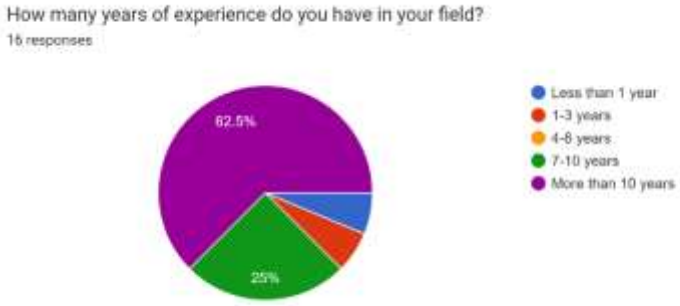

Figure 2- Survey Responses Analysis - How many years of experience do you have in your field?

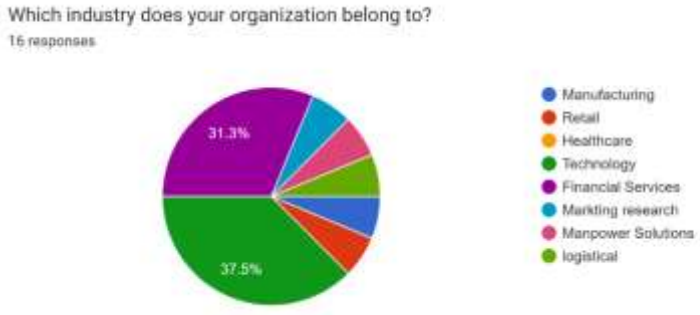

Figure 3- Survey Responses Analysis - Which industry does your organization belong to?

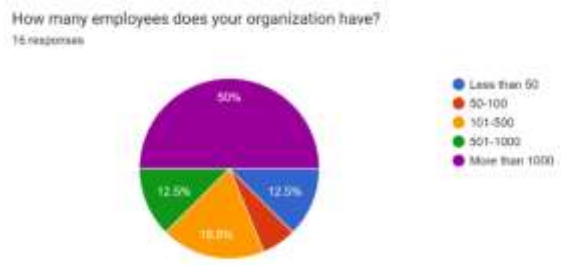

Figure 4- Survey Responses Analysis - How many employees does your organization have?

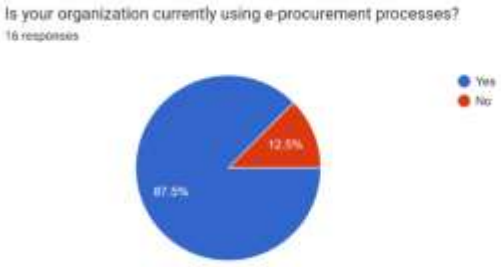

Figure 5- Survey Responses Analysis - Is your organization currently using e-procurement processes?

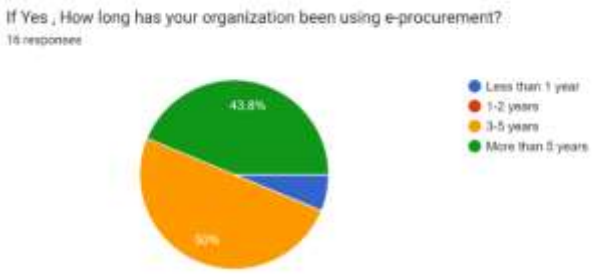

Figure 6- Survey Responses Analysis - If yes, how long has your organization been using e-procurement?

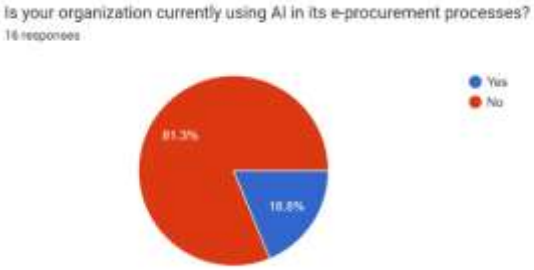

Figure 7- Survey Responses Analysis - Is your organization currently using AI in its e-procurement processes?

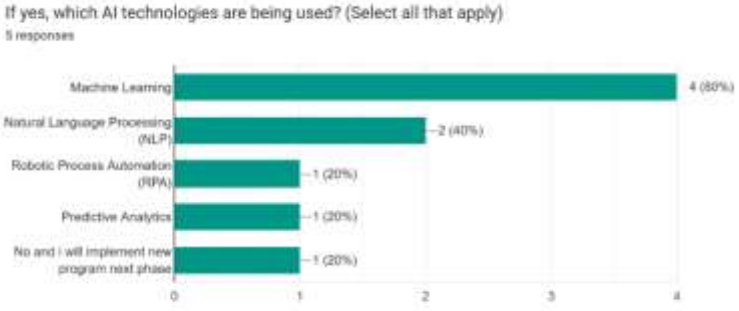

Figure 8- Survey Responses Analysis - If yes, which AI technologies are being used?

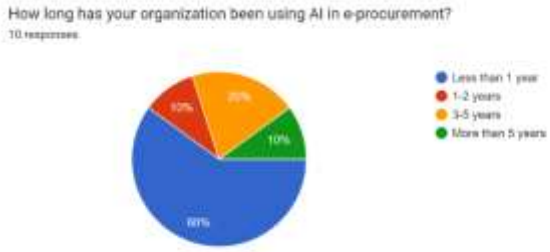

Figure 9- Survey Responses Analysis - How long has your organization been using AI in e-procurement?

Figure 10- Survey Responses Analysis - Could you please mention which platform your organization is currently using for e-procurement?

Figure 11- Survey Responses Analysis - To what extent has AI improved the following aspects of e-procurement in your organization? (Rate on a scale of 1-5, with 1 being 'Not Improved' and 5 being 'Greatly Improved')

Figure 12- Survey Responses Analysis - What challenges has your organization faced in implementing AI in e-procurement?

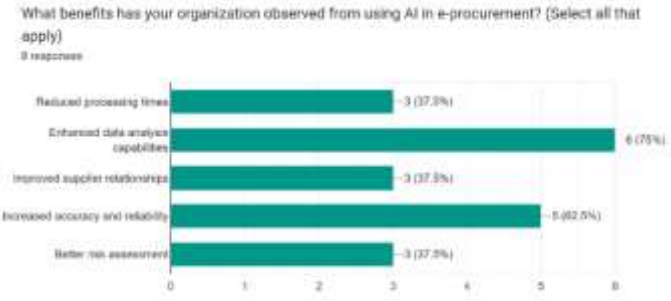

Figure 13- Survey Responses Analysis - What benefits has your organization observed from using AI in e-procurement?

Figure 14- Survey Responses Analysis - On a scale of 1-5, how satisfied are you with the overall impact of AI on your organization's e-procurement processes? (1 being 'Not Satisfied' and 5 being 'Highly Satisfied')

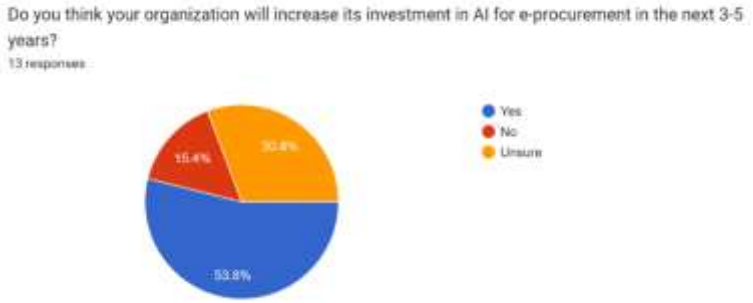

Figure 15- Survey Responses Analysis - Do you think your organization will increase its investment in AI for e-procurement in the next 3-5 years?

Conclusion of Survey & Cases included in Paper:

The survey results & Paper Cases presents the benefits of incorporating AI in e-procurement, highlighting its importance in modern business operations. The key advantages observed include increased efficiency, cost savings, enhanced supplier management, improved decision-making capabilities, and effective risk mitigation. These findings strongly support the argument that AI plays a crucial role in transforming procurement processes, making them more strategic, efficient, and resilient.

Leveraging AI in e-procurement specially in supplier selecting and evaluation and other mentioned cases in this paper are better positioned to adapt to dynamic market conditions, optimize their supply chains, and achieve competitive advantages.

In conclusion, the evidence gathered from the survey & paper cases clearly demonstrates that AI is not just an enhancement but a necessity for businesses aiming to streamline their procurement operations and achieve sustainable growth. AI's ability to mitigate risks makes it an invaluable tool in the evolving landscape of e-procurement in SCM and ERP for business and organizations.

****** End Of Survey & Cases Analysis ******

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