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**| RESEARCH ARTICLE**

## Analyzing the Effectiveness of Property Developers' In-house-Developed Versus Outsourced Systems on Procurement Efficiency

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**| ABSTRACT**

Digital solutions have greatly progressed the automation of procurement functions across industries, including real estate. This study focused on analyzing the effectiveness of in-house-developed applications compared to outsourced systems on the procurement efficiency of property developers. Regardless of the company size, procurement involves several steps to obtain the goods and services needed for the business. One of the distinct functions of the procurement department is to ensure that purchased materials, or services conform to specified requirements at the most economical but good quality and in favorable terms. Streamlining systems, procedures, and processes, overcoming operational challenges, and establishing a sound business culture with well-integrated solutions are the objectives of digitization. This research study aims to ascertain the efficacy of internally developed systems versus externally obtained software for procurement efficiency of real estate developers in Makati City, Philippines, with 65 respondents. The researchers aim to examine the respondents' perception of the perceived usefulness and perceived ease of use of in-house-developed systems compared to outsourced applications in achieving procurement efficiency with consideration of the company size and users' age group. The researchers made use of descriptive and explanatory research methods for the investigation of the significant relationship and differences between the two digital platforms. The results of the study show several significant implications. The demographic profile of the respondents plays a relevant role in the assessment of the effectiveness of internally developed software versus outsourcing for procurement efficiency. Distinct differences were observed in terms of perceived usefulness and perceived ease of use between in-house-developed systems and outsourced systems. The findings indicate that individuals who utilize outsourced systems tend to exhibit a greater inclination towards strongly agreeing that their productivity is enhanced and their job performance is improved when utilizing such systems. Conversely, the findings revealed that participants who utilized internally developed systems exhibited a greater propensity to strongly agree that acquiring proficiency in the system and enhancing their skillset was a comparatively effortless endeavor. This study provides recommendations for procurement professionals, property developers, future researchers, and national and local governments to maximize the use of digital platforms for productivity and operational efficiency.

**| KEYWORDS**

Digital solutions, in-house-developed, outsourced systems, property developers, procurement, procurement functions, sourcing, real estate industry, digitization

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### 1. Introduction

As the entire workforce, business practices, including supplier and customer interactions, have been transformed to a new norm where digital transformation has been identified as a key component to survive and thrive during and after the Covid-19 pandemic, the need for sustainable and well-integrated business applications has greatly increased.

With the growing complex operational and statutory reportorial requirements in the real estate industry in the Philippines, specialty applications were developed to achieve the proper recording, organization, consolidation, and analysis of management and financial data of property developers. For instance, procurement functions of property developers cover a wide array of roles and responsibilities, which include but are not limited to vendor prequalification and accreditation, sourcing, bid management, contract management, vendor management, purchasing, logistics, delivery compliance monitoring, quality control, non-conformance reporting, and vendor performance evaluation. All business requirements should be put in place in a single digitized platform with relevant data security measures and access controls.

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Capitalizing on the current challenges being encountered by property developers in terms of procurement functions, there is a need to improve the digital landscape of how the workflows are being captured. Multiple disparate systems may be used across different business units and departments, leading to inefficiencies in operations and financial reporting. The lack of a centralized and integrated system for procurement hampers the organization's ability to obtain a holistic view of its operational and financial performance and make informed decisions.

Selecting and implementing the appropriate digital platform is of high importance in addressing these challenges. This will mean that property developers should seek the implementation of a comprehensive solution that centralizes file maintenance and financial data, streamlines controllership and procurement processes, and enhances reporting capabilities. This procurement solution can either be developed by available resources or outsourced to experienced systems providers.

### **1.1 Background of the Study**

Digital transformation aims to enhance and streamline the transactional processes within and across all departments of an organization. Every automation project recognizes the critical importance of accurate management and financial data, robust validation and control procedures, and effective controllership capabilities to support strategic decision-making and drive organizational growth. The real estate industry, particularly property developers, is one of the leading, stable, and diversified business types in the Philippines. Property development encompasses areas such as residential, commercial, industrial or land/site development. The common challenges of property developers in terms of procurement functions include disparate and non-integrated off-the-shelf systems, operational inefficiency, costly implementation of foreign Enterprise Resource Planning (ERP) systems, lacking data visibility, traceability, and controllership, difficulties in data consolidation and reporting, and non-compliance to regulatory reporting requirements. Moreover, companies are in quest to future proof their digitalization initiatives.

According to research, there are varied dimensions in which all the external and internal factors on decision-making affecting the procurement digitization process are considered. Compared with conventional supply chain and procurement management, supply chain digitalization differs in terms of management of information, emerging technologies, and knowledge. One of the key factors is the assessment of the existing tools, techniques, processes, and solutions to support the decision to adopt new technologies, either by in-house development, outsourcing, or outright purchase from providers of business applications. Upon consideration of the firm's requirements and standards, studying the advantages of adopting new standards and systems, and enabling advanced technologies, the functional users and top management decide to adopt digitalization for improved information sharing, cost-reduction, efficiency and effectiveness, competitiveness, and compliance. (Deepu & Ravi, 2021)

By thinking about the procurement process as a product and putting the stakeholders at the very center of property developers' focus, the delivery of an improved digital platform as a single source of truth serves the operational requirements of property developers' business teams.

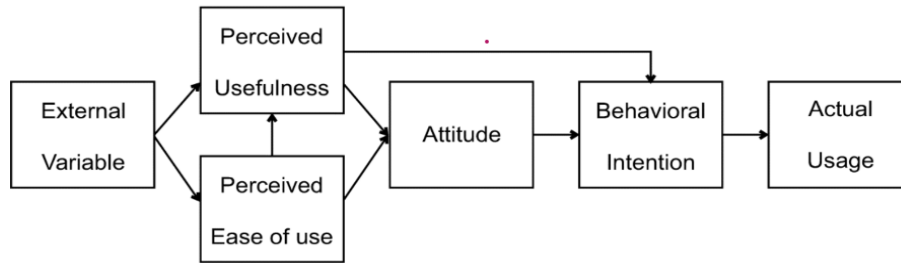
E-Procurement is a component of the innovations on technological platforms enabling systems using the internet, and over time, it has been extensively accepted and used globally by different sectors. Several studies have been done to analyze the factors influencing the decision to adopt digital platforms, as well as examine the impacts of digitalization on the organization's performance in terms of cost reduction, operational efficiency, data visibility, and productivity. There are several factors affecting the adoption and application of digital procurement by organizations, including the organization, environment, technology, and management support. Previous studies suggested that the management support factors showed the most influence on digital procurement implementation, which is followed by environmental factors, then technological factors, and lastly, organizational factors. (Muriithi & Senelwa, 2018)

These research studies have been conducted with the intention of understanding the efficacy of in-house-developed applications compared to outsourced Enterprise Planning Systems (ERPs) or specialty applications on the efficiency of procurement workflows and processes of property developers in Makati City, Metro Manila.

The understanding further aims to provide a comprehensive comparison of the benefits of implementing in-house-developed systems and externally provided software to property developers in terms of operational efficiency for their procurement department.

**1.2 Theoretical Framework**

**Figure 1**  
*Technology Acceptance Model (TAM)*

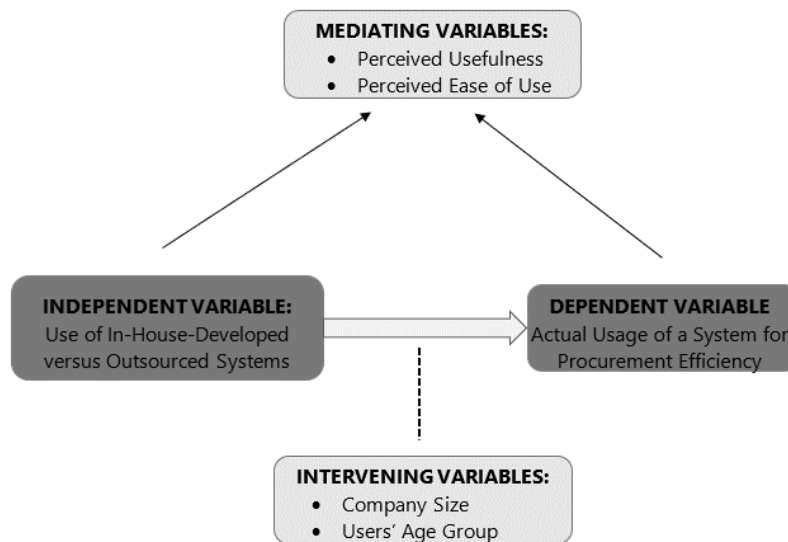


Source : (Davis, 1989)

Davis created the TAM to explain Information Technology users’ behaviors and predict them based on the Theory of Reasoned Action (TRA). Perceived usefulness and ease of use are identified as the main factors affecting attitude in the TAM, which develops only the relations among attitude, belief, behavior, and intention. All other external factors are presumed to influence intention and attitude indirectly through perceived usefulness and ease of use. Thus, the variables called perceived usefulness and perceived ease of use are the inputs to TAM. The perceived usefulness of IT specifies how much users from different departments believe that using some kind of digital platform improves their task attainment ability and productivity, and perceived ease of use signifies how much they believe that a specific system is simple to use. (Park & Park, 2020)

**1.3 Conceptual Framework**

**Figure 2**  
*Conceptual Framework*



The above figure shows the use of in-house-developed versus outsourced systems as the independent variable in this conceptual framework. This variable describes the implementation of property developers of either in-house-developed or outsourced systems for their procurement department. The mediating variables, specifically perceived usefulness and perceived ease of use, pertain to the belief that using some kind of digital system improves tasks attainability and that a specific application is easy to

use. The dependent variable in this framework is the actual usage or utilization of a system for procurement efficiency, which refers to the level of effectiveness of using the digital platform in the performance and accomplishment of tasks of the users from the procurement department. Lastly, the intervening variables include the company size and age group of the users from the procurement department of the property developers. The study will establish how these variables are connected – whether the implementation of in-house-developed software is more beneficial and impactful on procurement efficiency or outsourcing from readily-available Information Technology (IT) service providers is more effective.

By using the Technology Acceptance Model as a framework, this study endeavors to analyze the effectiveness of adopting in-house-developed systems versus outsourced solutions of property developers for their procurement department's operational efficiency. (Park & Park, 2020)

Furthermore, the data collection for the said variables will be through phone interviews with administered questionnaires to assess the effectiveness of in-house-developed and outsourced solutions on procurement operational efficiency.

#### **1.4 Statement of the Problem**

This research aims to understand the effectiveness of utilizing in-house-developed software solutions compared to outsourced business applications on the procurement efficiency of property developers. By considering the mediating variables of perceived usefulness and ease of use, this study illustrates which is more impactful on the procurement department's users' actual utilization of the system for tasks efficiency. This research seeks to answer the following queries:

1. What is the demographic profile of the respondents?
  - 1.1. Type of Application (In-house-developed or Outsourced)
  - 1.2. Company Size
  - 1.3. Users' Age Group
2. What is the significant relationship between the use of in-house-developed or outsourced systems and actual usage for procurement efficiency in terms of demographic profile?
3. Is there a significant relationship between the mediating variables of perceived usefulness and ease of use of the in-house-developed and outsourced systems and the impact of their actual usage for procurement efficiency?
4. Are in-house-developed and outsourced systems equally effective in terms of usage for procurement operational efficiency?

To provide insightful information on the effectiveness of in-house-developed solutions compared to outsourced systems of property developers' procurement department's operational efficiency, this research seeks to answer these questions.

#### **1.5 Objectives of the Study**

This study will examine how the effectiveness of internally developed software versus externally obtained applications for the operational efficiency of the procurement department of property developers.

1. to establish the relationship between the mediating variables of perceived usefulness and ease of use of the in-house-developed and outsourced systems and the impact of their actual usage for procurement efficiency;
2. to determine the significant relationship between in-house-developed or outsourced systems and procurement efficiency in terms of company size and user's age group and ;
3. to ascertain whether in-house-developed applications and outsourced systems are equally effective in terms of procurement operational efficiency.

#### **1.6 Hypotheses**

This study evaluates the following hypotheses:

- H<sub>0</sub> In-house-developed and outsourced systems are equally effective in terms of procurement operational efficiency.
- H<sub>1</sub> In-house-developed system is likely to be more effective in terms of procurement operational efficiency than an outsourced platform.
- H<sub>0</sub> There is no significant relationship between the mediating variables of perceived usefulness and ease of use of the in-house-developed and outsourced systems and their actual usage for procurement efficiency.
- H<sub>1</sub> There is a significant relationship between the mediating variables of perceived usefulness and ease of use of the in-house-developed and outsourced systems and their actual usage for procurement efficiency.

### **1.7 Significance of the Study**

This research aims to establish an understanding of the effectiveness of in-house-developed software applications versus outsourced platforms in achieving procurement efficiency of property developers in the Philippines. The output of this research will be of significance to the following stakeholders :

Procurement and Information Technology Departments. This study will provide the stakeholders from the Procurement and Information Technology departments with supporting documentation on the more suitable choice of a digital platform to achieve operational efficiency. This will help elaborate on the effectiveness of implementing an in-house-developed solution compared to an outsourced procurement platform. This will also grant visibility on how digitalization directly impacts procurement operational efficiency from data capturing to reporting. Further, this research will contribute to the decision departments' endorsement to the top management and key users on what type of platform is to be adopted to help standardize the procurement functions of the company and promote operational efficiency.

Property Developers. This research will enlighten property developers on the efficacy of implementing in-house-developed programs and outsourced systems to achieve procurement efficiency. Given the complexity of doing business in the Philippines, this will help provide insight into which platform is more effective to cater for the needs of the Procurement Department.

Researcher and Future Researchers. This research grants an opportunity to contribute to the understanding and knowledge of the effectiveness of in-house-developed software versus outsourced systems in achieving procurement efficiency of property developers in the Philippines. By conducting this study, the research gains insightful information, valuable skills, and experiences in research design, data gathering and analysis, and technical writing. This research may also be used as a reference in conducting future studies on the direct effects of various digitalization strategies in other nature of businesses and departments and considering other external factors such as user experience, frequency of system use and user acceptance, and level of user satisfaction.

### **1.8 Scope and Delimitation**

This study will focus on understanding the effectiveness of in-house-developed solutions versus outsourced systems in achieving the procurement department's operational efficiency of property developers using the Technology Acceptance Model (TAM).

The researcher will also gather primary data through phone interviews and online surveys from some procurement heads of property developers in Metro Manila, particularly from Makati City. This study will cover the period from March 2020 to June 2023, as this is the period when the Covid-19 pandemic hit the Philippines, which triggered most of the property developers and other businesses to adopt full digitalization.

The study's delimitations include the limited size of the sample and potential biases in the responses from the procurement heads and managers. The study does not examine other factors affecting operational efficiency, such as the number of employees, behavior and level of acceptance of users to digital platforms, availability of financial resources, organizational policies and culture, and other Philippine government mandates and regulations for property developers for compliance.

## **2. Literature Review**

### **2.1 Automation and Technology**

An organization's capacity to compete may depend on controlling the organizational spend by automating the sourcing procedures and sharing information to assist the business increase agility, visibility, and digital connection in an unpredictably and quickly changing world. (Harvard Business Review, 2021) Profits are shifting due to digitalization. Highly digital industries have a winner-take-all advantage, but most incumbent firms only offer ad hoc answers, and half of those who invest do not see returns. (Belotserkovskiy, Mercker, Rocha, & Spiller, 2018)

Automation is generally described as a process of performing combined programs or commands with controlled feedback to guarantee the correct execution of the instructions. Human intervention is eliminated, thereby increasing the dependency on computers or computer-operated technologies by all users. Over time, demand for automated systems increased with complexity and sophistication. These advanced technologies used in various departments of an organization, including Procurement Management, represent a certain level of capacity and performance, which can exceed human abilities in many ways to accomplish work precisely and more productively. (Groover, 2023)

### **2.2 In-house and Outsourced Systems**

There are many businesses that implement systems for procurement that are developed and maintained by their own Information Technology (IT) department team. It can come in various forms, such as spreadsheets containing the records for purchase order

transactions or some automated system that is designed and enhanced for other purposes. Organizations maintain in-house systems primarily because of the price of outsourced systems. Ironically, cost is also one of the disadvantages of an in-house-maintained procurement system. There will be savings on the license costs if the software is internally programmed, but if compared to the potential savings on costs that a globally accepted outsourced system can deliver, the overall expense for an in-house system is much higher. (Loughlin, 2021)

In-house built systems are deemed to meet the unique requirements of every department as the company has its own manpower dedicated to support the applications full time. Modifications can be addressed even when they're not needed, unlike outsourced systems, where the users need to wait until the next release or version becomes ready for use. Though there are benefits to maintaining an in-house procurement system, users find the idea of building its own system absurd as there are world class available applications that can be implemented readily. Outsourced systems are developed with appropriate validations and controls with flexibility to adapt to changes in market conditions and industry best practices. Procurement management users who consider the effectiveness of an application usually purchase out-of-the-box solutions which can be implemented faster regardless of the cost implications. (Loughlin, 2021)

### ***2.3 Procurement Digitalization: End-to-end Transformation***

Technology decisions leading to digital procurement transitions, more often than not, bring significant value to an organization. (Schnellbacher, Weise, Tevelson, & Högel, 2018) The adoption of innovative technology and processes by an organization's procurement department can help it gain competitive advantages by giving it a bigger strategic role and enhancing both its own capabilities and those of its suppliers. (Harvard Business Review, 2021)

As procurement plays a critical role in the delivery of organizational targets (Llywodraeth Cymru Welsh Government, 2020) digitalization has become the new industrial norm and is no longer the cutting edge of procurement innovation. Digital procurement is being used by companies of all sizes and across all sectors, including property developers, to standardize procedures, integrate technologies, and save costs. (Babb, 2023)

Procurement digitalization is a top management agenda, but many leaders express dissatisfaction with its slow, expensive, and slow returns. Transitioning from highly customized processes to standardized workflows is challenging, and some leaders find their IT capabilities insufficient to adopt digital technologies. Three main reasons for failure include not fully defining digitalization, being motivated by technology's potential rather than its value, and prioritizing internal issues over the organization's needs. To fully realize the potential of digitalized procurement, a user-centered, end-to-end transformation of the entire P2P process is needed, focusing on user experience. (Abidi, Russo, Sommerer, & Streif, 2018)

### ***2.4 Digital Procurement Solutions***

A variety of digital procurement solutions have been uncovered through Bain & Company research, emphasizing an increasingly complex environment. According to Radell and Schannon (2018), collaboration platforms, collection of data in real-time, blockchain, and predictive analytics have all been made possible by new technology. These tools enable procurement teams to readily share data and assist cross-functional teams in developing solutions in collaboration with internal stakeholders and suppliers. By enhancing internal coordination and supplier performance, frictionless collaboration shortens cycle times. Leading industry players are already leveraging these technologies to accelerate issue solving and generate more value for the business.

Leading industry players employ digital tools to improve category management, sourcing methods, and forecasting. Richer data sets, optimization engines, and tools to control demand and ensure compliance are the building blocks. Advanced category strategies assist procurement teams in lowering costs by purchasing and spending more wisely. (Radell & Schannon, 2018)

### ***2.5 Usage of a System for Procurement Efficiency***

The ability of a business to purchase goods and services in an efficient manner was described by the company Oboloo Limited. This phrase refers to the steps involved in purchasing goods or services or the procurement process. Several variables, including the cost of purchase, the caliber of goods or services, and the rate of delivery, can have an impact on procurement efficiency. (oboloo Limited, 2023)

Cost reductions and quicker delivery times are two of the most obvious ways that procurement efficiency may affect corporate operations. Costs for the business may be decreased when products or services are acquired more swiftly and effectively. Furthermore, since workers can clearly see how their effort affects the business's bottom line, procurement that is efficient can boost employee satisfaction. (oboloo Limited, 2023)

## **2.6 Synthesis**

The primary objective of a procurement department is to acquire necessary resources in order to sustain and support the ongoing operations of a company, as elucidated in the existing body of literature. Digital procurement eliminates non-value adding activities through the implementation of efficient administration of procurement and other related company processes, the screening and selection of innovative suppliers and supply chain partners, successful negotiation of contracts, and effective management of inventory. Additionally, these factors contribute to cost reductions and mitigate market disruptions. The literature review emphasized the necessity for further investigation to elucidate the correlation between operational efficiency, procurement, and digitalization. A comprehensive research methodology is required to analyze procurement systems and ascertain their impact on efficiency within the procurement process.

The primary finding of the literature suggests that there exists empirical evidence substantiating the influence of digitalization on procurement and overall system utilization within a corporate setting. Comprehensive statistical data is readily accessible on a global scale, while more generalized information can be obtained at the local level. However, the applicability of these overarching findings to a specific industry and the diverse demographics of the Philippines remains uncertain.

The real estate industry is experiencing growth, especially in light of the recent pandemic. The proportion of real estate developer clientele is increasing, particularly in prominent commercial centers such as Makati. The rationale for the study's focus on the digital procurement processes of local real estate developers is as follows.

## **3. Methodology**

### **3.1 Research Design**

The researchers used both descriptive and explanatory research methods for the in-depth analysis of the correlation between using in-house-developed solutions or outsourced systems for procurement operational efficiency of property developers. A descriptive research design aims to purposely collect data in order to describe a situation or circumstance, population, or phenomenon. This research method will be utilized to elaborate on the effectiveness of implementing in-house-developed and outsourced digital platforms. The study collected data through an online survey to describe the effectiveness of adopting in-house-developed or outsourced digital platforms for the operational efficiency of the Procurement Department of property developers.

The researchers also studied whether there is a significant impact of implementing either in-house-developed or outsourced systems in terms of perceived usefulness and perceived ease of use on the actual usage of the same for procurement efficiency. With this, an explanatory research design was applied. Questionnaires for some active property developers within Makati City have been formulated to investigate the platform they are using as part of procurement digitalization and the direct impact of these systems on the productivity and operational efficiency of the procurement functions.

The dependent variable is the actual usage of a system for procurement operational efficiency. The independent variable is the use of either in-house – developed or outsourced systems with mediating variables of perceived usefulness and perceived ease of use. The demographic profile of respondents will be gathered in terms of company size and age group.

### **3.2 Sample and Sampling Technique**

The researchers used a direct purposive sampling technique based on the characteristics of the population. Purposive sampling is a non-probability sampling method in which respondents or data collected have qualities that are relevant to the research problems. This sampling technique is used as the respondents selected "on purpose" are suitable to the objectives of the research. In this instance, the items are chosen deliberately by the researchers. In addition, it happens if the researcher's judgment is used to choose the sample's components.

### **3.3 Research Instrument**

The researchers made use of adapted questionnaires to obtain the primary information needed from procurement department heads and managers of selected active property developers, which will be administered through an online survey. The questions are derived from the problem statement, which will cover the demographic profile of property developers in terms of the types of digital applications being used by the Procurement Department, the size of the company, and the respondent's age group. The questionnaires also include the factors under mediating variables of perceived usefulness and ease of use and the impact of the actual usage of a system for procurement efficiency.

Different statistical methods were utilized in conducting an analysis and interpreting the data gathered. The conclusion is that the results are valid and correct when the appropriate methodological techniques are used.

**3.4 Ethical Consideration**

The researchers guaranteed the anonymity of the respondents and utmost confidentiality of the obtained details following RA 10173 "Data Privacy Act (DPA) of 2012. All information gathered from the selected respondents was used for academic purposes only. The data gathered were used in this research to better understand the direct impact of digital procurement on operational efficiency. The information acquired by the researchers was for ethical and lawful activities only.

**3.5 Data Gathering Procedure**

The researchers used the primary method for data collection. The primary data was collected by conducting an online survey with some pre-selected sixty-five (65) property developers from the city of Makati in Metro Manila. Prior to the collection of the primary data, researchers administered the questionnaire to a few property developers to ensure that the questions were understandable and clear and pretest if the Cronbach Analysis result falls under the acceptable range. Once the pretest was conducted, the questionnaire was sent to the target respondents and the online survey was conducted.

**3.6 Statistical Treatment of Data**

The study used the Statistical Package of the Social Sciences (SPSS), a statistical software, to analyze collected data. The researchers will use the T-test, Analysis of Variance (ANOVA), Mean, Frequency Distribution, and Pearson's Correlation as analytical procedures. T-test measures significant differences between groups (Hayes, 2023). ANOVA separates observed aggregate variability into systematic and random factors (Kenton, 2023). Mean is the average of the data set (Haslam S. A., 2003). Frequency Distribution shows different measurements of variables (Dawson B, 2004), and Pearson's Correlation measures the intensity of the statistical relationship between two variables. (Srivastav, 2023)

**4. Results and Discussion**

This section presents the results, findings, analysis, and interpretation of the primary data collected from sixty-five (65) property developers as respondents located in Metro Manila, specifically from the city of Makati. This section also includes the testing of the study's objective identified.

**4.1 Demographic Profile**

**Table 1**  
*Demographic Profile in terms of Digital Application*

<b>Digital Application</b>	<b>Frequency</b>	<b>Percentage</b>
In-house – developed	40	61.5
Outsourced	25	38.5
<b>Total</b>	<b>65</b>	<b>100.0</b>

The table shows that 40 out of 65 respondents are using in-house – developed digital applications, which is equivalent to 61.50%, and 25 respondents are using outsourced, equivalent to 38.50%. This implies that most of the respondents are using in-house – developed in their digital applications.

According to Indeed Editorial Team (Indeed, n.d.), an in-house-developed system is mostly used by companies due to customization of day-to-day operations, which fits to company's requirement for operational efficiency and effectiveness.

**Table 2**  
*Demographic Profile in terms of Company Size*

<b>Company Size</b>	<b>Frequency</b>	<b>Percentage</b>
Small	7	10.8
Medium	13	20.0
Large	45	69.2
<b>Total</b>	<b>65</b>	<b>100.0</b>

The table shows that 45 out of 65 respondents are large companies, which is equivalent to 69.20%; 13 respondents are medium-sized companies, equivalent to 20.00%, and 7 respondents are small-sized companies, equivalent to 10.80%. This implies that most of the respondents are large-sized companies.

Considering words from (GRZEGORZEK, 2021), the size of the company can be identified in its sales or revenue, profit, number of employees, market share, and capital employed. With this, it is undeniably proving that most of the property developers are



considered to be large companies since their capital outlay required to be huge, with Ayala Land having a capital of 100-billion-peso down to Shang Properties having a 10-billion-peso capital (Lamudi, 2019).

**Table 3**  
*Demographic Profile in terms of Age Group of User Respondent*

Age Group of User Respondent	Frequency	Percentage
23 to 27 Years Old	17	26.2
28 to 32 Years Old	10	15.4
33 to 37 Years Old	15	23.1
38 Years old and above	23	35.4
<b>Total</b>	<b>65</b>	<b>100.0</b>

The table shows that 23 out of 65 respondents are from the age group of 38 Years old and above, which is equivalent to 35.40%; 17 respondents are from 23 to 27 Years Old, equivalent to 26.20%; 15 respondents are from 33 to 37 Years Old equivalent to 23.10%, and 10 respondents are from 28 to 32 Years Old equivalent to 15.40%. This implies that most of the respondents are from the age group of 38 Years old and above.)

According to (Chanthavong, 2023), the average procurement head are 46 years old. However, due to the shifting of organizational strategy, most procurement heads are training younger generations, makes younger generations arise early in leading procurement departments.

#### 4.2 Arithmetic Mean, T-Test and ANOVA Results

**Table 4**  
*Test of Significant Difference between Perceived Usefulness and Digital Application*

Perceived Usefulness	Digital Application	N	Mean	SD	F-Value	Sig. Value	Decision of HO	Verbal Interpretation
Using the system in my job would enable me to accomplish tasks more quickly.	In-house – developed	40	3.70	0.46	0.118	0.732	Accept	Not Significant
	Outsourced	25	3.72	0.46				
The system would help me standardize procurement processes.	In-house – developed	40	3.40	0.50	0.428	0.516	Accept	Not Significant
	Outsourced	25	3.36	0.49				
Using the system would likely increase my productivity and improve my job performance.	In-house – developed	40	3.55	0.50	12.335	0.001	Reject	Significant
	Outsourced	25	3.76	0.44				
The system is useful and would likely enhance my effectiveness on the job.	In-house – developed	40	3.53	0.51	1.286	0.261	Accept	Not Significant
	Outsourced	25	3.60	0.50				
Perceived Usefulness (GRAND MEAN)	In-house – developed	40	3.54	0.29	1.527	0.221	Accept	Not Significant
	Outsourced	25	3.61	0.22				

Note:  $p > .05$  Accept HO (Not Significant) ;  $p < .05$  Reject HO (Significant)

The table shows the significant difference among groups as determined by the Independent Sample Test between Perceived Usefulness according to Digital Application. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Perceived Usefulness according to Digital Application". This only indicates the variance based on the results of 65 respondents' perception of the Perceived Usefulness based on digital application, that there is no statistical difference with (M=3.61, SD=0.22) for outsourced that received a higher score than In-house – developed (M=3.54, SD=0.29) with a rating of  $t(65)=-0.987$ ,  $F(1,65)=1.527$ , the p-value of 0.221.

The perception of respondents-based on the significance value of 0.221 is that there is a 77.89% chance that the answer of the different respondents is probably true and a 22.11% chance are probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the "status quo" between the perception of digital applications with regards to the Perceived Usefulness as a measure of analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency.

Hence, when the nature of work requires physical documents, outsourced software impairs employee productivity towards work. Thus, skills are regarded as relevant characteristics that practitioners and users within organizations must possess to facilitate organizational operations to produce efficiency and effectiveness. Procurement planning, execution and implementation are some of the organizational operations that include activities related to collating and determining requirements, procurement methods, and timing for making purchases. (Changalima, 2021)

**Table 5**  
*Test of Significant Difference between Perceived Ease of Use and Digital Application*

Perceived Ease of Use	Digital Application	N	Mean	SD	F-Value	Sig. Value	Decision of HO	Verbal Interpretation																																															
Learning to use the system would be easy for me.	In-house – developed	40	3.55	0.50	4.950	0.030	Reject	Significant																																															
	Outsourced	25	3.20	0.50					I find it easier to perform my daily tasks using system.	In-house – developed	40	3.63	0.49	2.667	0.107	Accept	Not Significant	Outsourced	25	3.72	0.46	The system is easy to navigate, and the naming conventions used are understandable.	In-house – developed	40	3.33	0.53	0.001	0.978	Accept	Not Significant	Outsourced	25	3.16	0.62	It is easy to become more skillful using the system.	In-house – developed	40	3.23	0.70	4.445	0.039	Reject	Significant	Outsourced	25	3.08	0.57	Perceived Ease of Use (GRAND MEAN)	In-house – developed	40	3.43	0.37	0.910	0.344	Accept
I find it easier to perform my daily tasks using system.	In-house – developed	40	3.63	0.49	2.667	0.107	Accept	Not Significant																																															
	Outsourced	25	3.72	0.46					The system is easy to navigate, and the naming conventions used are understandable.	In-house – developed	40	3.33	0.53	0.001	0.978	Accept	Not Significant	Outsourced	25	3.16	0.62	It is easy to become more skillful using the system.	In-house – developed	40	3.23	0.70	4.445	0.039	Reject	Significant	Outsourced	25	3.08	0.57	Perceived Ease of Use (GRAND MEAN)	In-house – developed	40	3.43	0.37	0.910	0.344	Accept	Not Significant	Outsourced	25	3.29	0.37								
The system is easy to navigate, and the naming conventions used are understandable.	In-house – developed	40	3.33	0.53	0.001	0.978	Accept	Not Significant																																															
	Outsourced	25	3.16	0.62					It is easy to become more skillful using the system.	In-house – developed	40	3.23	0.70	4.445	0.039	Reject	Significant	Outsourced	25	3.08	0.57	Perceived Ease of Use (GRAND MEAN)	In-house – developed	40	3.43	0.37	0.910	0.344	Accept	Not Significant	Outsourced	25	3.29	0.37																					
It is easy to become more skillful using the system.	In-house – developed	40	3.23	0.70	4.445	0.039	Reject	Significant																																															
	Outsourced	25	3.08	0.57					Perceived Ease of Use (GRAND MEAN)	In-house – developed	40	3.43	0.37	0.910	0.344	Accept	Not Significant	Outsourced	25	3.29	0.37																																		
Perceived Ease of Use (GRAND MEAN)	In-house – developed	40	3.43	0.37	0.910	0.344	Accept	Not Significant																																															
	Outsourced	25	3.29	0.37																																																			

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the significant difference among groups as determined by the Independent Sample Test between Perceived Ease of Use according to Digital Application. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Perceived Ease of Use according to Digital Application". This only indicates the variance based on the results of 65 respondents' perception of the Perceived Ease of Use based on digital application, that there is no statistical difference with (M=3.43, SD=0.37) for In-house – developed that received a higher score than outsourced (M=3.29, SD=0.37) with a rating of  $t(65)=1.501$ ,  $F(1,65)=0.910$ , a p-value of 0.344.

The perception of respondents-based on the significance value of 0.344 is that there is a 65.62% chance that the answer of the different respondents is probably true and a 34.38% chance are probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the "status quo" between the perception of digital applications with regard to the Perceived Ease of Use as a measure of analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency.

According to (Markovic, 2022), in-house developed systems are easier to use because they are program according to the company process, culture and requirements. It totally fits the client's requirements since it is programmed and formulated as what the company needs. However, outsourced systems are now offering some consideration, such as but not limited to some customization of their existing program just to make the outsourced system match and usable to clients need.

**Table 6**

*Test of Significant Difference between Actual Usage of a System for Procurement Efficiency and Digital Application*

<b>Actual Usage of a System for Procurement Efficiency</b>	<b>Digital Application</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F-Value</b>	<b>Sig. Value</b>	<b>Decision of HO</b>	<b>Verbal Interpretation</b>																																																																																						
The system meets all the exacting requirements and needs of procurement users.	In-house – developed	40	3.40	0.67	1.434	0.236	Accept	Not Significant																																																																																						
	Outsourced	25	3.12	0.67					The system enables recording of procurement transactions easier transactions with faster turnaround time.	In-house – developed	40	3.58	0.50	0.161	0.689	Accept	Not Significant	Outsourced	25	3.60	0.50	The system is used daily by all procurement users.	In-house – developed	40	3.48	0.55	4.723	0.034	Reject	Significant	Outsourced	25	3.68	0.48	The system requires technical knowledge and skills of regular procurement users.	In-house – developed	40	3.10	0.74	0.017	0.897	Accept	Not Significant	Outsourced	25	2.68	0.69	The system improves the procurement department's performance.	In-house – developed	40	3.55	0.50	0.643	0.426	Accept	Not Significant	Outsourced	25	3.40	0.50	The system is easy to develop and update in case of change of policies or business process.	In-house – developed	40	3.15	0.80	0.021	0.886	Accept	Not Significant	Outsourced	25	2.52	0.77	The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant	Outsourced	25	3.40	0.50	Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept
The system enables recording of procurement transactions easier transactions with faster turnaround time.	In-house – developed	40	3.58	0.50	0.161	0.689	Accept	Not Significant																																																																																						
	Outsourced	25	3.60	0.50					The system is used daily by all procurement users.	In-house – developed	40	3.48	0.55	4.723	0.034	Reject	Significant	Outsourced	25	3.68	0.48	The system requires technical knowledge and skills of regular procurement users.	In-house – developed	40	3.10	0.74	0.017	0.897	Accept	Not Significant	Outsourced	25	2.68	0.69	The system improves the procurement department's performance.	In-house – developed	40	3.55	0.50	0.643	0.426	Accept	Not Significant	Outsourced	25	3.40	0.50	The system is easy to develop and update in case of change of policies or business process.	In-house – developed	40	3.15	0.80	0.021	0.886	Accept	Not Significant	Outsourced	25	2.52	0.77	The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant	Outsourced	25	3.40	0.50	Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant	Outsourced	25	3.20	0.30								
The system is used daily by all procurement users.	In-house – developed	40	3.48	0.55	4.723	0.034	Reject	Significant																																																																																						
	Outsourced	25	3.68	0.48					The system requires technical knowledge and skills of regular procurement users.	In-house – developed	40	3.10	0.74	0.017	0.897	Accept	Not Significant	Outsourced	25	2.68	0.69	The system improves the procurement department's performance.	In-house – developed	40	3.55	0.50	0.643	0.426	Accept	Not Significant	Outsourced	25	3.40	0.50	The system is easy to develop and update in case of change of policies or business process.	In-house – developed	40	3.15	0.80	0.021	0.886	Accept	Not Significant	Outsourced	25	2.52	0.77	The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant	Outsourced	25	3.40	0.50	Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant	Outsourced	25	3.20	0.30																					
The system requires technical knowledge and skills of regular procurement users.	In-house – developed	40	3.10	0.74	0.017	0.897	Accept	Not Significant																																																																																						
	Outsourced	25	2.68	0.69					The system improves the procurement department's performance.	In-house – developed	40	3.55	0.50	0.643	0.426	Accept	Not Significant	Outsourced	25	3.40	0.50	The system is easy to develop and update in case of change of policies or business process.	In-house – developed	40	3.15	0.80	0.021	0.886	Accept	Not Significant	Outsourced	25	2.52	0.77	The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant	Outsourced	25	3.40	0.50	Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant	Outsourced	25	3.20	0.30																																		
The system improves the procurement department's performance.	In-house – developed	40	3.55	0.50	0.643	0.426	Accept	Not Significant																																																																																						
	Outsourced	25	3.40	0.50					The system is easy to develop and update in case of change of policies or business process.	In-house – developed	40	3.15	0.80	0.021	0.886	Accept	Not Significant	Outsourced	25	2.52	0.77	The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant	Outsourced	25	3.40	0.50	Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant	Outsourced	25	3.20	0.30																																															
The system is easy to develop and update in case of change of policies or business process.	In-house – developed	40	3.15	0.80	0.021	0.886	Accept	Not Significant																																																																																						
	Outsourced	25	2.52	0.77					The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant	Outsourced	25	3.40	0.50	Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant	Outsourced	25	3.20	0.30																																																												
The system is costly to maintain.	In-house – developed	40	3.38	0.74	6.861	0.011	Reject	Significant																																																																																						
	Outsourced	25	3.40	0.50					Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant	Outsourced	25	3.20	0.30																																																																									
Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	In-house – developed	40	3.37	0.34	1.130	0.292	Accept	Not Significant																																																																																						
	Outsourced	25	3.20	0.30																																																																																										

*Note:  $p > .05$  Accept HO (Not Significant) ;  $p < .05$  Reject HO (Significant)*

The table shows the significant difference among groups as determined by the Independent Sample Test between the Actual Usage of a System for Procurement Efficiency according to Digital Application. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Perceived Ease of Use according to Digital Application". This only indicates the variance based on the results of 65 respondents' perception of the Actual Usage of a System for Procurement Efficiency based on digital application, that there is no

statistical difference with (M=3.37, SD=0.34) for In-house – developed that received a higher score than outsourced (M=3.20, SD=0.30) with a rating of  $t(65)=-2.095$ ,  $F(1,65)=1.130$ , p-value of 0.292.

The perception of respondents-based on the significance value of 0.292 is that there is a 70.83% chance that the answer of the different respondents is probably true and a 29.17% chance are probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the “status quo” between the perception of digital application with regards to the Actual Usage of a System for Procurement Efficiency as a measure of analyzing the effectiveness of property’s developers’ in-house developed versus outsourced system on procurement efficiency.

According to Balachandran (2023), outsourced system maintenance is costly to maintain as it need to have to provider in doing so, however analyzing some variables such as expertise, flexibility, and safety, it is concluded that in house-developed and outsourced system are not that far in maintenance considerations. (Balachandran, 2023)

In-house-developed and outsourced systems only matter in company requirements for sustainable procurement. Both systems are highly assessed as what a company needs for its operations, having their own pros and cons, which a company should evaluate in promoting procurement efficiency. (Sayed, 2020)

**Table 7**  
*Test of Significant Difference between Perceived Usefulness and Company Size*

Perceived Usefulness	Company Size	N	Mean	SD	F-Value	Sig. Value	Decision of HO	Verbal Interpretation
Using the system in my job would enable me to accomplish tasks more quickly.	Small	7	3.57	0.53	0.420	0.659	Accept	Not Significant
	Medium	13	3.77	0.44				
	Large	45	3.71	0.46				
The system would help me standardize procurement processes.	Small	7	3.14	0.38	4.000	0.023	Reject	Significant
	Medium	13	3.69	0.48				
	Large	45	3.33	0.48				
Using the system would likely increase my productivity and improve my job performance.	Small	7	3.57	0.53	0.159	0.853	Accept	Not Significant
	Medium	13	3.69	0.48				
	Large	45	3.62	0.49				
The system is useful and would likely enhance my effectiveness on the job.	Small	7	3.43	0.53	0.270	0.764	Accept	Not Significant
	Medium	13	3.54	0.52				
	Large	45	3.58	0.50				
Perceived Usefulness (GRAND MEAN)	Small	7	3.43	0.28	2.100	0.131	Accept	Not Significant
	Medium	13	3.67	0.26				
	Large	45	3.56	0.26				

*Note:  $p > .05$  Accept HO (Not Significant) ;  $p < .05$  Reject HO (Significant)*

The table shows the significant difference among company size as determined by One Way Analysis of Variance between Perceived Usefulness according to company size. The grand mean significant difference according to "Analyzing the effectiveness of property’s developers’ in-house developed versus outsourced system on procurement efficiency based on Perceived Usefulness according to company size". This only indicates the variance based on the results of 65 respondents’ perception of the Perceived Usefulness based on company size, that there is no statistical difference with Medium (M=3.67, SD=0.26), Large (M=3.56, SD=0.26), and Small (M=3.43, SD=0.28) with a rating of  $F(2,64)=2.100$ ,  $p=0.131$  which  $p>0.05$

The perception of respondents-based on the significance value of 0.131 is that there is an 86.90% chance that the answer of the different respondents is probably true and a 13.10% chance is probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the “status quo” between the perception of Perceived Usefulness according to company size as a measure of analyzing the effectiveness of property’s developers’ in-house developed versus outsourced system on procurement efficiency.

According to (Ponniah, 2022), many small and medium-sized enterprises (SMEs) don't opt to use an e-procurement system because they believe that doing so requires a lot of money to set up. However, according to (Jenkins, 2023), small and medium sized companies usually tend to overlap some procurement processes by allowing one person to do procurement processes that impacts the segregation of task set up by the standard system.

**Table 8**  
*Test of Significant Difference between Perceived Ease of Use and Company Size*

Perceived Ease of Use	Company Size	N	Mean	SD	F-Value	Sig. Value	Decision of HO	Verbal Interpretation
Learning to use the system would be easy for me.	Small	7	3.29	0.49	1.273	0.287	Accept	Not Significant
	Medium	13	3.62	0.51				
	Large	45	3.38	0.53				
I find it easier to perform my daily tasks using system.	Small	7	3.86	0.38	1.854	0.165	Accept	Not Significant
	Medium	13	3.46	0.52				
	Large	45	3.69	0.47				
The system is easy to navigate, and the naming conventions used are understandable.	Small	7	3.29	0.49	0.068	0.934	Accept	Not Significant
	Medium	13	3.31	0.48				
	Large	45	3.24	0.61				
It is easy to become more skillful using the system.	Small	7	3.00	0.82	0.508	0.604	Accept	Not Significant
	Medium	13	3.08	0.64				
	Large	45	3.22	0.64				
Perceived Ease of Use (GRAND MEAN)	Small	7	3.36	0.43	0.022	0.978	Accept	Not Significant
	Medium	13	3.37	0.33				
	Large	45	3.38	0.38				

*Note:  $p > .05$  Accept HO (Not Significant) ;  $p < .05$  Reject HO (Significant)*

The table shows the significant difference among groups as determined by One Way Analysis of Variance between Perceived Ease of Use according to company size. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Perceived Ease of Use according to company size." This only indicates the variance based on the results of 65 respondents' perception of the Perceived Ease of Use based on company size, that there is no statistical difference based on a significance value of 0.978 that there is 2.18% chance that the answer of the different respondents is probably true, and 97.82% chances are probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the "status quo" between the perception of company size with regards to the Perceived Ease of Use as a measure of Analyzing the effectiveness of property developers' in-house-developed versus outsourced system on procurement efficiency.

According to insights from (Roudbaraki, 2022), systems should be user-friendly and easy to use, comprehend, and analyze. In order to achieve it, a user can easily evaluate the process, data, and reports even without technical aspects. In addition, learning to navigate does not require much time.

**Table 9**  
*Test of Significant Difference between Actual Usage of a System for Procurement Efficiency and Company Size*

<b>Actual Usage of a System for Procurement Efficiency</b>	<b>Company Size</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F-Value</b>	<b>Sig. Value</b>	<b>Decision of HO</b>	<b>Verbal Interpretation</b>
The system meets all the exacting requirements and needs of procurement users.	Small	7	3.14	0.69	1.143	0.325	Accept	Not Significant
	Medium	13	3.54	0.52				
	Large	45	3.24	0.71				
The system enables recording of procurement transactions easier transactions with faster turnaround time.	Small	7	3.71	0.49	0.292	0.747	Accept	Not Significant
	Medium	13	3.54	0.52				
	Large	45	3.58	0.50				
The system is used daily by all procurement users.	Small	7	3.57	0.53	0.240	0.787	Accept	Not Significant
	Medium	13	3.46	0.66				
	Large	45	3.58	0.50				
The system requires technical knowledge and skills of regular procurement users.	Small	7	3.00	0.58	0.339	0.714	Accept	Not Significant
	Medium	13	3.08	0.76				
	Large	45	2.89	0.78				
The system improves the procurement department's performance.	Small	7	3.57	0.53	0.407	0.667	Accept	Not Significant
	Medium	13	3.38	0.51				
	Large	45	3.51	0.51				
The system is easy to develop and update in case of change of policies or business process.	Small	7	3.00	0.82	0.169	0.845	Accept	Not Significant
	Medium	13	3.00	0.82				
	Large	45	2.87	0.87				
The system is costly to maintain.	Small	7	3.57	0.53	0.323	0.725	Accept	Not Significant
	Medium	13	3.38	0.77				
	Large	45	3.36	0.65				
Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	Small	7	3.37	0.34	0.238	0.789	Accept	Not Significant
	Medium	13	3.34	0.33				
	Large	45	3.29	0.34				

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the significant difference among groups as determined by One Way Analysis of Variance between Actual Usage of a System for Procurement Efficiency according to company size. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Actual Usage of a System for Procurement Efficiency according to company size. ". This only indicates the variance based on the results of 65 respondents' perception of the Actual Usage of a System for Procurement Efficiency on company size, that there is no statistical difference based on a significance value of 0.789 that there is a 21.13% chance that the answer of the different respondents is probably true, and 78.87% chances are probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the "status quo" between the perception of company size with regards to the Actual Usage of a System for Procurement Efficiency as a measure of Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency.

According to the interviewed consultants, small and medium-sized enterprises (SMEs) tend to invest slowly or postpone comprehensive IT projects (F. Bienhaus, 2018), yet it signifies that despite company size, having a type of software application is necessary for business operations.

**Table 10**  
*Test of Significant Difference between Perceived Usefulness and Age*

Perceived Usefulness	Age	N	Mean	SD	F-Value	Sig. Value	Decision of HO	Verbal Interpretation
Using the system in my job would enable me to accomplish tasks more quickly.	23 to 27 Years Old	17	3.76	0.44	1.522	0.218	Accept	Not Significant
	28 to 32 Years Old	10	3.50	0.53				
	33 to 37 Years Old	15	3.87	0.35				
	38 Years old and above	23	3.65	0.49				
The system would help me standardize procurement processes.	23 to 27 Years Old	17	3.47	0.51	0.681	0.567	Accept	Not Significant
	28 to 32 Years Old	10	3.50	0.53				
	33 to 37 Years Old	15	3.27	0.46				
	38 Years old and above	23	3.35	0.49				
Using the system would likely increase my productivity and improve my job performance.	23 to 27 Years Old	17	3.29	0.47	4.539	0.006	Reject	Significant
	28 to 32 Years Old	10	3.80	0.42				
	33 to 37 Years Old	15	3.67	0.49				
	38 Years old and above	23	3.78	0.42				
The system is useful and would likely enhance my effectiveness on the job.	23 to 27 Years Old	17	3.65	0.49	0.936	0.429	Accept	Not Significant
	28 to 32 Years Old	10	3.40	0.52				
	33 to 37 Years Old	15	3.67	0.49				
	38 Years old and above	23	3.48	0.51				
Perceived Usefulness (GRAND MEAN)	23 to 27 Years Old	17	3.54	0.32	0.225	0.879	Accept	Not Significant
	28 to 32 Years Old	10	3.55	0.23				
	33 to 37 Years Old	15	3.62	0.27				
	38 Years old and above	23	3.57	0.24				

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the significant difference among company size as determined by One Way Analysis of Variance between Perceived Usefulness according to age. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Perceived Usefulness according to age". This only indicates the variance based on the results of 65 respondents' perception of the Perceived Usefulness based on age, that there is no statistical difference with 33 to 37 Years Old (M=3.62, SD=0.27), 38 Years old and above (M=3.57, SD=0.24), 28 to 32 Years Old (M=3.55, SD=0.23), and 23 to 27 Years Old (M=3.54, SD=0.32), with a rating of F(2,64)=0.225, p=0.879 which p>0.05

The perception of respondents-based on the significance value of 0.879 that there is a 12.12% chance that the answer of the different respondents is probably true and an 87.88% chance are probably not true.

Based on the result, there is no significant difference; therefore, there is no change in the "status quo" between the perception of Perceived Usefulness according to age as a measure of analyzing the effectiveness of property's developers' in-house developed versus outsourced systems on procurement efficiency.

A study made by (Zambianchi, 2019) states that older working people who often use a system has the one who have a more positive attitude towards its use. The more people think a particular system is useful, the more they will use it in their day-to-day routine for productivity and improving their effectiveness on the job.

**Table 11**  
*Test of Significant Difference between Perceived Ease of Use and Age*

Perceived Ease of Use	Age	N	Mean	SD	F-Value	Sig. Value	Decision of HO	Verbal Interpretation
Learning to use the system would be easy for me.	23 to 27 Years Old	17	3.71	0.47	2.653	0.057	Accept	Not Significant
	28 to 32 Years Old	10	3.40	0.52				
	33 to 37 Years Old	15	3.27	0.59				
	38 Years old and above	23	3.30	0.47				
I find it easier to perform my daily tasks using system.	23 to 27 Years Old	17	3.65	0.49	0.096	0.962	Accept	Not Significant
	28 to 32 Years Old	10	3.60	0.52				
	33 to 37 Years Old	15	3.67	0.49				
	38 Years old and above	23	3.70	0.47				
The system is easy to navigate, and the naming conventions used are understandable.	23 to 27 Years Old	17	3.65	0.49	4.190	0.009	Reject	Significant
	28 to 32 Years Old	10	3.20	0.42				
	33 to 37 Years Old	15	3.13	0.52				
	38 Years old and above	23	3.09	0.60				
It is easy to become more skillful using the system.	23 to 27 Years Old	17	3.71	0.47	8.165	0.001	Reject	Significant
	28 to 32 Years Old	10	2.70	0.67				
	33 to 37 Years Old	15	3.13	0.52				
	38 Years old and above	23	3.00	0.60				
Perceived Ease of Use (GRAND MEAN)	23 to 27 Years Old	17	3.68	0.30	6.286	0.001	Reject	Significant
	28 to 32 Years Old	10	3.23	0.34				
	33 to 37 Years Old	15	3.30	0.33				
	38 Years old and above	23	3.27	0.35				

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the significant difference among groups as determined by One Way Analysis of Variance between Perceived Ease of Use according to age. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Perceived Ease of Use according to age". This



only indicates the variance based on the results of 65 respondents' perception of the Perceived Ease of Use based on age, that there is statistical difference with 23 to 27 Years Old (M=3.68, SD=0.30), 33 to 37 Years Old (M=3.30, SD=0.33), 38 Years old and above (M=3.27, SD=0.35), and 28 to 32 Years Old (M=3.23, SD=0.34), with a rating of  $F(3,64)=6.286$ ,  $p=0.001$  which  $p<0.05$

The perception of respondents-based on the significance value of 0.001 that there is a 99.90% chance that the answer of the different respondents is probably true and a 0.10% chance is probably not true.

Based on the result, there is a significant difference; therefore, there is a change in the "status quo" between the perception of age groups with regards to the Perceived Ease of Use as a measure of Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency.

Another study made by (Pargaonkar, 2019) concludes that technology awareness, perception of technology importance in their life, willingness to learn and upgrade their skills and learnings, security on the internet and enjoyment of using software are some factors affecting the willingness to use software older people.

**Table 12**  
*Test of Significant Difference between Actual Usage of a System for Procurement Efficiency and Age*

<b>Actual Usage of a System for Procurement Efficiency</b>	<b>Age</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F-Value</b>	<b>Sig. Value</b>	<b>Decision of HO</b>	<b>Verbal Interpretation</b>
The system meets all the exacting requirements and needs of procurement users.	23 to 27 Years Old	17	3.71	0.47	3.453	0.022	Reject	Significant
	28 to 32 Years Old	10	3.30	0.67				
	33 to 37 Years Old	15	3.07	0.70				
	38 Years old and above	23	3.13	0.69				
The system enables recording of procurement transactions easier transactions with faster turnaround time.	23 to 27 Years Old	17	3.47	0.51	1.770	0.162	Accept	Not Significant
	28 to 32 Years Old	10	3.90	0.32				
	33 to 37 Years Old	15	3.53	0.52				
	38 Years old and above	23	3.57	0.51				
The system is used daily by all procurement users.	23 to 27 Years Old	17	3.47	0.51	0.245	0.865	Accept	Not Significant
	28 to 32 Years Old	10	3.60	0.52				
	33 to 37 Years Old	15	3.53	0.64				
	38 Years old and above	23	3.61	0.50				
The system requires technical knowledge and skills of regular procurement users.	23 to 27 Years Old	17	3.59	0.51	7.770	0.001	Reject	Significant
	28 to 32 Years Old	10	2.80	0.63				
	33 to 37 Years Old	15	2.73	0.70				
	38 Years old and above	23	2.65	0.71				
The system improves the procurement department's performance.	23 to 27 Years Old	17	3.82	0.39	3.869	0.013	Reject	Significant
	28 to 32 Years Old	10	3.30	0.48				
	33 to 37 Years Old	15	3.40	0.51				

The system is easy to develop and update in case of change of policies or business process.	38 Years old and above	23	3.39	0.50	6.605	0.001	Reject	Significant
	23 to 27 Years Old	17	3.59	0.51				
	28 to 32 Years Old	10	2.80	0.92				
	33 to 37 Years Old	15	2.73	0.70				
	38 Years old and above	23	2.57	0.84				
The system is costly to maintain.	23 to 27 Years Old	17	3.71	0.47	2.000	0.123	Accept	Not Significant
	28 to 32 Years Old	10	3.20	0.79				
	33 to 37 Years Old	15	3.27	0.80				
	38 Years old and above	23	3.30	0.56				
	23 to 27 Years Old	17	3.62	0.17				
Actual Usage of a System for Procurement Efficiency (GRAND MEAN)	28 to 32 Years Old	10	3.27	0.32	9.939	0.001	Reject	Significant
	33 to 37 Years Old	15	3.18	0.25				
	38 Years old and above	23	3.17	0.33				

*Note:  $p > .05$  Accept  $H_0$  (Not Significant) ;  $p < .05$  Reject  $H_0$  (Significant)*

The table shows the significant difference among groups as determined by One Way Analysis of Variance between Actual Usage of a System for Procurement Efficiency according to age. The grand mean significant difference according to "Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency based on Actual Usage of a System for Procurement Efficiency according to age". This only indicates the variance based on the results of 65 respondents' perception on the Perceived Ease of Use based on age, that there is statistical difference with 23 to 27 Years Old (M=3.62, SD=0.17), 28 to 32 Years Old (M=3.27, SD=0.32), 33 to 37 Years Old (M=3.18, SD=0.25), and 38 Years old and above (M=3.17, SD=0.33), with a rating of  $F(3,64)=9.939$ ,  $p=0.001$  which  $p<0.05$

The perception of respondents-based on the significance value of 0.001 that there is a 99.90% chance that the answer of the different respondents is probably true and a 0.10% chance are probably not true.

Based on the result, there is a significant difference; therefore, there is a change in the "status quo" between the perception of age groups with regards to the Actual Usage of a System for Procurement Efficiency as a measure of Analyzing the effectiveness of property's developers' in-house developed versus outsourced system on procurement efficiency.

According to (Rosell, 2021), age matters in using a technology. Adults often say that, "I am too old to use technology", or sometimes adults tend to use processes that they are comfortable with. We usually hear words like, "Technology is for younger people".

4.3 Pearson Correlation Results

**Table 13**

*Strength of Association between Perceived Usefulness and Actual Usage of a System for Procurement Efficiency of an In-house-Developed System*

Predictors	Pearson Correlation	Sig. (2-Tailed)	Decision on HO	Interpretation
Perceived Usefulness Actual Usage of a System for Procurement Efficiency	.099**	0.544	Accept	Not Significant

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the correlation coefficient between the "Perceived Usefulness and Actual Usage of a System for Procurement Efficiency". It can be seen in the coefficient indicating that there is a positive weak significant relationship with Pearson Correlation value of 0.099, equivalent to 9.90%

The result suggests we can predict that there is a 9.90% that Perceived Usefulness is associated towards the Actual Usage of a System for Procurement Efficiency.

We can further conclude that the Perceived Usefulness and Actual Usage of a System for Procurement Efficiency that is enough evidence based on the result of the simulation that we can suggest that the indicators have no significant relationship with a 45.60% confidence level.

Applications for simplifying complex processes or workflows are used by many prosperous businesses. They have attributes that make tedious, repeated work easier. These include tasks like information gathering and sorting. (Villanueva, 2022)

**Table 14**

*R-Squared Value of Perceived Usefulness towards Actual Usage of a System for Procurement Efficiency of an In-house-Developed System*

Predictors	R-Squared
Perceived Usefulness Actual Usage of a System for Procurement Efficiency	0.010

The R<sup>2</sup> linear value of 0.010, which is equivalent to 1.0% of changing variation, is represented by perceived usefulness towards actual usage of a system for operational efficiency of an in-house-developed system.

(Butt, 2021) described that the usefulness of a particular system does not have a significant impact on its actual usage; however, usefulness affects and proves to be a contributor to achieving user's satisfaction.

**Table 1**

*Strength of Association between Perceived Ease of Use and Actual Usage of a System for Procurement Efficiency of an In-house-Developed System*

Predictors	Pearson Correlation	Sig (2-Tailed)	Decision on HO	Interpretation
Perceived Ease of Use Actual Usage of a System for Procurement Efficiency	.627**	0.001	Reject	Significant

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the correlation coefficient between the "Perceived Ease of Use and Actual Usage of a System for Procurement Efficiency". It can be seen in the coefficient indicating that there is a positive, strong, significant relationship with Pearson Correlation value of 0.627, equivalent to 62.70%

The result suggests we can predict that there is a 62.70% that Perceived Usefulness is associated towards the Actual Usage of a System for Procurement Efficiency.

We can further conclude that the Perceived Ease of Use and Actual Usage of a System for Procurement Efficiency, there is enough evidence based on the result of the simulation that we can suggest that the indicators have no significant relationship with a 99.90% confidence level.

A team can concentrate more and work for longer stretches of time uninterrupted because technology can handle many other responsibilities. They are primarily made more productive as a result of that. Therefore, it's crucial to pick the appropriate technological components to match a current business's processes, workflows, and culture. By opting for older technology, you can miss out on the newest productivity tools and programs. (Villanueva, 2022)

**Table 16**

*R-Squared Value of Perceived Ease of Use towards Actual Usage of a System for Procurement Efficiency of an In-house-Developed System*

Predictors	R-Squared
Perceived Ease of Use	0.393
Actual Usage of a System for Procurement Efficiency	

The R<sup>2</sup> linear value of 0.393, which is equivalent to 39.30% of changing variation, is represented by perceived ease of use towards actual usage of a system for procurement efficiency of an in-house-developed system.

(Butt, 2021) stated that user's satisfaction affects its actual use of a particular system or software. It is highly recommended that a system needs to be user-friendly to contribute a major impact to the actual usage of the system to achieve procurement efficiency.

**Table 17**

*Strength of Association between Perceived Usefulness and Actual Usage of a System for Procurement Efficiency of an Outsourced System*

Predictors	Pearson Correlation	Sig (2-Tailed)	Decision on HO	Interpretation
Perceived Usefulness	.106**	0.615	Accept	Not Significant
Actual Usage of a System for Procurement Efficiency				

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the correlation coefficient between the "Perceived Usefulness and Actual Usage of a System for Procurement Efficiency". It can be seen in the coefficient indicating that there is a positive weak significant relationship with Pearson Correlation value of 0.106, equivalent to 10.60%

The result suggests we can predict that there is a 10.60% that Perceived Usefulness is associated towards the Actual Usage of a System for Procurement Efficiency.

We can further conclude that the Perceived Usefulness and Actual Usage of a System for Procurement Efficiency that there is enough evidence based on the result of the simulation that we can suggest that the indicators have no significant relationship with a 38.50% confidence level.

Applications for simplifying complex processes or workflows are used by many prosperous businesses. They have attributes that make tedious, repeated work easier. These include tasks like information gathering and sorting. (Villanueva, 2022).

**Table 18**

*R-Squared Value of Perceived Usefulness towards Actual Usage of a System for Procurement Efficiency of an Outsourced System*

Predictors	R-Squared
Perceived Usefulness	0.011
Actual Usage of a System for Procurement Efficiency	

The R<sup>2</sup> linear value of 0.011, which is equivalent to 1.10% of changing variation, is represented by Perceived Usefulness towards Actual Usage of a System for Procurement Efficiency of an outsourced system.

According to (Team, 2023), employees are required to follow the management mandated software to promote efficiency. Despite some concerns about its usefulness, users of a particular software are instructed to use it to perform their tasks and functions.

**Table 19**

*Strength of Association between Perceived Ease of Use and Actual Usage of a System for Procurement Efficiency of an Outsourced System*

Predictors	Pearson Correlation	Sig (2-Tailed)	Decision on HO	Interpretation
Perceived Ease of Use Actual Usage of a System for Procurement Efficiency	.635**	0.001	Reject	Significant

*Note: p > .05 Accept HO (Not Significant) ; p < .05 Reject HO (Significant)*

The table shows the correlation coefficient between the "Perceived Ease of Use and Actual Usage of a System for Procurement Efficiency". It can be seen in the coefficient indicating that there is a positive, strong, significant relationship with a Pearson Correlation value of 0.635, equivalent to 63.50%.

The result suggests we can predict that there is a 63.50% that Perceived Usefulness is associated towards the Actual Usage of a System for Procurement Efficiency.

We can further conclude that the Perceived Ease of Use and Actual Usage of a System for Procurement Efficiency that, there is enough evidence based on the result of the simulation that we can suggest that the indicators have a significant relationship with a 99.90% confidence level.

A team can concentrate more and work for longer stretches of time uninterrupted because technology can handle many other responsibilities. They are primarily made more productive as a result of that. Therefore, it's crucial to pick the appropriate technological components to match a current business's processes, workflows, and culture. By opting for older technology, you can miss out on the newest productivity tools and programs. (Villanueva, 2022)

**Table 20**

*R-Squared Value of Perceived Ease of Use towards Actual Usage of a System for Procurement Efficiency of an Outsourced System*

Predictors	R-Squared
Perceived Ease of Use Actual Usage of a System for Procurement Efficiency	0.403

The R-Squared linear value of 0.403, which is equivalent to 40.30% of changing variation is represented by Perceived Ease of Use towards Actual Usage of a System for Procurement Efficiency.

According to (Gallimore, 2023), many companies opt to use outsourced digital applications in their business operations due to various advantages such as foreign markets helps the company to modify and upgrade its business model, lessen developmental cost, and have more access to the experts in technology, business process, and industry's experts. It is highly regarded that ease of use of a foreign system does really affect the actual usage of it, having a perspective that it will help the efficiency of the company.

**5. Conclusion**

The findings of the study yield several significant implications. Firstly, the demographic characteristics of the respondents play a crucial role in assessing the influence of utilizing an internally developed system versus outsourcing on procurement efficiency. The survey participants primarily consist of prominent property developers who employ internally developed systems. Additionally, individuals from the procurement departments predominantly fall within the age bracket of 38 years and older.

In relation to the efficiency of procurement, the analysis indicates that the ease of utilization of the system, whether it is an in-house-developed or outsourced system, is more likely to lead to efficient procurement functions compared to the perceived usefulness of the system. The participants exhibited a high level of agreement regarding the importance of a user-friendly system that facilitates learning and navigation, as well as enables users to improve their skills, thereby enhancing the overall efficiency of the procurement department.

Moreover, the study's findings indicate that the aforementioned mediating factors, namely perceived usefulness and perceived ease of access, have a direct influence on the efficiency of the procurement department. This influence is manifested through enhanced productivity and reduced processing time, regardless of whether the systems are developed in-house or outsourced. The participants exhibited a high level of agreement regarding the direct influence of these factors on the successful fulfillment of precise requirements and demands of procurement users, as well as the facilitation of expedited procurement transaction processing.

The research demonstrates a notable correlation between the perceived utility of a system, the perceived simplicity of its use, and the tangible utilization of said system for the purpose of enhancing procurement efficiency. This correlation underscores the significance of the technical knowledge and skills possessed by regular procurement users in order to effectively execute a streamlined procurement process. This finding provides additional support for the deduction made by Abidi, Russo, Sommerer, and Streif (2018), which posits that the emphasis on procurement digitalization should be placed on a comprehensive transformation of the procurement process that is centered around the needs of the users. This transformation aims to enable procurement users to operate within a completely digitalized environment.

Distinct differences were observed in terms of perceived usefulness and perceived ease of use between in-house-developed systems and outsourced systems. The findings indicate that individuals who utilize outsourced systems tend to exhibit a greater inclination towards strongly agreeing that their productivity is enhanced and their job performance is improved when utilizing such systems. Conversely, the findings revealed that participants who utilized internally developed systems exhibited a greater propensity to strongly agree that acquiring proficiency in the system and enhancing their skillset was a comparatively effortless endeavor.

In general, after considering the demographic characteristics of the participants, there is no statistically significant distinction observed between users of in-house-developed systems and users of outsourced systems in terms of the property developer's perspective on the perceived usefulness of the system, perceived ease of use, and the actual utilization of a system for enhancing procurement efficiency. Therefore, it can be concluded that a singular system is not universally applicable to address the diverse procurement requirements and procedures of property developers. In order to make informed decisions regarding procurement digital transformation and process improvement and standardization, it is crucial to carefully consider various factors. This includes drawing upon the research conducted by (Haider, Samdani, Ali, & Kamran, 2016), which examines the comparison between in-house-developed and outsourced systems. Additionally, it is important to align the aspirations of the procurement department and the property developers while also taking into account economic and financial considerations. Furthermore, a comprehensive evaluation of the benefits and risks associated with utilizing a specific type of system in the procurement process should be undertaken.

Based on the conclusions, this study offers recommendations for procurement professionals, property developers, future researchers, and the national and local governments.

For procurement professionals, the recommendations involve conducting research and comparing digital platforms, documenting results such as time and cost savings, and issues encountered and fix, and coming up with process improvement initiatives that would promote work stability to those who are involved in the procurement functions.

For property developers, the recommendations include improving their procurement functions, investing in digitalization for procurement efficiency, strengthening and facilitating efficient communications across business processes and stakeholders involved in the procurement functions, actively seeking feedback from employees, suppliers, and customers, unceasingly striving for improvement.

Future researchers are urged to improve the study further by including a more diverse and larger sample size, considering the use of comparative analyses and longitudinal studies, incorporating both quantitative and qualitative research methods, examining other organizational factors such as employee productivity and retention, and keeping oneself updated on the developing trends in the digital and property development industry.

National and local governments are recommended to focus on regulation and stakeholder protection, setting up fair and quality compliance standards, reassuring support and connections for local businesses, developing opportunities for professional development, sponsoring ethical and environmental initiatives, and encouraging digital transformation for further economic development in the Philippines.

By implementing these recommendations, procurement professionals can strategically enhance their work efficiency, while property developers can improve their procurement process and overall service and product quality and assess what is the best

type of system suited to achieving procurement targets. Future researchers can contribute to the field by investigating further the impact of the type of system used by property developers in their procurement functions, and governments have a critical role in promoting a digital environment across businesses and protecting the stakeholders' interests.

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## References

- [1] Asatiani A, E. P. (2016). Turning robotic process automation into commercial success – Case OpusCapita. *Journal of Information Technology Teaching Cases*, 6(2), 67–74.
- [2] Abidi, A., Russo, F., Sommerer, M., & Streif, A. (2018, November 10). *McKinsey & Company*. Retrieved from [www.mckinsey.com: https://www.mckinsey.com/capabilities/operations/our-insights/digital-procurement-for-lasting-value-go-broad-and-deep](https://www.mckinsey.com/capabilities/operations/our-insights/digital-procurement-for-lasting-value-go-broad-and-deep)
- [3] Abraham, M. C. (1999). Key factors predicting the effectiveness of cultural change and improved productivity in implementing total quality management. *International Journal of Quality & Reliability Management*.
- [4] Aitzaz, S. (2016). A Comparative Analysis of In-house and Outsourced Development in Software Industry. *International Journal of Computer Applications*, 141(3):18-22.
- [5] Almeri, D. H. (2022, January 20). *Linkedin*. Retrieved from <https://www.linkedin.com/pulse/project-success-vs-top-management-support-dr-husam-mohamed-alameri>
- [6] Babb, B. (2023, June 1). *Pipefy AI*. Retrieved from [pipefy.com: https://www.pipefy.com/blog/digital-procurement/#:~:text=Digital%20procurement%20is%20the%20use,and%20information%20related%20to%20procurement](https://www.pipefy.com/blog/digital-procurement/#:~:text=Digital%20procurement%20is%20the%20use,and%20information%20related%20to%20procurement)
- [7] Balachandran, J. (2023, March 29). *Breaking Down the Numbers: The True Costs of Outsourced Maintenance*. Retrieved from [Linkedin: https://www.linkedin.com/pulse/breaking-down-numbers-true-costs-outsourced-jai-balachandran](https://www.linkedin.com/pulse/breaking-down-numbers-true-costs-outsourced-jai-balachandran)
- [8] Belotserkovskiy, R., Mercker, B.-U., Rocha, A., & Spiller, P. (2018, November 21). *McKinsey & Company*. Retrieved from [www.mckinsey.com: https://www.mckinsey.com/capabilities/operations/our-insights/operations-blog/unleash-the-power-of-digital-in-procurement](https://www.mckinsey.com/capabilities/operations/our-insights/operations-blog/unleash-the-power-of-digital-in-procurement)
- [9] Black, R. T. (2004). Agency Risks in Outsourcing Corporate Real Estate. *Journal of Real Estate Research*, Vol. 26, No. 2, pp. 137-160.
- [10] Butt, S. (2021). Students' Performance in Online Learning Environment: The Role of Task Technology Fit and Actual Usage of System During COVID-19. *Organizational Psychology*.
- [11] Bienhaus, F. A. H. (2018). Procurement 4.0: factors influencing the digitisation of procurement and supply chains. *Business Process Management Journal*, pp. 965-984.
- [12] Changalima, I. A. (2021). Obtaining the best value for money through procurement planning: Can procurement regulatory compliance intervene? *Journal of Money and Business*, 133–148.
- [13] Chanthavong, A. (2023, June 1). *Procurement IQ*. Retrieved from <https://www.procurementiq.com/blog/procurement-recruit-next-generation>
- [14] Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 319-340.
- [15] Dawson B, T. (2004). Basic and clinical biostatistics.
- [16] Deepu, T. S., & Ravi, V. (2021). A conceptual framework for supply chain digitalization using integrated systems model approach and DIKW hierarchy. *ScienceDirect - Intelligent Systems with Applications*.
- [17] Gallimore, D. (2023, January 23). *Top 4 reasons why companies outsource*. Retrieved from <https://www.outsourceaccelerator.com/articles/top-4-reasons-why-companies-outsource/>
- [18] Groover, M. P. (2023). *Automation*. *Britannica*.
- [19] GRZEGORZEK, J. (2021, March 18). *Measuring Business Size*. Retrieved from <https://www.superbusinessmanager.com/measuring-business-size/>
- [20] Haider, S. A., Samdani, G., Ali, M., & Kamran, M. (2016, May). *ResearchGate*. Retrieved from [www.researchgate.net: https://www.researchgate.net/publication/303318785\\_A\\_Comparative\\_Analysis\\_of\\_In-house\\_and-Outsourced\\_Development\\_in\\_Software\\_Industry](https://www.researchgate.net/publication/303318785_A_Comparative_Analysis_of_In-house_and-Outsourced_Development_in_Software_Industry)
- [21] Harvard Business Review. (2021, April 14). *Harvard Business Publishing*. Retrieved from [hbr.org: https://hbr.org/sponsored/2021/04/six-best-practices-for-elevating-procurement-at-your-organization#:~:text=High-performing%20procurement%20organizations%20are%20driving%20enterprise,efficiency%2C%20and%20reducing%20risks%20and%20costs.&text=High-performi](https://hbr.org/sponsored/2021/04/six-best-practices-for-elevating-procurement-at-your-organization#:~:text=High-performing%20procurement%20organizations%20are%20driving%20enterprise,efficiency%2C%20and%20reducing%20risks%20and%20costs.&text=High-performi)
- [22] Haslam S. A., M. C. (2003). *Research Methods and Statistics in Psychology*. Sage Foundations of Psychology. Retrieved from [tibco.com: https://www.tibco.com/reference-center/what-is-analysis-of-variance-anova#:~:text=Analysis%20of%20Variance%20\(ANOVA\)%20is,the%20means%20of%20different%20groups](https://www.tibco.com/reference-center/what-is-analysis-of-variance-anova#:~:text=Analysis%20of%20Variance%20(ANOVA)%20is,the%20means%20of%20different%20groups)
- [23] Hayes, A. (2023, April 5). *Investopedia*. Retrieved from <https://www.investopedia.com/terms/t/t-test.asp>
- [24] Hartley J.L. W. S. (2019). Tortoise, not the hare: digital transformation of supply chain business processes. pp. 707-715.
- [25] Indeed. (n.d.). Retrieved from <https://ca.indeed.com/career-advice/career-development/in-house-vs-outsourcing>
- [26] Jenkins, A. (2023, September 5). *Oracle Net Suite*. Retrieved from <https://www.netsuite.com/portal/resource/articles/accounting/procurement.shtml>
- [27] Johannesburg. (2015). *Digital Procurement Discussion Paper*.
- [28] Kenton, W. (2023, June 12). *Investopedia*. Retrieved from <https://www.investopedia.com/terms/a/anova.asp#toc-what-is-analysis-of-variance-anova>
- [29] Lam, T. Y. (2004). Economic perspective on outsourcing of property management. *Property Management*, Vol. 30, No. 4, pp. 318-332.

- [30] Lamudi. (2019). *The Largest Philippine Real Estate Developers and Their CAPEX in 2015*. Retrieved from <https://www.lamudi.com.ph/journal/the-largest-philippine-real-estate-developers-and-their-capex-in-2015/>
- [31] Llywodraeth Cymru Welsh Government. (2020, March 18). *GOV.WALES*. Retrieved from [www.gov.wales: https://www.gov.wales/sites/default/files/pdf-versions/2021/1/3/1610564636/progress-towards-the-development-of-a-new-procurement-landscape-in-wales.pdf](https://www.gov.wales/sites/default/files/pdf-versions/2021/1/3/1610564636/progress-towards-the-development-of-a-new-procurement-landscape-in-wales.pdf)
- [32] Loughlin, P. (2021). How Does your In-House Procurement System Compare to World Class? *Purchasing Insights*.
- [33] Markovic, I. (2022, May 2). *TMS*. Retrieved from <https://tms-outsource.com/blog/posts/in-house-development-vs-outsourcing/>
- [34] Motaung, J. (2019). Procurement Digitalisation at Airports Company South Africa.
- [35] Muriithi, M. P., & Senelwa, D. A. (2018). Factors Influencing Adoption of E-Procurement in Humanitarian Organizations in Kenya: A Case of Norwegian Refugee Council - Kakuma Refugee Camp. *International Journal of Recent Research in Social Sciences and Humanities (IJRSSH)*, (248-264).
- [36] oboloo Limited. (2023). *oboloo*. Retrieved from [oboloo.com: https://oboloo.com/blog/what-is-procurement-efficiency-and-why-is-it-important/#Procurement%20Efficiency:%20Its%20Definition%20and%20Importance](https://oboloo.com/blog/what-is-procurement-efficiency-and-why-is-it-important/#Procurement%20Efficiency:%20Its%20Definition%20and%20Importance)
- [37] Pargaonkar, A. M. (2019). A Study on Elderly Individuals' Attitude Towards ICTs. In Chakrabarti, A. *Research into Design for a Connected World. Smart Innovation, Systems and Technology*, pp.135.
- [38] Park, E. S., & Park, M. S. (2020). Factors of the Technology Acceptance Model for Construction IT. *MPDI Open Access Journals*.
- [39] Ponniah, G. (2022, April 13). *Microsys*. Retrieved from LinkedIn: <https://www.linkedin.com/pulse/benefits-e-procurement-systems-small-medium-sized-gilroy-ponniah>
- [40] Radell, C., & Schannon, D. (2018, September 10). *Bain & Company*. Retrieved from [www.bain.com: https://www.bain.com/insights/digital-procurement-the-benefits-go-far-beyond-efficiency/](https://www.bain.com/insights/digital-procurement-the-benefits-go-far-beyond-efficiency/)
- [41] Remane, G., Hanelt, A., & Nickerson, L. (2017). Discovering Digital Business Models in Traditional Industries. *J. Bus. Strategy*, 38.
- [42] Rosell, J. (2021, March 17). *Oxford*. Retrieved from [Oxford: https://www.ageing.ox.ac.uk/blog/use-of-technology-does-age-matter](https://www.ageing.ox.ac.uk/blog/use-of-technology-does-age-matter)
- [43] Roudbaraki, E. H. (2022). Analyzing User-Friendly Software Designs to Improve Customer Satisfaction. *Social Sciences & Humanities Open*. Retrieved from <https://kndcode.com/nearshoreinsights/UX-UI-importance>
- [44] Sayed, M. H. (2020, January 13). Sustainable procurement: comparing in-house and outsourcing.
- [45] Schnellbacher, W., Weise, D., Tevelson, R., & Högel, M. (2018, October 26). *BCG*. Retrieved from [bcg.com: https://www.bcg.com/publications/2018/jump-starting-digital-procurement-journey](https://www.bcg.com/publications/2018/jump-starting-digital-procurement-journey)
- [46] Srivastav, A. K. (2023). Pearson Correlation Coefficient. *WallStreetMojo*.
- [47] Team, I. E. (2023, April 27). Retrieved from <https://au.indeed.com/career-advice/career-development/examples-of-policies-and-procedures-in-the-workplace>
- [48] Villanueva, M. S. (2022, February 1). *Intelligent Technical Solutions*. Retrieved from [www.itsasap.com: https://www.itsasap.com/blog/6-ways-technology-increases-productivity](https://www.itsasap.com/blog/6-ways-technology-increases-productivity)
- [49] Zambianchi, M. R. (2019). Attitudes Towards and Use of Information and Communication Technologies (ICTs) Among Older Adults in Italy and Sweden: The Influence of Cultural Context, Socio-Demographic Factors, and Time Perspective. *Journal of Cross-Cultural Gerontology*, 34, 291-306.