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**DIGITALIZATION OF THE PROCUREMENT PROCESS IN THE DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS IN THE PROVINCE OF MASBATE**

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**ABSTRACT**

Government offices are moving to digitalization and transformation on its services. Advantages of digitalization will have public sectors improve operational transparency, responsiveness, accountability and internal efficiency. (Ylinen, 2021). This descriptive-inferential research design focus on the digitalization of the procurement process in the Department of Public Works and Highways in the Province of Masbate, aimed in determining its status of the procurement process in terms of pre-procurement, procurement, and post procurement. Assessing the level of efficiency through transparency, competitiveness, streamlined procurement process, system of accountability, and public monitoring to know if agreement exist among the three districts. Findings of the study denoted that pre-procurement, procurement, and post-procurement process were indicated to be highly applied based from the indicators, and very efficient for the level of efficiency, while the mean ranks for each stage and activity vary across the different groups, suggesting some degree of variation in perceptions and experiences of the procurement process. However, the overall finding of significant agreement on the ranks of the procurement process indicates a general consensus among the groups in the 1st district about the relative importance and effectiveness of different stages and activities in the procurement process. However, positivity on the use of digital services an e-procurement process can effectively adopted.

**KEYWORDS:** Social Science, Digitalization, Procurement, Procurement process, Bicol College, Philippines.

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## 1. INTRODUCTION

### Rationale of the Study

Government offices are moving to digitalization and transformation on its services. Advantages of digitalization will have public sectors improve operational transparency, responsiveness, accountability and internal efficiency (Ylinen, 2021). Public sectors can benefit from the technological innovations and responds to the growing service needs of its stakeholders. Administrative governance is one of the approaches needed as public sectors like Department of Public Works and Highways cope up with the operational environment which is meant to help administrative systems in response to the growing changes and liked to organizational resilience.

Digitalization provides the public sector capability to react on the changing demands of the organization by enabling faster responses to the citizen's needs (Weingarh, et. al., 2018). Moreover, digitalization in the public sector provides advantages such as improve operational efficiency, flexibility, collaboration and better customer service despite barriers including tradition approaches and operational structures as well as resistance to change. Hence, DPWH must have a clear view on digitalization, considers the size of the organization and how to delivery an enhanced efficiency and productivity of public service. Moreover, it needs to adapt digital transformation amidst to the growing demands of public sector.

Globally, electronic procurement and/or the use of computers in procurement is becoming more popular and a necessity in today's government transactions wherein trends, issues, problems and needed solutions must be in place to support the growing needs of the state. Electronic communication and use of computers offer effective communication and transaction process which leads to increase efficiency in decision making and information flow. Investing in the development of digital infrastructure is for the purpose of meeting existing and future demand [Organization for Economic Cooperation and Development, (OECD, 2017)]. Hence, inclusion of information and communications technology in governmental transactions is necessary as governments are driving digital transformation. With this, the study is timely and relevant as procurement processes needs data tracking and monitoring. Without the use of electronic means or information and communications technology both the agencies of the government and its bidders would find difficulty as they involved themselves in the procurement activities.

Another discussion by Hanna (2018) on an international point of view, stakeholders must understand the role of the government in driving digital change particularly information and communication technologies innovations. Providing and enabling digital innovations is one of the main roles of the government which includes ecosystem of innovative and inclusive digital economy. Public sector also experienced challenges in setting national policies and priorities for digital economy. Currently, the Philippines implementing rules and guidelines is provided in republic Act 9184 or the act providing for the modernization, standardization and regulation of the procurement activities of the government and for other purposes also known as government procurement reform act which includes policies on procurement by electronic means. At present, the electronic means as specified in the law is not yet fully implemented which makes the present study relevant and timely as it looks into the information and communication technology used

currently by Department of Public Works and Highways in terms of procurement. Hence, the government must take a holistic view in nurturing a digital transformation ecosystem.

On the national perspective, the Asian Development Bank (2021) emphasizes multistakeholder support to foster an inclusive and equitable digital economy. More importantly in dealing with digital infrastructure basic underpinning must be in place such as legal and regulatory environment, mode of payment systems, governance of data, consumer protection, cyber security and digital skills of employees. Hence, the necessity of the present study would help provide insights on how to conduct regional integration when it comes to information and communications technology.

A study on local government authorities that they have been slow in adopting electronic procurement processes given the existence of basic information communication infrastructure (Mabhodha and Choga, 2021) which could be due to resistance to change. There is a need to determine the status of the procurement management as government have been slow to adopt or implement electronic procurement systems despite existence of basic digital infrastructure wherein recommended information and communications technology must be anchored on national policy. Hence, there are many challenges to be able to achieve speed in the procurement process. Among these challenges include difficulty in measuring usefulness and potential of the digital infrastructure, lack of capital investments, lack of foresight, and among other concerns. Moreover, commitment and personal attitude as well as organizational behavior has a direct impact on the speed of transactions in the procurement process.

Government digital transformation is a respond of the country to the multi-sectoral call to deliver public service at its best including speed of transactions. The need for better e-system in governance includes procurement management to efficiently address the new normal demands. Determination of the status helped in formulating or designing strategic reforms or significant e-procurement process as assessed by the districts to achieve objectives for digital change that can positively support the public needs particularly on the enhancement of swift procurement process of Department of Public Works and Highways in the Province of Masbate which is in relation to supporting government's drive for digital change. The assessment of the level of efficiency reflected the situation of DPWH Province of Masbate that helped the researcher in formulating strategies or reforms for a significant e-procurement process based from various insights of procurement activities assessed by the respondents or initiatives aligned with information and communications technology as key factors for speedy transactions incorporating other critical success factors such as environmental sustainability, support for local businesses, employee and stakeholder training needs as well as focusing on citizen-centric approach for public service. Significant agreement on the ranks of the procurement process and its relationship as assessed by the three districts were also measured. When the problems and issues of the procurement process in DPWH Masbate are addressed the principles of government procurement can be met as it captures the value creation in the supply chain. Moreover, there will be proper management of limited resources like budgets and people to support the procurement process. The stages of procurement will be streamlined while stimulating innovation and promote competitiveness (Malacina, et. al., 2022). Hence, the benefits of public procurement's value will be considered as employees' practice such in the different stages (Meynhardt, 2021). There will be more organized demonstration of

processes to include variety of practices from assessment to contract management (OECD, 2019) which has an impact on the performance of the organization (Patrucco, et. al., 2019). With the DPWH leadership on procurement process it will help shape the market demands and innovation (Miller and Lehoux, 2020) which leads to solutions that generates the highest value possible.

As discussed by Natividad (2021), and Salac and Kim (2016), the Philippines has a slow Internet connection because of the outdated Philippine law and red tape that hinders the quick installations of cell towers. This is a national problem and since the DPWH is geographically located in an island internet provider seems to be the main problem in delivering good service communication. Network connection is the usual issues and problems because suddenly it removed or get disconnected. Wi-Fi signal is weak or nonexistent in other areas, thus, the Agency or office area can result in a weak wireless connection. Masbate City was the chosen location as the researcher observes the need to identify the current status in the pursuit of digitalization.

### **Objectives of the Study**

This endeavor assessed the main objective of this research study which is about the efficiency of the procurement process of the DPWH in the Province of Masbate, through information communications and technology.

It specifically aimed to;

1. Determine the status of the current procurement process of DPWH Masbate in terms of;
  - a. Pre-procurement;
  - b. Procurement; and
  - c. Post-procurement.
2. Assess the level of efficiency of the procurement process in terms of;
  - a. Transparency;
  - b. Competitiveness;
  - c. Streamlined Procurement Process;
  - d. System of Accountability; and
  - e. Public Monitoring
3. Measure the significant agreement on the ranks of the procurement process as assessed by the three districts.
4. Propose an e-procurement process that can effectively be adopted by the target beneficiaries.

### **Assumptions**

The assumptions of this study are as follows;

1. The status of the current procurement process is committed on the government's promotion of good governance in its procurement process in terms of the governing principles on government procurement as regards to pre-procurement, procurement, and post-procurement;
2. The Department of Public Works and Highways, Province of Masbate is efficient on the procurement process in terms of transparency, competitiveness, streamlined procurement process, system of accountability and public monitoring;
3. The Agency has no significant agreement as assessed by the three (3) district on the procurement process; and

4. E-procurement process leading towards an enhanced and swift procurement process in Department of Public Works and Highways in the Province of Masbate is necessary to respond to the needs and demands of information communication and technology.

### **Hypothesis**

The hypotheses of this study based on the statistical objective:

There is no significant agreement on the ranks of the procurement process as assessed by the three districts. There is no significant agreement on the indicators "TRANSPARENCY," "STREAMLINED PROCUREMENT PROCESS," and "SYSTEMACCOUNTABILITY." However, there is significant agreement on the indicators "COMPETITIVENESS" and "PUBLIC MONITORING."

### **Literature Review**

This section of literature review focused on **“the status of the current procurement process in terms of pre-procurement, procurement and post procurement”**.

#### **The overview of the current procurement process.**

Procurement planning shall be in accordance with the principles of government procurement as provided in the manual of procedures for the procurement of goods, services and infrastructure projects. It is important that pre-procurement identifies the availability of goods or services in the market.

Pre-procurement It is a conference or forum where all officials involved in the procurement meet and discuss all aspects of a specific procurement activity. Pre-procurement tasks involves institutional due diligence, deciding the whole procurement process, committees and teams among others. Examples of pre-procurement activities involves detailed investigations and designs, budget planning, determining methods of procurement, milestone activities, readiness of bidding documents are available and the legal, technical, and financial requirements are discussed during pre-procurement conference. The Commission on Audit (2022) defines pre-procurement conference as **“The pre-procurement conference is the forum where all officials involved in the procurement meet and discuss all aspects of a specific procurement activity, which includes the technical specifications, the Approved Budget for the Contract (ABC), the applicability and appropriateness of the recommended method of procurement and the related milestones, the bidding documents, and availability of the pertinent budget release for the project”**. Hence, pre-procurement is helping prepare the process to be more efficient and effective.

Also, Commission on Audit (2022) mentioned that the pre-procurement basically involves three (3) activities: procurement planning, preparation of the bidding documents, and the conduct of the pre-procurement conference. Hence, this are very important phases to appreciate succeeding procurement activities including identification of courses of actions, alternatives and measures to determine the best manner to institute with least cost.

The Government Procurement Reform Act (Republic Act 9184) provides its purpose which states that “prescribing the necessary rules and regulations for the modernization, standardization, and regulation of the procurement activities of the government of the Philippines”. Clearly, the law mentioned modernization which actually entails digital opportunities to the government offices for procurement management as well as standardization of procurement functions would lead to speed in responsiveness in transactions which will eventually regulate the procurement activities in various government departments and/or agencies like Department of Public Works and Highways, Masbate Third District Engineering Office. The law specifically provides procurement by electronic means and the Philippine Government Electronic Procurement Systems discussing the importance of promoting information and communications technology utilization in the conduct of procurement procedures along with transparency and efficiency. In addition, RA 9184 incorporates the need for security, integrity and confidentiality of the procurement activities to support government drive on digital change while protecting its people. However, the procurement regulations and manuals have indicated the criteria, processes, guiding principles among others but the problematic situation basically relies on the implementation of the e-procurement process or the digitalization aspects as the current status entails both best practices and needs improvements.

Digitalization in the procurement sector of the public entity shall cover the areas of services, goods, and infrastructures. The government procurement reform act (Republic Act 9184) applies to infrastructure projects, goods and services with the goal of providing modernization, standardization, and regulation of procurement activities of the government. However, such modernization is not fully implemented today. Hence, this study is relevant in determining the situation of procurement particularly in the Province of Masbate.

Moreover, Republic Act 9184 defines procurement as the acquisition of goods, consulting services, and the contracting for infrastructure projects by the procuring entity including lease of goods and real estate. Such law also provides the definition of goods referring to all items, supplies, materials, and general support services except consulting services and infrastructure projects which are needed in the transactions of government activities. On the other hand, consulting services are for infrastructure projects and other activities of the government that requires adequate external expertise.

Digital disruption requires decisive responses which leaders of the government must respond. According to Commonwealth of Australia (2021), delivering the right foundations to grow the digital economy by keeping at the forefront of emerging technologies using these three pillars namely; building the foundations to grow the digital economy, building capability in emerging technologies and setting digital growth priorities. Hence, the role of the government is to set policies on digital infrastructure with skilled workforce. Moreover, the current situation of Department of Public Works and Highways is not fully using digitalization making the present research study necessary to encourage the adoption and creation of trusted technology while recognizing the role of emerging technologies to drive future productivity and digital capability. In addition, a key area in building technological capability includes skills, regulation, and cyber security.



Future workforce capability is one of the right foundations when building the digital economy as well as digital capabilities of the small and medium sized enterprises. Hence, government must encourage the small and medium sized enterprises to adopt to new technology wherein in the present study, they are the bidders who form part of the procurement process implemented by the Department of Public Works and Highways (DPWH). Moreover, according to Dryer and Nygaard (2020), government around the world are adopting measures to encourage of small and medium sized enterprises to adopt information and communications technology making the present study relevant and timely?

To have sustainable digital government policies, procurement activities must be coordinated through the use of information and communications technology to speed up transactions with significant efficiencies at the same time it allows better oversight and monitoring activities. However, information and communications technology investments are not yet strongly focused in some areas where strong internet connectivity is still an issue. There is a need to determine the status that will provide better understanding of stakeholder needs and concerns including simplifying the procurement process and interactions between the government agency, suppliers or bidders given the current digital infrastructures, speed of procurement transactions, and connectivity issues. More importantly, government initiatives for driving digital change must embody a citizen centric-approach to public services.

Procurement must be governed by the principles set by the law on government procurement (Commission on Audit, 2022). There are many activities involve in the procurement process where due diligence is a must. Examples of activities are ensuring the widest dissemination of advertising and posting of invitation to apply for eligibility and to bid, installed computerized registry of contractors and conduct electronic eligibility processing, provide the rules in relation to the issuance of the bidding documents, responsible and knowledgeable officials attend the pre-bid conference, establish the correct calculated prices of the bids through detailed evaluation, ascertain compliance with post-qualification requirements and post bidding results in the DPWH Website and G-EPS.

Procurement is considered as a discipline which is strategically important for efficient and effective completion of services (Funda, 2019). Hence, this study established the importance of how procurement function influences overall contribution to government performance particularly digitalization. Internal collaboration between employees, contractors and other stakeholders must embraced automation and e-procurement for digitalization to prosper the way it is intended to be.

Procurement procedure must be practical with short-term and long-term guidance that would reflect a culture of principles of government procurement and sustainability. Formation of staff structure is also vital in the procurement process representing potential inputs and standardized procedures. Incorporating digitalization assists in the integration of procurement process and supply chains with transparency and resilience. The importance of quality in information technology and digitalization must complement each other to generate the correct data.

Post procurement process happens after the implementation of award contracts wherein one of the procurement principles in this stage is public monitoring in reference to R.A. 9184, Section 63 and

the 2016 IRR, Section 63.1 (a) provide the mandate of the GPPB to ensure the proper implementation by the Procuring Entities of the GPRA, the 2016 IRR, and all other relevant rules and regulations pertaining to public procurement. Example of activities in post procurement are as follows; use checklist to ensure the completeness of the documents comprising the contract, observe the proper posting of performance security, provide standard procurement performance monitoring on a regular basis, use evaluation tools in addressing procurement risks, utilize the information in the procurement database for more effective decision making, encourage effectiveness of competition and level of confidence among participants and exert reasonable efforts to preserve confidentiality of information. Technical and quality evaluation helps contract award decision whether the decision is objectively done, fair and transparent that could demonstrate the best value in the procurement process.

The increased changes in digital technology changes day to day transactions (KPMG, 2020) wherein real-time tracking or monitoring is possible. However, there are disruptions and to survive in the competition there is a need to innovate and reinvent this includes the government's goal of implementing digitalization in their transactions particularly the procurement process. The procurement process is an important part of holistic supply chain management where digitalization can be used to increase value.

How can the government embark on the digital transformation journey? It includes ideation, developing mission, information technology solution scouting, and other lean development. Why a need for digitalization of procurement? Digitalization is creating new ways and channels (Accenture, 2017) for clients and government interactions. Hence, digitalization models must be in place to provide more agile and efficiency as well as embracing digital to transform key functions in real time.

According to Radell and Schannon (2018), digital procurement solutions not only create an opportunity to improve efficiency and play a strategic role in accelerating innovation specifically using the digital strategy and roadmap including improving procurement efficiency and effectively and enabling broader digital vision. Moreover, the use of digitalization provides competitive edge because of enhanced speed and quality of procurement. Given the situation that supply chain has increased its complexity, the government must harness and integrate new tools for procurement and collaborate with stakeholders to reduce risks and appreciate innovation.

Digital procurement involves automation of the procurement process using e-procurement platforms (Ikram and Latifa, 2022) wherein government agencies must build digital strategy in its procurement policy. Hence, the present study provides insights to obtain competitive advantage to meet the changing demands of its clientele. However, digitalization should consider vision of leadership and collaboration among stakeholders to ensure success. The present study provided insights on digitalization to enhance the e-procurement process.

As discussed by Kasmehag and Lofnertz (2018), procurement is a supporting function and covers processes of buying wherein digitalization drives increase in complexity, competition and efficiency. When government agencies have the foundation on technological investments risks can



be mitigated and opportunities will be explored as logical structure of e-procurement is in place. Moreover, Gartner (2018) defines digitalization as “the use of digital technologies to change a business model while providing new revenue and value-producing opportunities” wherein the functionality of such investment must adhere to the principles, processes and legal compliance.

As Roy (2020) defined procurement as "the management of the company's external resources in a way that the supply of all the goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities are secured at the most favorable conditions" wherein set of procedures are indicated in the implementation of procurement activities. Hence, the present study given the definition promotes activities favorable to all stakeholders because of implementation of digitalization which encompasses interrelated technologies.

The future of procurement is digital (Schnellbacher and Weise, 2021), since procurement decisions needs data and analytics to ensure sustainability compliance. Moreover, the government agency must choose the best support in terms of digital investment in e-procurement including cost savings, spending management, automated bidding, among others. Real time reports and feedbacks is one of the demands of the clientele aside from speed of transactions. Hence, government agencies like DPWH must look into so that quality innovation and sustainability concerns will be enabled aligned to the principles of e-procurement and the objectives of digitalization.

#### **Efficiency on the procurement process.**

Transparency procurement process and the implementation of procurement contracts must be transparent. Procuring entities must ensure the widest dissemination of bid opportunities and the participation of pertinent non-government organizations.”

As presented in the Digital Transformation System Framework (Hanna, 2018) which is composed of the following interdependent elements; as regards to “Enabling policies and institutions includes the necessary tools of the government to coordinate and synergize the whole digital transformation ecosystem; as regards to “Human capital is about skilled talents which are the heart of the digital revolution; and about “Information and Communications Technology and data industry covers a dynamic digital industry ecosystem which is necessary to adapt globally available technology solutions to local needs like regional offices, manage and maintain technological infrastructure, develop digital local content and solutions, and effectively partner with global suppliers of technology.” Furthermore, the theory on Digital Transformation System will help the researcher in formulating strategies and/or reforms leading towards an enhanced and swift procurement process in Department of Public Works and Highways in the Province of Masbate which involves digital infrastructure “referring to affordable and competitive communication infrastructure, including affordable access to the internet and tools, broadband, key platforms such as cloud computing and digital payment systems and digital transformation applications is the component which includes digital technology applications and complementary investments in institutional capabilities to transform key user sectors of the economy, including digital government, digital commerce and finance, and digital transformation of other priority economic sectors.”

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Competitiveness as discussed by Kasmehag and Lofnertz (2018), procurement is a supporting function and covers processes of buying wherein digitalization drives increase in complexity, competition and efficiency. When government agencies have the foundation on technological investments risks can be mitigated and opportunities will be explored as logical structure of e-procurement is in place. Moreover, Gartner (2018) defines digitalization as “the use of digital technologies to change a business model while providing new revenue and value-producing opportunities” wherein the functionality of such investment must adhere to the principles, processes and legal compliance.

Public procurement must be competitive and, as a rule, be conducted through public bidding, except as otherwise provided for under the GPRA, its IRR and this Manual. A competitive bidding process treats bidders equitably and provides fair grounds for competition among themselves, thereby ensuring that no single bidder significantly influences the outcome of the bidding.”

Competitive advantage must be advanced and sustained (Alabdali and Salam (2022) wherein the mediation role of procurement is yet to be explored when digitally transformed. Hence, the present study enlightened the current status of e-procurement in DPWH, Province of Masbate as regards to its implementation and continuously improves its best practices while taking into considerations matters that need to be enhanced. When the government agency is open to changes for the betterment of its processes, competitive advantage is sustained however there is a need to invest in advancement of technologies where one of which is digitalization.

According to Radell and Schannon (2018), digital procurement solutions not only create an opportunity to improve efficiency and play a strategic role in accelerating innovation specifically using the digital strategy and roadmap including improving procurement efficiency and effectively and enabling broader digital vision. Moreover, the use of digitalization provides competitive edge because of enhanced speed and quality of procurement. Given the situation that supply chain has increased its complexity, the government must harness and integrate new tools for procurement and collaborate with stakeholders to reduce risks and appreciate innovation.

Digital procurement involves automation of the procurement process using e-procurement platforms (Ikram and Latifa, 2022) wherein government agencies must build digital strategy in its procurement policy. Hence, the present study provides insights to obtain competitive advantage to meet the changing demands of its clientele. However, digitalization should consider vision of leadership and collaboration among stakeholders to ensure success. The present study provided insights on digitalization to enhance the e-procurement process.

Economic globalization increases competition (Ikram, 2022) wherein procurement is considered a vital function in delivering government service particularly in the supply chain. It has direct impact on costing. Digitalization as a key driver in procurement provides greater flexibility and control over the purchasing process. Hence, this study is very relevant because in the light of digitalization the procurement process must be reviewed including its practical outcomes.

The COVID-19 pandemic triggered digital and e-commerce turning point sharing global retail trade which requires the need for a digital world (Lavilla, 2020). The shift for the digitalization requires tools and trainings which will create new virtual habits. Moreover, digitalization for businesses and organizations needs innovation and resiliency in the midst of uncertainty. In addition, digitalization influences innovation and competitiveness which includes smart use of information and communication technology. Hence, the present study is relevant as it will provide the current status of the procurement activities in Department of Public Works and Highways, Province of Masbate.

Streamlined Procurement Process and use of technology in procurement is basically about “streamlined procurement process that will uniformly apply to all government procurement must be adopted. The procurement process must be simple and made adaptable to advances in modern technology in order to ensure an effective and efficient method.” The procurement stage can be streamlined using innovation (Malacina, et. al., 2022) given the benefits of public procurement’s value practiced by employees (Meynhardt, 2021). Organized procurement stage includes assessment to contract management (OECD, 2019) reflecting the performance of the organization (Patrucco, et. al., 2019).

As Lavilla (2020), also mentioned that “innovation does not necessarily imply the invention of new or enhanced products, but encompasses any novel approach to business organization, marketing strategy or product distribution that allows the enterprise to differentiate itself relative to its market competitors.” Such data analytics derived from the systems used for the information communications and technology that can provide insights into business processes and may create or uncover opportunities that can decrease costs of operations in the procurement activities. Digital opportunities are emerging there must be continuous orientation and prioritization of sufficient digitalization which is not yet evident in the in Department of Public Works and Highways, Province of Masbate although the regional office is using traditional computer-based submission and reporting transactions.

System of Accountability the study on the Digital Maturity Framework by Eggers and Bellman (2016) is composed of people, process and preparedness. Digital maturity refers to “the extent to which digital technologies have transformed an organization’s processes, talent engagement, and

citizen service models.” In terms of people, it will include “digital know-how, ability of leadership, workforce skills, avenues to up skill, and enabling talent. In terms of processes, it will cover innovation and collaboration, citizen service, citizen involvement, open-source usage, and enabling procurement. In terms of preparedness, it involves “strategy articulation, investment reaction and response to digital trends, and capability benchmarking.” Hence, to prepare the employees, bidders and other stakeholders on the modernization and digitalization of procurement process appreciation of the readiness factors must be in place. Moreover, digital maturity among government agencies maybe more or less similar across geographical regions. Hence, the theory on Digital Maturity helped the researcher in formulating strategies and/or reforms leading towards a significant e-procurement process and enhanced swift procurement process in Department of Public Works and Highways in the Province of Masbate.

Accountability is a system of accountability must be established. Thus, both the public officials directly or indirectly involved in the procurement process as well as in the implementation of procurement contracts, and the private parties that deal with government are, when warranted by circumstances, investigated and held liable for their actions relative thereto.

According Lavilla (2020), fostering digital transformation means creating environment where innovation delivers meaning change leading towards positive transaction outcomes particularly on speed of transactions. The swift procurement process needs to deliver the right technology and upgrade of digital structure. Hence, in transforming the government with the use of digital power will be a journey making the present study part of it. A digitally savvy leadership is a game changer but it requires digital maturity.

Public Monitoring of the procurement process and the implementation of awarded contracts are provided for in R.A. 9184 in view of guaranteeing that these contracts are awarded pursuant to the provisions of the R.A. 9184 and its 2016 IRR, and that all these contracts are performed strictly according to specifications.

Application of digital innovations in the government would significantly improve public service delivery by minimizing the human interface, reducing cost, strengthening feedback mechanisms between stakeholders and more transparent system. Introduction of digital innovations can be affected by internet connectivity and penetration in the region. The government must ensure that there is enough installation and expansion of wired and wireless networks to enable use of digital technologies and tools to benefit from digitalization.

Significant agreement as assessed by the three districts according to Han (2021), ability to understand the local market is one of the challenges when operating regionally. When doing regional operations there is a need for talents that can operate in a multicultural business environment. The role of the government is to encourage a diverse mix and one of the challenges is looking for talents. In assessing the responsiveness of managing procurement needs to attract and groom local talents that would lead to the success of the building digital infrastructures. Although

efforts to find and groom digital talents will take time but the present study would provide insights to help responsive in looking for the right pool of talents.

The increasing role of data in the digital economy or digitalization allows data to flow from all corners of industry and society (United Nations Conference on Trade and Development, 2019). Hence, access and analysis of data is needed with the use of information and communications technology and internet of things which concerns about connecting people and organizations to integrate operations and management. Moreover, United Nations Conference on Trade and Development (2019) mentioned different challenges in a data-driven economy as follows; (1) Privacy and security which is described as “Creating trust online is critically important to seize opportunities from e-commerce and the digital economy and internet-enabled devices raises security concerns because of collection of sensitive information”; (2) Market concentration of digital platforms wherein “digital platforms are mainly characterized by their reliance on data; and (3) Policy and regulatory implications to include data protection, data flows, competition policy, among others.

E-Procurement process proposal that can effectively adopted. The OECD (2019) defines E-procurement as “systems enable governments to increase the transparency of public procurement activities as well as collect consistent, up-to-date and reliable data on procurement processes” wherein this forms part of the information technology investments to improve public service. Hence, the present study provided insights on the current e-procurement practices implemented in DPWH Masbate Province that will help enhance the public services. Enabling technology through digitalization should as well balance the principles of procurement.

According to Asia Pacific and Economic Cooperation (2020), digital economy is defined as “that part of economic output derived solely or primarily from digital technologies with a business model based on digital goods or services” wherein the procurement activities form part of the digital economy which requires use of information and communication and technology. Moreover, one of the challenges of government office is preventing the digital revolution from fulfilling its transformative potential

The future of procurement is digital (Schnellbacher and Weise, 2021), since procurement decisions needs data and analytics to ensure sustainability compliance. Moreover, the government agency must choose the best support in terms of digital investment in e-procurement including cost savings, spending management, automated bidding, among others. Real time reports and feedbacks is one of the demands of the clientele aside from speed of transactions. Hence, government agencies like DPWH must look into so that quality innovation and sustainability concerns will be enabled aligned to the principles of e-procurement and the objectives of digitalization.

Digital procurement is the use of technological innovations to allowing strategic sourcing to become more predictive, transactional purchasing more automated as well as supplier management more proactive (Deloitte, 2021). However, there is a need to continuously study procurement process because it evolves overtime given the global economic situation is shifting. Hence, the use of e-procurement can help obtain actionable information.



Procurement 4.0 drives increasing digitalization of public institution (Babica, et. al., 2019). The transformation of public procurement processes establishes an advantage because of the data analytics it may produce that would foster innovation and address better decision making leading to an improved clientele experience. Moreover, government agency may find ways the pros and cons of digitalization. In addition, efficiency of procurement process must be assessed using tools such as use of key performance indicators to include transparency, professionalism and contract management. Hence, the present study focused on the transparency as one of its indicators.

According to Bauer, et. al. (2019), electronic procurement supports operational processes because of expectations on atomization and connected systems that will provide reliable data leading to efficiency in delivering functions. Efficiency means optimal relationship between input and output (Holmblad, 2017) given the right goals e-procurement processes should defined their resources within the concept of efficiency. Moreover, Bauer, et. al. (2019) also provides the following insights in evaluating efficiency; (1) Procurement cost in per cent of the procurement volume; (2) Procurement volume of each employee in procurement; and (3) Demand rate of framework contracts and catalogues. Hence, this study provided valuable insights on procurement efficiency.

Digital transformation has significant contribution (Streif, et. al. 2019) like automating procurement processes where opportunities to incorporate workflows are possible leading towards building smart systems. Hence, there is a need to invest in technologies but determining its current status on digitalization would provide better insights on what and how to improve processes particularly in the procurement function. In addition, according to Stradner and Brunner (2022), increasing efficiency, process transparency and information quality are the main benefit potentials of digitalization of procurement that will enable future procurement at competitive level. Procurement departments either in the public and private entities is face with many challenges like long lead times and complicated process for approval. Hence, the present study established the current status of the procurement processes in the DPWH which provides information necessary for decision making on the best practices and those that needs improvements.

This section of literature review focused on the “**e-procurement process**” in support to the government initiatives on driving digital change and can be effectively adopted by the target beneficiaries.

According to Organization for Economic Cooperation and Development (2021), the following are the policy recommendations that can be used to enhance procurement process in the public sector; “(1) Call for national digital strategies to close the access and usage gaps and ensure that the internet is for all.” This policy recommendation is focusing on adoption, use of digital technologies and inclusiveness of digital transformation. Although, barriers may be experienced such as lack of high quality performing yet affordable digital infrastructure, presence of hesitation to use or lack of trust on online activities, shortages on skills and competencies, high cost, among others. “(2) Boost investment on digital infrastructures and their key enablers.” Information and communication technology investments must help bridge digital divides. “(3) Improve framework policies to foster the financing of digital infrastructure and innovative new business models.” Framework or models shall map the best practices to create an environment where digital innovations and transformation



are appreciated. “(4) Encourage the development of standards and standards-based interoperability to support IoT and Industries 4.0.” Standards and guidelines must be appropriate and secured. Most importantly, it should address the social and economic challenges. “(5) Ensure competition in the ICT sector and address the economy.” Exploring different approaches through development of tools that would assess complexities of competition in the digital environment. “(6) Call for national policy and security risk management strategies and improve interoperability among frameworks.” This is to ensure data privacy and security in the use of digital technologies. “(7) Craft more effective strategies that enable all people to adapt to and excel in the digital economy.” The use of information and communication technologies will contribute to the upgrading of skills. “(8) Support SMEs in reaping the benefits of digitalization and addressing the challenges.” This presents opportunities to SMEs in the present study the bidders or suppliers which can boost business dynamism. “(9) Promote consumer protection in the digital era.” Actions should be taken to strengthen consumer trust. “(10) Adapt legal frameworks to the realities of an increasingly digital and data-driven global economy and improve measurement.” When digital drive is in place it affects economy and society which requires policies and coordination. “(11) Coordinate and cooperate to better measure digitalization across economies.” Policies must be aligned with sound measurement. Hence, specific actions must be corroborated with policies and comparable metrics to address the appropriate use of digital innovations wherein the present study would provide insights to fill data gaps and enable better benchmarking.

The call for digital change requires new competencies that all actors of the economy must possess. As the government strive for these changes, their role must be fit for the digital age. As Hanna (2018) enumerated the following ranges of these government roles in digital transformation, “(1) Setting new policies for the digital age and aligning digital initiatives with national development strategy; (2) Supporting research and development and playing an entrepreneurial role in researching and testing promising new digital platforms and technologies; (3) Extending the backbone telecommunications infrastructures and securing access to an inclusive and affordable internet; and (4) Investing in human and organizational complements and institutional learning across all actors, to secure digital dividends and inclusion.

The Asian Development Bank (2021) enumerated some recommendations in the adoption of digitalized solutions as follows; “(1) Establish a holistic roadmap through multilayer cooperation.” This includes multistakeholder support to reinforce digital transformation. “(2) Foster an inclusive and equitable digital economy.” The government must address connectivity challenges by expanding affordable and quality internet connections in rural and underserved areas. “(3) Inject circulatory into e-commerce.” The digital transformation is an opportunity to transition the businesses towards sustainable practices. Hence, these suggestions could form part of strategies and/or reforms leading towards an enhanced and swift procurement process in Department of Public Works and Highways in the Province of Masbate.

According to the United Nations Conference on Trade and Development digital economy and e-commerce “are the heart of the Sustainable Development Goals” but is also subject to challenges which includes digital divides, elimination of jobs and tasks due to automation, consumer protection, data privacy and cybercrime. Hence, the present study would help establish approaches

to include readiness assessment, infrastructure, strategy formulation on information communications and technology as well as empowering employees and bidders involved in the procurement activities for effective use of digital technology and efficient processes including speedy transactions. Advantages of digitalization will have public sectors improve operational transparency, responsiveness, accountability and internal efficiency including (Ylinen, 2021) which can help the government offices as they are moving to digitalization and transformation on its services.

Organizations must equip their employees with the skills and knowledge on information and communications technology (Mabhodha and Choga, 2021) wherein the role of executive management or in department heads of government agencies must consider taking the lead role in integrating technology innovations in the procurement process through established roles and regulations. Appreciation from the users must be in place to recognize the need for information and communications system in the usage of procurement to support decision making, monitoring activities, recording, among others. Moreover, this research study defined the importance of having a significant e-procurement process that corresponds to the procurement cycle which also handles information, sourcing, solicitation, evaluation, contracting, and contract management among others. E-procurement process should also consider managing bidders, other tools and platforms.

Digitalization is a complex concern and its infrastructures enable more effective communications, connections, and exchange of information. Implementation of reforms in public service in has experienced challenges combining technical, financial and structural that warrants the need for digital tools and technologies. Digitalization increases the level of transparency which leads to boosting the confidence of the citizens on the system. According to Ofoma (2021), “digitalization is a complex socio-technical phenomena and procedures of adopting and utilizing digital technologies and innovations by individuals, organizations, and the society at large” that can uplift the public service which is the machinery of government in formulating and implementing policies and programs.

Cost reduction is expected as a main driver of digitalization implementation (Klunder, et. al., 2019) which is necessary to determine the effects on the procurement process which represents a major function in the Department of Works and Highways. Digitalization and procurement costs are considered for any technological investments. Moreover, the present study provides insights on processes and its significant agreement that would provide a better outlook on e-procurement processes.

According to Layaq (2019), digital revolution must collaborate with direct stakeholders to survive in the industry. Hence, digitalization of procurement processes would mean more complexity and risks. In addition, procurement is an important part of the supply chain involves collaboration between several stakeholders which has impact digitalization and is making the procurement processes prone to more risks. Moreover, the present study is necessary particularly in identifying further risks in procurement process because risk management is all about identifying, analyzing, evaluating and mitigating possible risks.

It has been a challenge to encounter digital divide wherein ensuring affordable and reliable connectivity for public services has remained a serious challenge in most areas in the Philippines including the Province of Masbate showing discrepancies in the utilization of digital technologies. Hence, digital divide must be acknowledged as a challenge to address issues link to it. Moreover, the introduction of significant e-procurement system should be aligned and accompanied by legal frameworks and policies to eliminate fraud, corruptions and other concerns. Citizens must be encouraged and be ready to accept e-procurement system as a new norm in the delivery of public service. There might be challenges and disruptions in the digital transformation process but when there is proper planning and guide by information from different studies, researches, surveys and other data gathering means the digitalization in the procurement process would be more effective and efficient benefiting all stakeholders.

The Commission on Audit (2022) mentioned procurement planning, preparation of the bidding documents, and the conduct of the pre-procurement conference as the three main activities for the first phase wherein Funda (2019) considers all phases as a discipline with strategic approach because it influences the overall performance until the last phase which is the post procurement. Moreover, the Organization for Economic Cooperation and Development (2021), emphasized coordination and cooperation to better measure digitalization and mitigate risks along the way because policies are aligned with sound assessment or evaluation tools. Although, DPWH Province of Masbate have no comparable metrics as regards to risk evaluation.

In addition, the call for digital change requires filling the gaps on data management and enables benchmarking. As Hanna (2018) enumerated the government roles in digitalization to include setting new policies and digital initiatives, supporting research and development, creates strong backbone on a secured telecommunications infrastructures and investment in human and organizational capability building. The Asian Development Bank (2021) also supports digitalization and enumerated some recommendations and these includes establishing a holistic roadmap of cooperation among stakeholders, fostering an inclusive and equitable digitalization, addressing connectivity challenges in rural and underserved areas to adopt to the growing e-commerce. Digital procurement solutions create opportunities for improvement (Radell and Schannon, 2018) which can accelerate innovations and increases competitiveness among employees as they perform the government procurement processes.

Investing in the development of digital infrastructure is for the purpose of meeting existing and future demand [Organization for Economic Cooperation and Development, (OECD, 2017) which will help established complete documentation prior post evaluation.

### **Theoretical Framework**

The present study is anchored on procurement stages emphasized by the Technological Determinism Theory. This posits that technology is the main driver of social and economic change. In the case of the digitalization of the procurement process, this theory suggests that the adoption of digital tools and platforms will inevitably lead to improvements in the procurement procedures namely; pre-procurement, procurement, and post procurement. The pre-procurement stages carry out risk assessment of public contracts prior to tendering which includes analysis of the proposal and documentation. It provides the employees tools such as standard forms, checklists, and

guidelines which will be used all through the procurement process implementation. Procurement stage comprises the participation of eligible bidders, evaluation of bids and approval. Post procurement stage is the application of the contract performance conditions set and agreed upon by the parties. In this procurement stage, the review and comparison of the progress is administered to ensure that the conditions are met. All of the stages in the procurement process mentioned in this theory were used by the researcher in determining the status of the current procurement process of DPWH Masbate. It has been associated with several scholars, including Melvin Kranzberg, Jacques Ellul, and Marshall McLuhan has its roots in the early 20th century, but it gained prominence in the 1960s and 1970s.

The procurement principles according to Everett Rogers (1961) new technologies are adopted by individuals and organizations over time. The digitalization of the procurement process can be seen as an innovation that needs to be adopted by the DPWH and its stakeholders. This suggests that the successful adoption of the innovation will depend on factors such as best value for money, accountability, integrity, transparency, fairness and effective competition, and best interest of the organization. The best value for money indicates combination of choosing the appropriate technical specifications, quality of service and cost efficiency as the relative advantage of the innovation, its compatibility with existing systems and processes, and the support of influential stakeholders. It analysis how the social members adopt the new innovative ideas and how they made the decision towards it. Both mass media and interpersonal communication channel is involved in the diffusion process. It heavily relies on Human capital. According to the theory, innovations should be widely adopted in order to attain development and sustainability. Procedures of procurement is open to all with fairness and effective competition are being reasonable and impartial. All suppliers are treated with respect and equality wherein all bids are evaluated with the same criteria in place. The best interest of the organization means fulfilling the mandate, goals and objectives of the parties. This study used the indicators transparency, accountability, competitiveness based on fairness and effective competition to assess the level of efficiency of the current procurement process.

The procurement framework of the Institutional Theory explains the successful adoption of digital tools and platforms in the procurement process will depend on the institutional norms and values that shape the behavior of the DPWH and its stakeholders. It focuses on the social and cultural context in which organizations operate and suggests that the adoption of the innovation will be more likely if it is consistent with the institutional norms and values of the organization and its stakeholders. This theory has its roots in the work of sociologists such as Max Weber and Talcott Parsons, but it was not until the 1980s and 1990s that it became a major force in organizational research. Notable scholars associated with institutional theory include Paul DiMaggio, Walter Powell, and John Meyer. Its serve as an instrument in shaping institutional change and evolution digitalization in the DPWH in the Province of Masbate and their behavior in the procurement process terms of Transparency, Competitiveness, Streamlined Procurement Process, System of Accountability, and Public Monitoring. Human organizations are driven by their rules and cultures. But the effects of rules and cultures on organizational development cannot be understood without untangling their effects on each other. People's values on the procurement are contingent on how they have been acculturated within organizations. Conversely, their values may influence the organizations they join, particularly in online community settings, where users have thousands of

organizations to choose from and exert selection pressure in favor of communities with favorable rules. Using longitudinal data on the rules systems of thousands of online communities, as well as the traffic of millions of users between them, we use techniques from network science to disentangle the relationship between cultural assimilation and institutional assimilation. We find that institutional similarities in administrative rules and informational rules drive cultural similarities. We discuss implications of these findings for research on organizational evolution, institution and culture, and the use of tracking data in organizational studies.

In addition, the adoption of digital tools and platforms in the procurement process can be seen as a process of creating a new actor-network that includes the DPWH, its stakeholders, and the digital tools and platforms themselves. The theory suggests that the success of the innovation will depend on the ability of the new actor-network to stabilize and maintain itself over time. This theory views technology as a network of actors that interact with each other to shape social and economic outcomes. This approach is radical because it shows just how active nonhumans have been in human affairs and calls for new political strategies that can acknowledge humans aren't the only ones enrolled in the production of truth. Wanted to attribute power to nonhuman actors as well. As digitalization is fast approaching all forces were not under our control, from germs to steam engines. This seemingly small idea was a direct challenge to the foundations of modern thought. Bruno Latour and Michel Callon are two of the key scholars associated with this theory, which emerged in the 1980s and 1990s. Other notable scholars who have contributed to actor-network theory include John Law, Annemarie Mol, and Donna Harawa. Actor-network theory insists on the capacity of nonhumans to be actors or participants in networks and systems which involves in the digitalization of procurement process in the DPWH. Also, Contract performance conditions involving different sectors of the supply chain with the assurance of visibility and accountability which is supported by new technologies. Monitoring and reporting involves reviews, inspections, and audits carried out to ensure legal compliance. Enforcement of the necessary actions to accomplish appropriate post procurement stage. This research paper used the indicator monitoring and reporting to represent public monitoring principle of the government procurement.

### **Theoretical Paradigm**

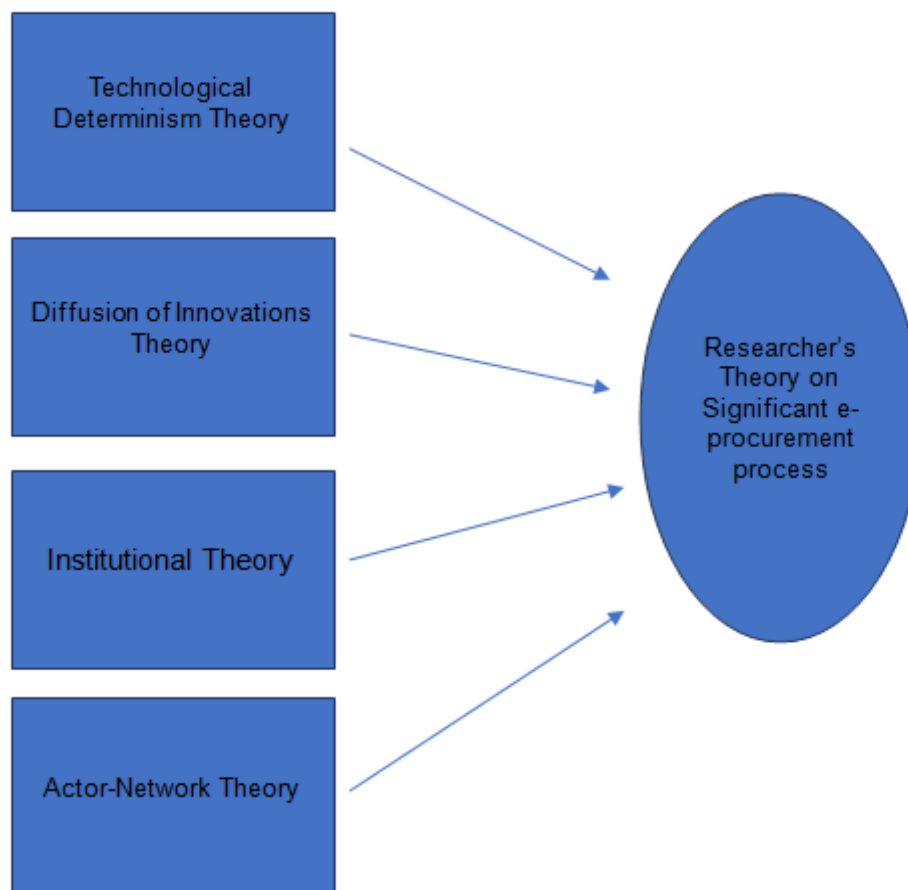


Figure No. 1 Theoretical Paradigm

### Conceptual Framework

The conceptual paradigm of the study is presented on Figure No. 4 which determined the current status of the procurement activities involving pre-procurement, procurement, and post procurement stages as well as assessing the level of efficiency of the employees on the procurement process towards the commitment of the government to promote good governance in its procurement process in terms of the governing principles on government procurement as follows (a.1) transparency, competitiveness, streamlined procurement process, system of accountability and public monitoring towards formulation of strategies and/or reforms for swift transactions in support to the government initiatives on driving digital change or a significant e-procurement process. Measuring the significant agreement on the ranks of the procurement process as assessed by the three districts and inferring the relationship as assess by the two groups of respondents based from the procurement process. In addition, review, feedback and continuous improvement is included since demands and expectations in procurement activities and digital community is changing and growing over time.



## Conceptual Paradigm

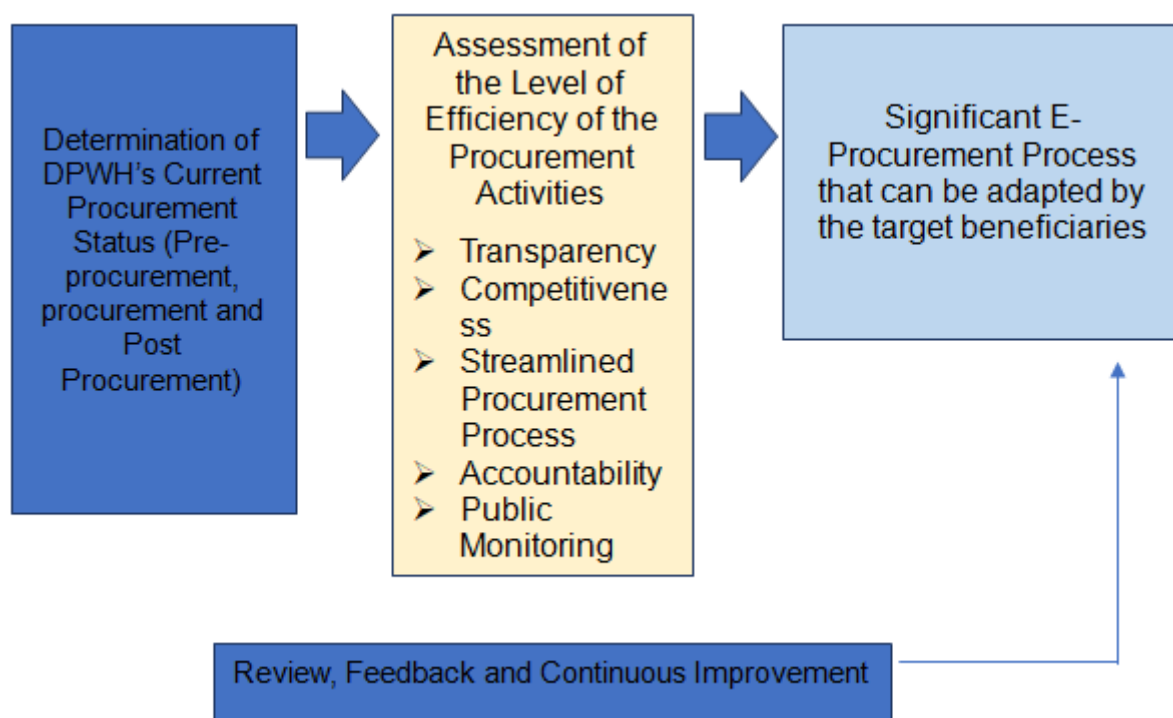


Figure No. 2 Conceptual Paradigm

## Scope and Delimitation of the Study

This section covers the scope and delimitation of the present study. The study covered the specific objectives namely; first, determine the status of the procurement activities as to pre-procurement, procurement and post procurement stages on the commitment of the government to promote good governance in its procurement process; Second, assessing the level of efficiency in terms of the governing principles on government procurement as follows transparency, competitiveness, streamlined procurement process, system of accountability and public monitoring. Third, measuring the significant agreement on the ranks of the procurement process as assessed by the three districts. The respondents of the study were the employees of Department of Public Works and Highways in the Province of Masbate with the following criteria; (1) Must be involve in the procurement activities of the department; (2) At least one year in government service; (2) Has knowledge on procurement activities; and (4) Willing and capable of answering the survey questionnaire. There were fifty (55) respondents wherein forty (40) are employees and fifteen (15) contractors or bidders. The researcher ensures 100% responses because of the available data on the list of the respondents. Computation of the number of participants for quantitative studies is guided by Budiu and Moran (2021) on sample size recommendations.

## Significance of the Study

The study will be beneficial to the following:

**Department of Public Works and Highways.** This research study will be a source of review guidelines on policy formulation, procurement processes, and technological innovations leading towards enhancing speed of responsiveness on procurement activities and support government initiatives towards driving digital change. The results of the study can be basis for policy

formulation, reviewing the implementation of procurement processes aligned to the principles of procurement as indicated in the manual of regulations, enrichment programs and learning opportunities can be provided to employees and other stakeholders so that they will become more competitive as they continue implementing procurement opportunities efficiently and effectively.

**DPWH/Government Employees.** This research study will also be a good contribution to knowledge, skills, expertise, and values and will be helpful in the delivery of procurement activities. Moreover, the study can offer insights on the appropriate professional development initiatives as one of the reforms for employees in order to improve their procurement activities or management practices. The actions plan proves that continuous improvement and feedback must be in place because technological advancement is fast changing and government employees must be able to adopt so that they can perform according to the demands of their clientele and other stakeholders in relation to procurement. The results of the study could also be a reflection of the actual processes and determine those best practices to be continuously performed while those weaknesses can be categorized for needs improvement.

**Bidders/Contractors.** This research study will also be a good contribution to knowledge, skills, expertise, and values as they may appreciate creation of digital awareness as regards to procurement activities. The used of e-procurement would be very helpful for the bidders given the principles of procurement where it is anchored. However, the bidders must also undergo trainings on the use of e-procurement to keep them abreast of the technological changes.

**Academe.** This research study will also be a good contribution to knowledge, skills, expertise, and values and will be useful to the school administration, faculty, students and other stakeholders. The research study will be useful for further research ideas and accreditation purposes. The results of the study can be used for further review and researches using different variables, objectives and indicators.

**Community.** This will allows for the community to involve themselves for the efficient and effective used of digital procurement and will increase efficiency in many ways. Team members can eliminate repetitive paperwork; reduce manual touch points and process orders faster.

**Commission on Audit (COA).** This will propose reduce procurement processing time and costs. Indeed, Procurement digital systems enable organizations to streamline the workflows, optimize the supplier base, effectively process procurement requests, and raise transparency and audit levels and implement control and visibility.

**Internet Provider.** This endeavor seek that Procurement has to concentrate its effort and focus more essentially on the strategic activities and automate at maximum its operational tasks taking advantage of the latest innovative tools and technology available in the market.

**Researcher.** The present study enhanced the research capabilities and competencies of the researcher to conduct studies that is currently needed by the society. Communication skills were also developed as the researcher needs to talk and explain to the respondents about the paper.

Communication skills improve were both oral and written since the preparation of the present study is tedious.

**Future Researchers.** This will provide the future researcher better grasp on preparing and conducting similar studies as future endeavor. Future researchers can use similar topic but different locations, respondents, variables, objectives and indicators.

### **Definition of Terms**

This section on the definition of terms provided better view on the concepts particularly the variables used in this research study. Specifically, the following terms are defined conceptually and operationally;

**Digitalization.** “Digitalization is a complex socio-technical phenomena and procedures of adoption and utilization of digital technologies by individuals, organizations, and the society at large” (Ofuma, 2021). This indicator is used as one of the components on e-procurement process where digital data and platforms are involved.

**Electronic Procurement.** “It is the electronic process of implementation of a part of a procurement procedure that enables the use of electronic communication like tender announcement, collection and registration of documents, exchange of information and submission of bids, as well as for evaluation and bid ranking by using automated evaluation methods” (de Cazalet & Zapatrina, 2021). The researcher used this term as the significant e-procurement process that can be adopted by DPWH offices guided by the principles in government procurement

**Procurement Process.** “It is the process of purchasing goods or services and is usually in reference to business spending” (Young, 2020). It refers to the procurement activities of Department of Public Works and Highways in the Province of Masbate.

**Pre-procurement.** It is prior to launching, the authorities implement preparatory activities (EIGE, 2023). It will be used in this study as the preparatory activities of DPWH to include preparation of forms, conference planning, and announcements of biddings, among others.

**Procurement.** “This refers to the acquisition of goods, consulting services, and the contracting for infrastructure projects by the Procuring Entity (RA 9184, 2021 Updates)”. The researcher refers this indicator to the procurement activities handled by the Department of Public Works and Highways in the Province of Masbate.

**Post-procurement.** The authorities apply the contract performance conditions set in the documents and agreed with the successful bidder (EIGE, 2023). This stage of procurement will be used by the researcher as regards to the DPWH’s application of the contract based on the approved bidding and monitoring activities as to compliance.

**Transparency.** “It is considered as operating in such as way that it is easy for others to see what actions are performed which implies openness, communication and accountability” Rodriguez (2019). It is used in the procurement activities as implementation of procurement contracts through

wide dissemination of bid opportunities and participation of pertinent non-government organizations.

**Competitiveness.** “It is a common practice that involves invitation for multiple vendors to submit offers” Iowa State University (2017). In this research study, it is used by extending equal opportunity to qualified contracting parties to participate in competitive bidding.

**Streamlined procurement process.** “This refers to the activities or steps on procurement uniformly apply to all government (RA 9184, 2021 Updates).” It is used as the procurement activities applied in all government agencies guided by the procurement act

**System of accountability.** “This both the public officials directly or indirectly involved in the procurement process as well as in the implementation of procurement contracts and the private parties that deal with Government are, when warranted by circumstances, investigated and held liable for their actions relative thereto (RA 9184, 2021 Updates)”. It is used as the accountability measures for both employees of the government and the bidders who form part of the procurement process.

**Public monitoring.** “This is the implementation of awarded contracts with the end in view of guaranteeing that these contracts are awarded pursuant to the provisions of the Procurement Act” (RA 9184, 2021 Updates). In this study it will be used as public announcement of winning bidders based on the standards set by the Government Procurement Reform Act.

**Quantitative Research Method.** It is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques which was used in this study to assess and analyze scientifically the gathered and collected data from the participants or respondents (Apuke, 2017). It is the use of survey questionnaire as the primary source of data reflects quantitative research.

## METHODOLOGY

This section presents the research methodology that dealt with the methods and the procedures used in conducting the research study. This includes the research design, research instrument, data gathering procedures, respondents of the study, sampling technique, research locale or study site, and data analysis plan or statistical treatment that were applied in the interpretation and analysis of data.

### Research Design

The researcher used a descriptive design to investigate one or more variables. As described by Fluet (2021), “It is a quantitative research method that is considered conclusive and is used to test specific hypotheses and describe characteristics or functions. Descriptive research should have a clear and accurate research question or problem”. In addition, quantitative research is often associated with a more traditional scientific method of gathering data in an organized, objective manner so that findings can be generalized and organized.

### **Research Instrument**

The researcher used self-made survey questionnaire validated prior to data gathering through reviews from experts and pilot testing guided by the objectives, frameworks, and literature review presented. The survey was composed of status of the procurement activities as to pre-procurement, procurement and post procurement stages; and the level of efficiency of the procurement process in terms of the governing principles on government procurement as follows; transparency, competitiveness, streamlined procurement process, system of accountability and public monitoring. The measurement used was the 4-point Likert scale with descriptions for the measurement of on how respondents viewed the current status of procurement process in the Department of Public Works and Highways, Province of Masbate and to collect attitudes and opinions, view and perspective towards digitalization on the procurement process.

### **Data Gathering Procedures**

The researcher handed the questionnaire personally to the District Engineer of each District Engineering Office, contractors, and employees and asked permission. The respondents filled out the survey questionnaire and return to the researcher. The estimated average time that the respondents completed the survey questionnaire is at least 30 minutes. This research study was conducted using descriptive research design through quantitative method. The survey questionnaire was guided by the terms in the Government Procurement Reform Act such as the principles on procurement and the features for electronic means which were answered by employees of Department of Public Works and Highways, Province of Masbate. The respondents were chosen through purposive sampling based on a set of criteria. The researcher also looked for articles, studies, literatures and news to support the present study. Afterwards, data collection and necessary statistical tools were applied to come up with results for interpretation and analysis. The results of the study were conformed to the synthesized related literature and studies.

All computations and counting were processed using Microsoft Excel. Statistical Package for Social Science (SPSS) Version 25 was used to analyze the data. The use of SPSS is whenever a researcher needs a flexible and customizable way to get super granular on even the most complex data sets. This gives the researcher more time to identify trends, developing predictive models, and drawing informed conclusions. The SPSS allows the researcher to perform complex analytics. It is revolutionary software mainly used by research scientists which help them process critical data in simple steps. Working on a data is a complex and time-consuming process but this software can easily handle and operate information with the help of some techniques. These techniques are used to analyze, transform, and produce a characteristic pattern between different data variables which can be transformed into graphical presentation.

Moreover, in gathering relevant data needed in this research study, the researcher adhered to ethical standards and complied with the confidentiality agreement between the researchers. The necessary consent needed from the respondents and other related parties were obtained in the conduct of the study. The participants were briefed about the research topic and the survey questionnaire assured them of confidentiality of the information. Confidentiality clause was included in the survey questionnaire. The researcher values the anonymity of the data that were obtained from the respondents by not revealing the identity of those concerned. The privacy of the participants and the

confidentiality of data that were obtained from them were strictly maintained and followed in such a manner that the participants couldn't be identified in the report or results or any related publications that this study addressed. The researcher assured that the information will be used purely for this particular research paper and for academic purposes as well as provide the confidentiality clause evident in the letter to respondents and introductory portion of the survey questionnaire and during the briefing or orientation of the respondents.

### Respondents of the Study

Purposive sampling is known as judgmental, selective, or subjective sampling (Crossman, 2020). The purposive sampling was chosen because the respondents were already identified. The respondents of the study were the employees and contractors or bidders of Department of Public Works and Highways in the Province of Masbate composed of three (3) districts. The respondents of the study were the employees of Department of Public Works and Highways in the Province of Masbate with the following criteria; (1) Must be involve in the procurement activities of the department; (2) At least one year in government service; (3) Has knowledge on procurement activities; and (4) Willing and capable of answering the survey questionnaire. For the contractors, the criteria are as follows; 1) Must be involve in the procurement activities or have been part of the procurement process; (2) At least one year experience as a contractor; (3) Has knowledge on procurement activities of DPWH; and (4) Willing and capable of answering the survey questionnaire. The respondents of the study were chosen because the researcher already identified that there is a pressing need to determine the status of the procurement process in the aim of adopting digitalization in the Province of Masbate despite challenges on communication and internet connectivity.

There were fifty-five (55) respondents of Department of Public Works and Highways in the Province of Masbate composing of all three districts with breakdown as follows; fifteen (15) contractors and forty (40) employees. Computation of the number of participants for quantitative studies is guided by Budiu and Moran (2021) on sample size recommendations wherein the number of participants in a quantitative study is a minimum of 40 based on the UX metric which is defined "as a piece of numerical data that talk about some aspect of the user experience of a product or service which is valuable in assessing quality and track improvements." The researcher ensures that the number of respondents is based on the actual records of the three (3) districts and complies with the criteria for the respondents. The breakdown of respondents is presented as follows:

**Table A**  
**Respondent Breakdown**

Respondent	1 <sup>st</sup> District	2 <sup>nd</sup> District	3 <sup>rd</sup> District	Total
Contractor	15	10	15	40
Employee	15			



### Sampling Technique

The researcher utilized a purposive sampling for this study According to Crossman (2020), “a purposive sample is a non-probability sample that is selected based on characteristics of a population and the objective of the study. Purposive sampling is known as judgmental, selective, or subjective sampling”. Since the respondents were already known and identified to be employees and contractors of DPWH Province of Masbate. No computation of the population since the researcher ensured that all the contractors and employees of the three districts answered the survey. The data gathering was done through personal distribution and/or face to face data gathering. Hence, there is one hundred percent (100%) responses because there are only few employees and contractors involved.

### Study Site

The highlight of the study site is the Department of Public Works and Highways, Province of Masbate. Masbate is officially the city of Masbate, a 4th class component city and capital of the Province of Masbate. An island located near the midsection of the nation’s archipelago. The province consists of three major islands: Masbate, Ticao and Burias. Because of the geographical location of Masbate connection of internet is very slow which is nowadays crucial to everyday living especially to industries? The researcher chose DPWH in the Province of Masbate since it needs to know and find out the status fast track the services amidst digitalization.

### Data Analysis Plan (Statistical Treatment)

This section on the statistical treatment provides better view on the tools which were used in this research study. Specifically, the following statistical tools;

**Weighted Mean.** The weighted mean was used as the measure of central tendency because the researcher used options and items in the questionnaires assigned with points. The weighted mean was used as the measure of central tendency and was presented in interpretation and presentation of data.

**Standard deviation.** This tool was used to measure variation of responses on the assessment of the respondents. According to Hargrave (2021), “The standard deviation is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance. The standard deviation is computed as the square root of variance by determining each data point's deviation relative to the mean”. The sample standard deviation formula is as follows;

Formula	Explanation
$s = \sqrt{\frac{\sum (X - \bar{x})^2}{n - 1}}$	<ul style="list-style-type: none"><li>• <math>s</math> = sample standard deviation</li><li>• <math>\sum</math> = sum of...</li><li>• <math>X</math> = each value</li><li>• <math>\bar{x}</math> = sample mean</li><li>• <math>n</math> = number of values in the sample</li></ul>

The use of standard deviation was to prove the correctness of dispersion. This will see to it that the population was well represented which means that the researcher was able to get the correct sample and distribution of the survey were given to the right respondents. Moreover, the standard deviation attests to the credibility and reliability of the sample respondents and the sample size because results shown that there is well representation of the population based on the actual distribution.

**Kendall Coefficient of Concordance W.** Kendall's coefficient of concordance (W) indicates the degree of association of ordinal assessments made by multiple appraisers when assessing the same samples. Kendall's coefficient values can range from 0 to 1. The higher the value of Kendall's, the stronger the association. Usually, Kendall's coefficients of 0.9 or higher are considered very well. The coefficient of concordance was used to measure the significant agreement among districts. A high or significant Kendall's coefficient means that the appraisers are applying essentially the same standard when assessing the samples.

Poor agreement = Less than 0.20

Fair agreement = 0.21 to 0.40

Moderate agreement = 0.41 to 0.60

Good agreement = 0.61 to 0.80

Very good agreement = 0.81 to 1.00

## **RESULTS AND DISCUSSIONS**

This section presents the results and discussions of this research study in terms of the current status of procurement process and assessment of the level of efficiency as well as measurement of the significant agreement on the ranks of the procurement process as assessed by the three districts and the relationship as assess by the two groups of respondents based from the procurement process. Results of the study were presented in tables using the statistical tools. Each table was presented, interpreted, analyzed and corroborated to the literature and studies mentioned in the study. The sources of data guided the researcher in providing the analytical results that enhances the recommendations best fit to the needed digitalization of procurement process in the DPWH Province of Masbate. The insights given by the respondents when tabulated provided a better picture on how they observed the application of procurement activities in the government sector particularly the respondent locale.

### **1. Status of the current Procurement Process in the DPWH Masbate**

#### **1.a. Pre-Procurement Process**

This section presents the current procurement activities of DPWH Masbate Province as to pre-procurement, procurement and post procurement. Pre-Procurement activities of DPWH Masbate Province involves Procurement planning ensures detailed investigations and designs; Plans for procurement are linked to budgets; The pre-requisite for procurement in terms of funding, engineering, technical documents, and project sites are met, The method of procurement is determined, The milestone activities are identified, Readiness of Bidding Documents are available, and The legal, technical, and financial requirements are discussed during pre-procurement conference. All factors are important wherein pre-procurement identifies the availability of goods or services in the market. Hence, institutional due diligence is necessary for the implementation of

pre-procurement process including conferences and documentations were crucial as the activities proceeds.

As gleaned on the results on the responses, “Readiness of Bidding Documents available” and “The milestone activities are identified” which means that there are forms that the bidders and employees can use prior bidding. Checklist of documents will help the respondents in determining the needed supported justifications for the pre-procurement process. However, “Plans for procurement are linked to budgets” wherein there is an actual financial plan but procurement activities aligned to finance aspect is not applied consistently. Hence, budgets for procurement activities must be disclosed and explained to contractors or bidders. On the other hand, based on the employees’ responses, “The method of procurement is determined” which means that the government procurement activities are already established given the availability of manuals and guidelines. However, the least applied indicator is “The pre-requisite for procurement in terms of funding, engineering, technical documents, and project sites are met” which means that there are inconsistencies on the pre-procurement activities particularly technical matters.

On the basis of the results of the findings, pre-procurement basically involves planning and preparation of documents for bidding. Hence, any errors in the pre-procurement phase will be affect succeeding stages. Moreover, the DPWH Province of Masbate exhibits readiness in the availability of bidding documents and delivering information needed by the contractors wherein it is also evident that the latter expressed that the methods of procurement are determined because of they are informed. With this, there are fewer implications on errors when everyone involved in the procurement process are informed. However, budget planning needs improvement although highly applied some circumstances on financial matters must be addressed to improved succeeding stages and activities of the procurement process.

Generally, the use of evaluation tools and checklist can address mitigation of risks and can utilize properly the data that the digitalization can provide to the employees and committees for decision making to whom the bid shall be awarded. Moreover, the presence of digitalization can uplift the confidence of the employees, committees, contractors and other stakeholders involved in the procurement process because of the presence of real-time monitoring on the transactions. However, there might be challenges but when everyone is well-trained and informed these concerns will be mitigated and/or avoided. In addition, increasing technological changes in the local and global market can implicate a government process which requires applications of digitalization to form part of the information technology to address speed in transactions while quality is in place.

Digitalization in the public sector provides advantages such as improve operational efficiency, flexibility, collaboration and better customer service despite barriers which requires DPWH must have a clear view of the digitalization which is supported by Republic Act 9184. Such law also provides the definition of goods referring to all items, supplies, materials, and general support services except consulting services and infrastructure projects which are needed in the transactions of government activities. The use of digitalization would provide them real time transactions and all-in data for decision making within the prescribed period. Moreover, due diligence begins in this phase to avoid further errors along the procurement process. Due diligence basically be improved

when digitalization of procurement is in place the activities such as widest dissemination of advertising and posting of invitation to apply for eligibility and to bid, registry of contractors and conduct electronic eligibility processing, issuance of the bidding documents, pre-bid conference, calculated prices of the bids among others will be more thorough, accurate and real time which can ascertain compliance with post-qualification requirements and post bidding results as this study presented the latter activities mentioned needs to be enhanced. As Funda (2019) mentioned, procurement process is a discipline which influences contribution to the performance of the employees and with e-procurement in place through digitalization the intention to be efficient and effective in delivering functions will be highly achieve. However, procurement must be seen both in short and long-term objectives as an investment in advancement of technologies aligned to the mandate of the government on digitalization to address risks.

### **1.b. Procurement Process**

Status of the current procurement activities of DPWH Masbate Province as to procurement process. Digital procurement improves efficiency and accelerates innovation as government agencies addressed its transactions given the technological advancement. The use of digitalization in procurement given the right criteria enhances communication among stakeholders.

Procurement activities involved the following stages such as Ensures widest dissemination of advertising and posting of invitation to apply for eligibility and to bid, Installed computerized registry of contractors and conduct electronic eligibility processing, Provide the rules in relation to the issuance of the bidding documents, Responsible and knowledgeable officials attend the pre-bid conference, Establish the correct calculated prices of the bids through detailed evaluation, Ascertain compliance with post-qualification requirements, Post bidding results in the DPWH Website and G-EPS.

As presented in the results of the study “Ensures widest dissemination of advertising and posting of invitation to apply for eligibility and to bid” which mean that during the DPWH are able to inform contractors or bidders on the all information needed about the procurement process. “Provide the rules in relation to the issuance of the bidding documents” and “Post bidding results in the DPWH Website and GEPS” which coincides with the employee’s best practice on information dissemination. While “Ascertain compliance with post-qualification requirements” which means that both employees and contractors are unable to satisfy the documentation during procurement process. However, “Responsible and knowledgeable officials attend the pre-bid conference”, though not mandatory must be attended by the participating bidders to give opportunity of the details of the project and discuss complicated specification and requirements that may arise before the opening of the bid. On the other hand, “Installed computerized registry of contractors and conduct electronic eligibility processing” which clearly manifests the need for digitalization so that contractors will be informed of their needed information? Hence, ensuring information dissemination of the bidding is applied accordingly but the submission of requirements after the bidding and awarding activities is not fully complied.

Full compliance to requirements has been a challenged which influences overall performance of the public service delivery. This includes reflection of a culture of principles of government procurement and sustainability which means there could be problems along the application as

guided by the principles. Formation of staff structure is one of the factors although there are few bidders or contractors, complacency on the standard procedures must be emphasized to address non-compliance of requirements immediately. Pre-procurement tasks involves institutional due diligence, deciding the whole procurement process, committees and teams among others which information and dissemination as well as advertising is part of the planning but during procurement process due diligence must be observe so that there will be full compliance after awarding of the bid.

The widest dissemination of advertising and posting of invitation to apply for eligibility and to bid is properly applied and observed making all contractors or bidders informed in the DPWH Province of Masbate. Taking into consideration that procurement process is part of the supply chain, tools for procurement can foster the processes; reduce risks and implications along the way while appreciating the importance of innovations and adoption of technological advancement beneficial to all stakeholders.

However, digital infrastructures must coincide with the principles of procurement and compliances indicated in the manual of regulations. Procurement as a supporting function (Kasmehag and Lofnertz, 2018) criteria must be explored and models to be used must be providing new revenue and value-producing opportunities (Gartner, 2018) while adhering to the principles, processes and legal compliances considering the future of procurement is digital (Schnellbacher and Weise, 2021) which will lead to high performance among teams and sustainability.

### **1.c. Post Procurement Process**

The status of the current procurement activities of DPWH Masbate Province as to post-procurement process. All stages must promote activities favorable to all stakeholders because of implementation of digitalization which encompasses interrelated technologies wherein the last phase must be well polished. However, there are concerns that need to be addressed to establish better post-procurement requirements are in place. Which involves the following indicators Use checklist to ensure the completeness of the documents comprising the contract, Observe the proper posting of performance security, Provide standard procurement performance monitoring on a regular basis, Use evaluation tools in addressing procurement risks, Utilize the information in the procurement database for more effective decision making, Encourage effectiveness of competition and level of confidence among participants, Exert reasonable efforts to preserve confidentiality of information.

The highest applied indicator is the “Use of checklist to ensure the completeness of the documents comprising the contract” which means that checklist of requirements and documents are helpful for both contractors and employees. Checklist of requirements is available which is a standard procedure which will guide both employees and contractors. However, checklist of every process including assessment of risks is not prioritized. Availability of all checklists and assessments will address and eliminate unnecessary issues like incompleteness of requirements and approving high risks contractors. “Provide standard procurement performance monitoring on a regular basis”, “Encourage effectiveness of competition and level of confidence among participants”, and “Exert reasonable efforts to preserve confidentiality of information” were more likely adapted in the DPWH. To promote good governance level of competition and confidence were among the

priority. The least applied indicator for the contractor and employees is “Use evaluation tools in addressing procurement risks” which means that there is less or no tools and methods used in assessing the risks prior to procurement monitoring. Also, the DPWH must identify levels of risks so that all employees can evaluate properly.

The post procurement phase due to non-compliance of post requirements which is evident also in the results of this study. Despite being informed by the DPWH Province of Masbate of all documentary requirements and guided by the manual of government procurement, the regional office still experience challenges on post procurement activities although number of contractors are few.

On the discussion by Hanna (2018) stakeholders must understand the role of the government in driving digital change particularly information and communication technologies innovations particularly the risks involved in the procurement process. The post procurement process happens after the implementation of award contracts wherein one of the procurement principles in this stage is public monitoring in reference to R.A. 9184, Section 63 and the 2016 IRR wherein digitalization is vital particularly in monitoring activities. Although, the contractors in DPWH Province of Masbate are manageable, the regional office must anticipate growth in terms of number of contractors and transactions particularly when they encourage effectiveness of competition and level of confidence among bidding participants.

The DPWH must review their process and reiterate compliance to requirements. Moreover, reviewing the pre-procurement process can help address issues that make the employees and bidders complacent of the procurement transactions. Include the preparation of checklists and assessment tools during the planning to minimize risk of non-compliance of requirements which is an auditable factor. Procurement activities must be appreciated as a discipline not just a job function that employees should perform. When taking into consideration procurement discipline it will influence the overall performance of the both the employees and contractors.

The management of the company's external resources (Roy, 2020) is necessarily be in accordance to the interrelated concepts and principles of e-procurement aligned with the legal compliances particularly when digital procurement involves automation (Ikram and Latifa, 2022 but there is a need to consider vision of leadership and collaboration among stakeholders.

## **2. The Level of Efficiency of the Procurement Process**

This section presents the assessment of the level of efficiency of the procurement process as to the principles of government procurement namely; transparency, competitiveness, streamlined procurement process, accountability and public monitoring.



**Table 2.a**  
**The Level of Efficiency of the Procurement Process as to Transparency**

Indicators	1st District		2nd District		3rd District		Contractor		Average	
	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.
1.. The DPWH provides bidders with many opportunities to participate in the procurement process	3.33	E	1.67	ME	3.33	E	3.33	E	2.92	E
2. The DPWH follows the ethical standards in the procurement process including their duties and responsibilities provided by the law	3.67	VE	1.33	ME	3.33	E	3.33	E	2.92	E
3. The DPWH commits to promote good governance in the procurement process through the use of information and communications technology	2.67	E	1.33	ME	4.00	VE	3.00	E	2.75	E
AWM									2.86	E

Legend: Very Efficient (VE=3.51-4.0); Efficient (E=2.51-3.50); Moderately Efficient (ME=1.51-2.50);

Not Efficient at all (NE=1.0-1.50)

Table 2.a shows the assessment of the level of efficiency of the procurement process as to transparency. The government must synergize various tools with its processes as it moved to digitalization. However, human capital must have the knowledge and appreciation as it goes through the processes of digitalization aligned with the principles of procurement. Formulation of strategies and reforms must lead to acceptable terms and conditions guided by pre-determined set of criteria as to any investment decisions which transparency is one of it.

Based on the results in the Masbate 1st District very efficient indicators is “The DPWH follows the ethical standards in the procurement process including their duties and responsibilities provided by the law” meaning The DPWH is strictly adhere to the rules and regulation stipulated in the RA 9184 and mandated to undertake the planning of infrastructure and other necessary documents as to transparency of digitalization. On the other hand, results for Masbate 2nd DEO is moderately efficient. While for Masbate 3rd DEO and Contractor it is efficient meaning the DPWH is partially follows the ethical standard of the procurement process which needs for improvement to provide the bidders clear, concise, and accurate information on the process for the procurement activities and employees are principled, fair and moral as guided by the principles of government procurement in the delivery of public service. Moreover, The DPWH commits to promote good governance in the procurement process through the use of information and communication technology which means that technological innovations are not yet fully adopted in the DPWH Province of Masbate which influences promotion of good governance. Hence, with digitalization transparency and good governance will be efficiently and effectively be in place. Furthermore, overall result, all indicators reflect of an efficient result.

Platforms require components that would address the needs in the procurement process both for the contractors and employees to benefit. The platforms must be able to address the transparency concerns particularly on the computations, registration of application and monitoring procedures. Electronic communication to remind the employees and contractors of the status of their transaction would be helpful for everyone involved. When transparency will not be achieved it will implicate the processes of procurement. However, the present study established that employees are capable of information dissemination to its widest coverage and are ready when it comes to documentation which contractors agrees that they are able to determine the right procurement method to follow. However, post procurement is affected when improper documentation is not in place. Moreover, employees and contractors must adhere to ethical standards and confidentiality when taking into consideration transparency of transactions which means limitations must be factored in every criterion.

As presented in the Digital Transformation System Framework (Hanna, 2018), enabling the policies of the government institutions include the necessary tools of the government wherein promotion of good governance is taken into considerations. Moreover, human capital also requires skills link to digital evolution since information and communications technology covers a wide range and dynamic digital ecosystem.

According to the study on the Digital Maturity Framework by Eggers and Bellman (2016) is composed of people, process and preparedness wherein transparency should reflect in the actions of people, in the implementation of procurement process including technological changes, and how the government prepare for all aspects of procurement process. Preparation includes training people particularly employees and contractors as well as choosing the best digital tools and methods. Moreover, these three (3) components must holistically interlink with each other to come up with more matured and engaged decisions on how to address information and communication technology concerns and challenges using digitalization as one of the aspects to consider.

**Table 2.b**  
**Assessment of the Level of Efficiency of the Procurement Process as to Competitiveness**

Indicators	1st District		2nd District		3rd District		Contractor		Average	
	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.
1. The qualifications of the Evaluators in respect to procurement activities Is known to the bidders	2.00	ME	1.33	NE	3.00	ME	3.33	ME	2.42	ME
2. The bidding standards are explained to all participants	2.00	ME	1.00	NE	3.00	ME	4.00	VE	2.50	ME
1. There is equal opportunity given to enable private contracting parties participate in the procurement process	3.00	E	1.33	NE	3.33	E	3.00	E	2.67	E

Legend: Very Efficient (VE=3.51-4.0); Efficient (E=2.51-3.50); Moderately Efficient (ME=1.51-2.50);  
 Not Efficient at all (NE=1.0-1.50)

Table 2.b shows the assessment of the level of efficiency of the procurement process as to competitiveness. Digital maturity must be considered in every employee to become more competitive as well as the criteria for selection of investments on digitalization must be corroborated with experiences which the present study provided in terms of current status and level of efficiency.

The very efficient indicators based from the contractors is “The bidding standards are explained to all participants” which means that due to information dissemination and advertising conducted openly and properly contractors are able to understand the bidding standards and moderately efficient for Masbate 1st DEO and Masbate 3rd DEO while for Masbate 2nd DEO the three indicators, “The qualifications of the evaluators in respect to procurement activities Is known to the bidder”; “The bidding standards are explained to all participants” and “There is equal opportunity given to enable private contracting parties participate in the procurement process” are not efficient at all which means that the contractors are not aware of the criteria to become part of the committee who will assess the bidding requirements and standards for bidding procedures needs to address and give focus so that delivery of service may adhere and dissemination of information will be properly conducted.

Improper preparation on procurement process on the part of employees, contractors and other stakeholders can implicate the whole process. Being ready should not only be in the pre-procurement phase but in all stages. However, the present study established readiness on the first

phase of procurement but there is are needs improvement particularly on the post procurement phase where decisions on awards were already given which means trust and confidence on the contractor was already met. Moreover, competitiveness on the process and the people must be continuously improved to avoid more negative implications throughout the whole transactions. Competitiveness requires digitalization requires tools and trainings requiring serious participation from stakeholders.

As Lavilla (2020), mentioned that “innovation does not necessarily imply the invention of new or enhanced products” wherein the DPWH Province of Masbate continues to perform their best practices in terms of information dissemination and advertising of bidding requirements. Due to the emerging opportunities in digitalization, continuous orientation must be done which includes assessment of evaluators that should match their capabilities on technological innovations. Fostering digitalization requires delivering innovation where transparency is one of the concerns of the contractors so that they will be able to understand the fairness in the conduct of e-procurement process.

As Eggers and Bellman (2016), people, process and preparedness are the components needed as transformation in an organization’s processes. Hence, the procurement process is a work of all departments of the DPWH Province of Masbate, since other teams should participate to improve competitiveness particularly the talent management. Hence, the present study established that readiness of human capital on e-procurement process needs knowledge upgrade and appreciation to succeed and achieve objectives of digitalization. Competitiveness should also be present on the technology invested there in by the government as well as the contractors as they use the digital infrastructure. However, national government must also provide the proper communication lines for connectivity concerns of all stakeholders. As emerging digital technologies are evident, everyone concerned in the procurement process must be confident and competitive as they undergo transformation without sacrificing ethical standards and while complying with legal requirements and adheres to the principles of procurement mandated in the manual of regulations.

**Table 2.c**  
**Assessment of the Level of Efficiency of the Procurement Process as to Streamlined Procurement Process**

Indicators	1st District		2nd District		3rd District		Contractor		Average	
	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.
1. There is enough number of qualified staff sufficient to undertake the procurement activities	1.67	ME	1.33	NE	4.00	VE	2.67	E	2.42	ME
2. The Department have adequate facilities such as PCs, internet connections, photocopy facilities, printers etc. to under- take the procurement activities	2.00	ME	1.67	ME	2.33	E	3.33	E	2.33	ME

3. The procurement process shall be simple and made adaptable to advances in modern technology	3.00	E	1.33	NE	4.00	VE	4.00	VE	3.08	E
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Legend: Very Efficient (VE=3.51-4.0); Efficient (E=2.51-3.50); Moderately Efficient (ME=1.51-2.50);  
 Not Efficient at all (NE=1.0-1.50)

Table 2.c shows the assessment of the level of efficiency of the procurement process as to streamlined procurement process. Digital procurement forms part of the whole digital economy. The swift procurement process needs streamlined steps to deliver the functions at its best. The use of digitalization will enable the streamlined procurement process.

The very efficient indicator based on results of DPWH Masbate 3rd DEO and contractor are “There is enough number of qualified staff sufficient to undertake the procurement activities” and “The procurement process shall be simple and made adaptable to advances in modern technology” which means that the employees and contractors appreciate and are aware of what digitalization can do to improve delivery of public service particularly streamlining the procurement process. While for the Masbate 2nd DEO the two indicators stated above were not at all efficient meaning, employees involved in the procurement process need to undertake seminars and trainings and must be equipped and aware of the procurement process. The moderately efficient indicator is “The Department has adequate facilities such as PCs, internet connections, photocopy facilities, printers etc. to undertake the procurement activities” which means that the DPWH Province of Masbate needs equipment and technological infrastructures to adopt to the needs of the contractors and other stakeholders.

Regional operation needs a streamlined procurement process in place because it may implicate any decision-making. The DPWH Province of Masbate City has executed best practices along the phases of procurement however needs improvement and continuous review is still suggested as problems particularly in monitoring and post procurement are still evident. Moreover, the use of digitalization will help in streamlining the procurement process. Streamlined procurement processes should exhibit uniformity in adopting all procedures, transactions and documentation to ensure that the modern technology selected must ensure an effective and efficient method.

According to Lavilla (2020), fostering digital transformation means creating an environment where a swift procurement process can happen but needs to deliver the right technology and upgrade of digital structure starting from computers, printers, internet connections among others which are basics to achieve a streamlined procurement process. Building digital infrastructures also needs talents allowing understanding the e-procurement process better with the support of equipment and machineries in relation to technology?

Generally, ability to understand the local market (Han, 2020) can be challenging however when application and registration are digitalized accompanied by a mix of diverse needs from contractors.

Given the increasing role of digital economy, e-procurement has a role to portray as part of a complex supply chain. Moreover, the need to groom digital talents must be considered. The government must be responsive in looking for the right pool of talents to form part of the e-procurement and/or digitalization trainings.

Digitalization allows data to flow (United Nations Conference on Trade and Development, 2019) wherein it connects people and processes. However, security and privacy must be necessary considered in investing to digital platforms to protect any data and policies. Uniform application is one of the objectives of having streamlined procurement process with the use of digitalization and well-trained employees and contractors.

**Table 2.d**  
**Assessment of the Level of Efficiency of the Procurement Process as to System of Accountability**

Indicators	1st District		2nd District		3rd District		Contractor		Average	
	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.
1. There is a standard statement of ethics and are those involved in procurement are required to formally commit to it	3.00	E	1.33	NE	3.00	E	4.00	VE	2.83	E
2. Those involved with procurement required to declare any potential conflict of interest and remove themselves from the procurement process	2.67	E	1.33	NE	3.00	E	2.67	E	2.42	ME
2. The procurement decisions and disputes are supported by written narratives	3.33	E	1.33	NE	2.33	E	2.67	E	2.42	ME

Legend: Very Efficient (VE=3.51-4.0); Efficient (E=2.51-3.50); Moderately Efficient (ME=1.51-2.50);  
 Not Efficient at all (NE=1.0-1.50)

Table 2.d shows the assessment of the level of efficiency of the procurement process as to accountability. Accountability is part of every transaction in the procurement process making every decision significant and risky. Public employees and contractors are both accountable for their actions in every phase of the procurement process. Every role of the team players in applying digital innovations should penetrate the region in its objective to enhance and speed up procurement activities.



The very efficient indicator based on contractor results is “There is a standard statement of ethics and are those involved in procurement are required to formally commit to it” which means that the employees and contractors are bound to follow ethical standards to secure an efficient and effective delivery of public service while for Masbate 1st DEO and Masbate 3rd DEO is very efficient. The not efficient at all indicator based on Masbate 2nd DEO results are “There is a standard statement of ethics and are those involved in procurement are required to formally commit to it”; “Those involved with procurement required to declare any potential conflict of interest and remove themselves from the procurement process “which means that there is a need to improve transparency by emphasizing conflict of interest in all phases of procurement process and “The procurement decisions and disputes are supported by written narratives” which means that documentation is lacking whenever decisions and disputes are present which makes post procurement monitoring inefficient. Hence, conflict of interest and proper documentation forms part of accountability measures that the government agency must address.

Employees and contractors have role to play in the procurement process. However, employee functions must be improved aligned with the principles of procurement particularly accountability as they are entrusted with digitalization because of their competencies and capabilities. Moreover, when employees are competitive, knowledgeable and appreciative they would understand their accountability functions much better.

As United Nations Conference on Trade and Development (2019), policy and regulatory implications to include data protection, data flows, competition policy, among others should consider system of accountability including proper documentation and coverage of conflict of interest towards fair decisions on procurement process and disputes. According to Han (2021), ability to understand the local market is one of the challenges wherein disputes can be based on the challenges to respond to the market needs. Procurement is considered a vital function in delivering government service as economic globalization increases competition (Ikram, 2022) wherein digitalization provides the needed flexibility given the complex situations in the procurement process.

**Table 2.e**

**Assessment of the Level of Efficiency of the Procurement Process as to Public Monitoring**

Indicators	1st District		2nd District		3rd District		Contractor		Average	
	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.	WM	A.I.
1. There is a written auditable trail of procurement decisions attributable to individuals and committees	2.33	ME	1.00	NE	2.67	E	2.00	ME	2.00	ME
2. There is a referencing system for procurement files such as copies of bids or	2.67	E	1.67	ME	2.67	E	2.33	ME	2.34	ME

proposals retained with the evaluation										
3. The original contracts are secured in a fire and theft proof location	1.67	ME	1.00	NE	1.67	ME	1.67	ME	1.50	NE

Legend: Very Efficient (VE=3.51-4.0); Efficient (E=2.51-3.50); Moderately Efficient (ME=1.51-2.50);  
 Not Efficient at all (NE=1.0-1.50)

Table 2.e shows the assessment of the level of efficiency of the procurement process as to public monitoring. Digital innovations should provide the ease in monitoring transactions in all phases. Digitalization in the procurement process must be reviewed because it must produce practical outcomes such as monitoring every transaction. This would allow strategic current and forecasting data that would be needed for decisions from approval of applications to awarding of bids. However, after the awarding there is a need to monitor post procurement activities and the use of digitalization can help obtain and ease actionable information.

The efficient indicator results based on the Masbate 3rd DEO is “There a written auditable trail of procurement decisions attributable to individuals and committees” which means that monitoring functions is supported by documents presenting procurement decisions retained with the evaluation. The auditable trail can be made more accessible for the employees and monitoring efficiently using digitalization and “There is a referencing system for procurement files such as copies of bids or proposals” is also efficient for Masbate 1st DEO and Masbate 3rd DEO which means that prospective bidders shall have an statement of all its on-going and completed government projects for reference and must be aware of all the government policies and procedures. Furthermore, based on the average results “The original contracts are secured in a fire and theft proof location” which means that there is no location established yet to safe keep original contracts. Hence, supporting the digital infrastructure is very relevant to address the growing demands in the procurement process. However, to support backup data there should be area for inventory of original contracts as one of the critical documents in the procurement process that is safe from fire and theft as common circumstances.

The transformation of public procurement processes creates competitive advantage on monitoring transactions. The implication of digitalization to public monitoring is to foster clientele experience as they will be informed of their transactions in real time as well as what they need in every transaction with DPWH Province of Masbate City. The data analytics that the e-procurement can provide will help the employees, contractors and other stakeholders in their decision making and the reports generated will be indicators or proof. All principles of procurement are linked to public monitoring. Hence, despite good practices in the pre-procurement phase there lies a problem on the delivery of the plan in procurement to post procurement process wherein information and communications technology through digitalization can improve inefficiencies in public monitoring. The information and communications technology and internet of things which concerns about connecting people and organizations to integrate operations and management United Nations

Conference on Trade and Development, 2019) is important to improve the DPWH Province of Masbate's transparency and fairness including risk assessments and widest information dissemination as well as monitoring procedures to address or minimize to no audit findings as well automation on reminding contractors of their incomplete requirements for submission. However, privacy and security must be taken into consideration in all principle-indicators.

The digital innovations must be reminded by the definitions of the principles in government procurement In reference to the 2016 IRR, Section 3 provides the legal reference wherein transparency focused on procurement process and the implementation of procurement contracts to ensure the widest dissemination of bid opportunities and the participation of pertinent non-government organizations. As well as, competitiveness on the public procurement must be conducted through public bidding, except as otherwise provided in the regulations.

Electronic procurement supports operational processes (Bauer, et. al. 2019), where efficiency increase optimal relationship (Holmblad, 2017) guided by the right people, right goals, right costing and applicable criteria. The e-procurement as a system should enable government processes wherein public monitoring plays an important function to ensure that all decisions in every transaction are properly implemented and can avoid further risks. Given the necessity of public monitoring, competency must be sustained as well as competitive advantage (Alabdali and Salam, 2022) that increases quality information.

The bidding process treats bidders equitably and fair setting aside conflicts of interests. On the other hand, streamlined procurement process is adoption of uniform application of the procurement activities in a simple and adaptable manner. Accountability is a where the public officials directly or indirectly involved in the procurement process as well as in the implementation of procurement contracts, and the private parties must be properly warranted by circumstances, investigated and be held liable wherein it is linked to public monitoring. Lastly, public monitoring must be viewed as guaranteeing that these contracts are awarded pursuant to the laws and regulations and performed strictly according to specifications and standards.

### **3. Significant Agreement on the Ranks of the Procurement Process assessed by the Three Districts.**

This section presents the significant agreement on the ranks of the procurement processes assessed by the three districts.

**Table 3.1**  
**The Significance of Agreement on the Ranks of the Procurement Process**  
**As Assessed by the Groups of Respondents**

<b>Indicators</b>	<b>TRANSPAR ENCY</b>	<b>COMPETETI VENESS</b>	<b>STREAMLI NED PROCURE MENT PROCESS</b>	<b>SYSTEM ACCOUNTA BILITY</b>	<b>PUBLIC MONITOR ING</b>
Summation of Squared Deviation from the Mean Difference	<b>3.5</b>	<b>3.5</b>	<b>8</b>	<b>3.5</b>	<b>24.5</b>
No. of Groups	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
No. of Activities	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
Coefficient of Concordance W	<b>0.11</b>	<b>0.11</b>	<b>0.26</b>	<b>0.11</b>	<b>0.80</b>
Degree of Freedom	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>
Computed X <sup>2</sup>	<b>0.88</b>	<b>0.88</b>	<b>2.08</b>	<b>0.88</b>	<b>6.4</b>
Tab. X <sup>2</sup> Value					
0.05	<b>5.99</b>	<b>5.99</b>	<b>5.99</b>	<b>5.99</b>	<b>5.99</b>
0.025	<b>7.38</b>	<b>7.38</b>	<b>7.38</b>	<b>7.38</b>	<b>7.38</b>
0.010	<b>9.21</b>	<b>9.21</b>	<b>9.21</b>	<b>9.21</b>	<b>9.21</b>
0.005	<b>10.60</b>	<b>10.60</b>	<b>10.60</b>	<b>10.60</b>	<b>10.60</b>
Significance of Agreement	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>NS</b>	<b>@0.05</b>
Decision on H <sup>1</sup>	<b>Rejected</b>	<b>Rejected</b>	<b>Rejected</b>	<b>Rejected</b>	<b>Accepted</b>

Based on the data, we can interpret the significance of agreement and the decision for each indicator as follows: TRANSPARENCY, the computed X<sup>2</sup> value: 0.88, tab. X<sup>2</sup> value at a 0.05 significance level: 5.99. Since the computed X<sup>2</sup> value (0.88) is less than the Tab. X<sup>2</sup> value (5.99), there is no

significant agreement on the indicator "TRANSPARENCY." Therefore, the decision on the alternative hypothesis (H1) for "TRANSPARENCY" is rejected. On COMPETITIVENESS, computed X2 value: 0.88, tab. X2 value at a 0.05 significance level: 5.99, similar to the previous case, the computed X2 value (0.88) is less than the Tab. X2 value (5.99). Hence, there is no significant agreement on the indicator "COMPETITIVENESS." Consequently, the decision on the alternative hypothesis (H1) for "COMPETITIVENESS" is rejected. For STREAMLINED PROCUREMENT PROCESS, computed X2 value: 2.08, Tab. X2 value at a 0.05 significance level: 5.99. The Computed X2 value (2.08) is less than the Tab. X2 value (5.99), indicating no significant agreement on the indicator "STREAMLINED PROCUREMENT PROCESS." Consequently, the decision on the alternative hypothesis (H1) for "STREAMLINED PROCUREMENT PROCESS" is rejected. And SYSTEM ACCOUNTABILITY Computed X2 value: 0.88, Tab. X2 value at a 0.05 significance level: 5.99. Similarly, the Computed X2 value (0.88) is less than the Tab. X2 value (5.99), implying no significant agreement on the indicator "SYSTEM ACCOUNTABILITY." Therefore, the decision on the alternative hypothesis (H1) for "SYSTEM ACCOUNTABILITY" is rejected.

While, PUBLIC MONITORING, Computed X2 value: 6.4, Tab. X2 value at a 0.05 significance level: 5.99. In this case, the Computed X2 value (6.4) exceeds the Tab. X2 value (5.99), indicating a significant agreement on the indicator "PUBLIC MONITORING." Thus, the decision on the alternative hypothesis (H1) for "PUBLIC MONITORING" is accepted.

To summarize, based on the provided data, there is no significant agreement on the indicators "TRANSPARENCY," "STREAMLINED PROCUREMENT PROCESS," and "SYSTEMACCOUNTABILITY." However, there is significant agreement on the indicators "COMPETITIVENESS" and "PUBLIC MONITORING."

It can be implied that the data vary depending on the specific context and purpose of the analysis. However, here are some general implications that can be drawn from the interpretation of the data:  
Transparency: The lack of significant agreement on the indicator of transparency suggests that there may be inconsistencies or variations in the perception or measurement of transparency among the different groups and activities. This finding highlights the need for further examination and clarification regarding transparency measures and practices within the analyzed context.

This transparency can be supported by the study of Adiputra, et al, using purposive sampling designs, findings emphasized that the financial accountability through the audit opinion and political environment have a significant positive effect on the transparency of local government in Indonesia. On the other hand, the size of the local government and local government response rate on the regulation do not affect the transparency of local government in Indonesia.

Competitiveness: The significant agreement on the indicator of competitiveness implies that there is a consensus among the groups and activities regarding the competitive nature of the analyzed factors. This finding can be seen as a positive aspect, indicating a common understanding and alignment in terms of competitiveness within the given context.

Zuti (2018) emphasized that digitalization or technology is a solution or key to a progressive society. Through digitalization it improved the delivery of services and becoming more accessible of the services required by the clientele. The presence of companies innovating for the good of their organizations considered a crucial element of the organizations competitiveness in a given locality. However, having digitalization in the business industry worthy of highlighting along these elements, the government and the public sector role is negligible. Region competitiveness can be enhanced by determining the services anchored on what are the needed services by the clientele in a digital era. This digitalization, served as an opportunity by the government sectors to be more inclusiveness, transparency, and trustworthiness, and operates effectively and efficiently than the traditional ways.

**Streamlined Procurement Process:** The lack of significant agreement on the indicator of streamlined procurement process suggests that there may be divergent views or experiences related to the efficiency and effectiveness of the procurement process. This finding points to the need for further investigation and potential improvements in the procurement process to enhance consensus and streamline operations.

**System Accountability:** The lack of significant agreement on the indicator of system accountability indicates potential discrepancies or differing perspectives on the accountability measures in place. This finding highlights the importance of clarifying and strengthening accountability mechanisms within the analyzed system to ensure transparency and responsibility.

**Public Monitoring:** The significant agreement on the indicator of public monitoring signifies a consensus among the groups and activities regarding the importance and effectiveness of monitoring by the public. This finding suggests that there is a shared understanding of the role and value of public monitoring, emphasizing the significance of involving the public in oversight and accountability processes.

## CONCLUSIONS

- a. The current status of DPWH Province of Masbate has exhibited a good practice on the pre-procurement phase as reflected on its readiness on bidding documents. However, pre-procurement plans are not reviewed according to budget. On the procurement phase, the agency displayed a good practice particularly information dissemination and advertising of bidding to the widest coverage possible making the bidding open to all qualified contractors but was not able to ensure requirement submission that affects the next procurement phase. The use of checklist ensures guidance on the submission of requirements however the checklist is on the procurement process from start of transaction is not evident. Moreover, post procurement shows that there is a need for risk evaluation to avoid non-compliance of requirements after the awarding of the bid. The pre-procurement process can implicate succeeding processes despite its best practice on information dissemination. The present studies have identified the need to ensure mitigation of risks as well as checklist must be made available.
- b. On transparency principle, the DPWH Province of Masbate provides opportunities to all contractors to participate on the procurement process guided by ethical standards. Although commitment with good governance in relation to technological innovations is not evident. On



competitiveness principle, qualifications of evaluators are not known to the contractors. On the streamlined procurement process principle, to adapt to digitalization, the agency may be first be fully equip with computers, printers, etc. On the system of accountability principle, there is a need to strengthened dispute resolutions. Lastly, the public monitoring principle, there is no secured location for all critical documents. Without transparency there will be implications in the decision-making process as well as trust and confidence on the procurement process implemented by the department. The present study had achieved to identify that the principles of procurement process as provide in the manual for procurement are not all present although all stakeholders are committed to achieve and strengthened the principles of procurement.

- c. The current status of the DPWH Province of Masbate had significant agreement among ranks wherein it shows that needs more improvement on post procurement phase but may also review earlier phases because the decisions were based on it because the three phases had a very strong relationship with each other. Despite efforts of widest dissemination bidding information, the procurement process had incurred implications wherein the problem lies after awarding of the bid which is auditable as post requirements are necessary to justify the procurement decisions. The present study has established that both contractors and employees are obliged to comply with the procurement activities based on the laws promulgated by the government to have better welfare for the society guided by the features of procurement by electronic means namely security, integrity and confidentiality.
- d. Based on the results of the study, it is evident that significant e-procurement process may be adopted beneficial to all stakeholders guided by action plan to establish a better and more efficient delivery of functions.

## RECOMMENDATIONS

1. The DPWH Province of Masbate can create a checklist of procedures or routing slips to guide the employees on how to facilitate the procurement process including the use of budget variance and checklist for pre-requisite on procurement process in terms of funding, engineering, technical documents, and project sites. The government agency must also ascertain submission of requirements that despite good practice on the widest dissemination of advertising and posting of invitation to apply for eligibility and to bid. The provisions contracts should be properly explained to the bidders not only the bidding procedures and standards which should also form part of the checklist of procedures. Moreover, to avoid non-compliance after awarding of the bid, the agency must identify the levels of risks and employ evaluation tools in addressing procurement risks.
2. The DPWH Province of Masbate can provide reorientation trainings of the manual of procedures and emphasize ethical practices on the delivery of procurement activities particularly commitment to good governance by starting to inform the contractors of the criteria of evaluators. Information dissemination should also include awareness on the implementation of e-procurement process including the laws and regulations attached to prepare the stakeholders as well as advertising of statement of ethical standards on procurement process. The government agency must give priority on their budget on the physical technological infrastructures particularly equipment before adapting to any digital changes as well as establishing secured location for critical documents. Moreover, the agency may adopt ways on how to settle procurement disputes including proper documentation such as consultations and committee designation on dispute resolutions.

3. The DPWH Province of Masbate can conduct review of all its initiatives per procurement phase to avoid further unfavorable results. Creation of committee to conduct reviews and evaluation of the procurement process should include those employees in every department to have a holistic view. Interviewing the contractors on their experiences can help in the review process. The DPWH Province of Masbate may ensure uniformity in the delivery of public services in relation to procurement activities. Avoid disputes and complaints. Ensure processes are accompanied with proper documentation to minimized unfavorable results in the post procurement stage. Trained contractors and employees to address their needs as they go along the procurement process leading towards use and appreciation of information and communications technology through digitalization.
  
4. The DPWH Province of Masbate may use and apply an e-procurement process which is necessary to become ready as digitalization will be fully implemented. The researcher has come up with different frameworks as a guide towards the direction of digitalization.

### **Major Output**

The major final output presents the illustration of the e-procurement process guided by the regulations in the Philippines on government procurement. The Agency are balancing these different purchasing criteria is by using an e-procurement system. By adapting the e-procurement process systems enhance purchasers' access to information, help standardize and streamline the procurement process. So, understanding the factors that encourage governments to adopt e-procurement systems is vital toward advancing the sustainability goals. E-Procurement Process will guide the members of the procurement department, person-in-charge, bids and awards committee and all other employees in the appreciation and delivery of procurement activities such as reducing purchasing costs and obtain substantial savings; provide better prices and resultative indicators; allowing more transparency; reduce the possibility for misuse, fraud and corruption; and review of government procurement principles.

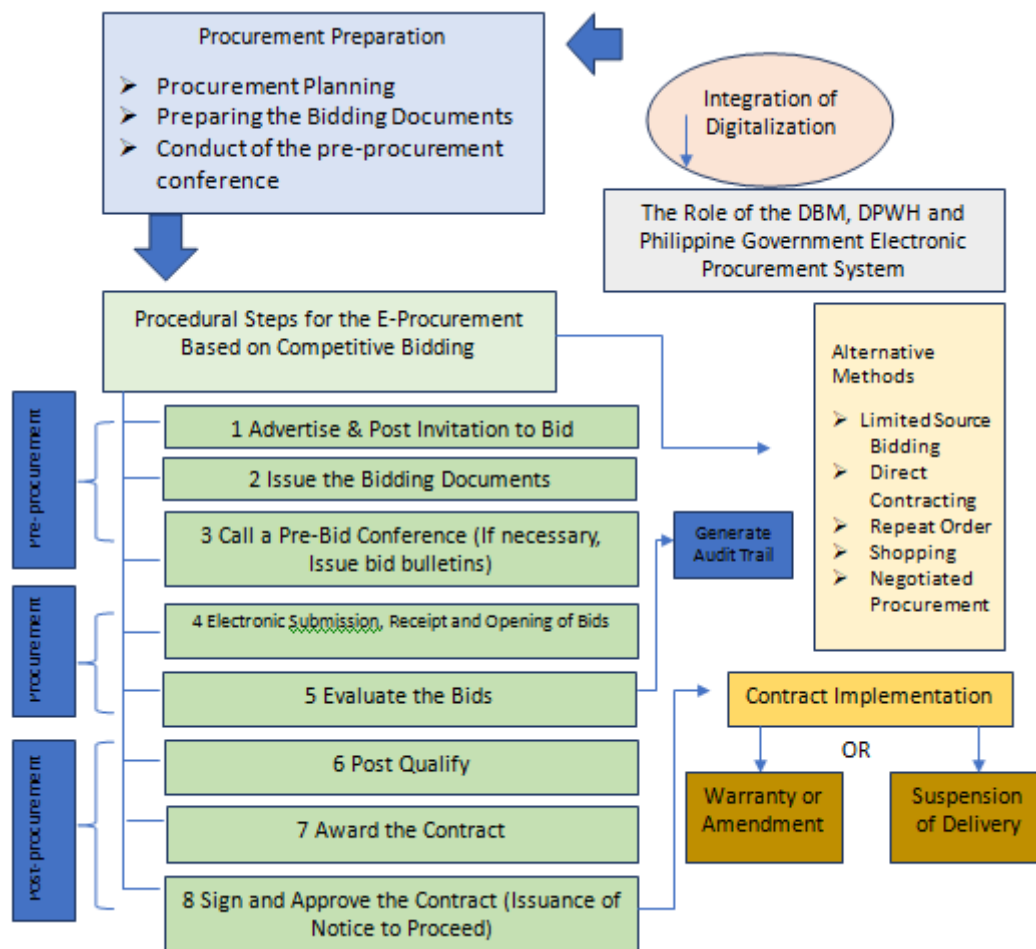
The e-procurement advances to easily distinguish competitive and non-competitive procurements. Preparation of checklists of procedures and other evaluation tools, information dissemination on laws and regulations of procurement process, advertise ethical standards of the agency, and criteria of evaluators and training for contractors and employees on information and communications technology and other related concerns on procurement process which present holistic view on the use of full e-procurement process.

This structure enables DPWH to leverage the experience and knowledge to guide or support their own procurement decision. Moreover, the structure is relatively flexible and adaptable. Adaption of e-procurement in the DPWH may encounter less bureaucratic obstacles embedded in the process, including the burdensome paperwork or delayed procurement approval. As a result, the agency will have greater capacity to accommodate multiple sustainability objectivities. Given their high level of functionality, they are likely to adopt the e-procurement system and can better manage the purchasing complexity that comes with promoting sustainability objectives.

## Major Output

### E-Procurement Process

The major final output presents the illustration of the e-procurement process guided by the regulations in the Philippines on government procurement.



## REFERENCES

Accenture (2017) Next Generation Digital Procurement.

[https://www.accenture.com/\\_acnmedia/PDF-129/Accenture-Next-Generation-Digital-Procurement.pdf](https://www.accenture.com/_acnmedia/PDF-129/Accenture-Next-Generation-Digital-Procurement.pdf)

Accenture Operations, 2017. Next Generation of Digital Procurement, s.l.: Accenture.

Alabdali, M. A. & Salam, A. (2022). The Impact of Digital Transformation on Supply Chain Procurement for Creating Competitive Advantage: An Empirical Study. Retrieved from <https://www.mdpi.com/journal/sustainability>

Asian Development Bank (2017). What principles guide ADB's procurement? Retrieved from <https://www.adb.org/business/how-to/what-principles-guide-adb-s-procurement>

Asian Development Bank (2021). Accelerating E-Commerce in ASEAN. Retrieved from <https://development.asia/policy-brief/accelerating-e-commerce-asean>

- Babica, Viktorija (2017) Digitalization of public procurement: barriers for innovation. Retrieved from <https://www.iis.org/CDs2019/CD2019Summer/papers/SA065QF.pdf>
- Bauer, Florian; Göbl, Martin (2019) The influence of digitalisation on procurement efficiency. Retrieved from <https://www.econstor.eu/bitstream/10419/215721/1/19965-Article.pdf>
- Commission on Audit (2022). Principles of Government Procurement. [https://www.coa.gov.ph/wp-content/uploads/ABC-Help/Updated\\_Guidelines\\_in\\_the\\_Audit\\_of\\_Procurement/annex%205/Section1-3.htm](https://www.coa.gov.ph/wp-content/uploads/ABC-Help/Updated_Guidelines_in_the_Audit_of_Procurement/annex%205/Section1-3.htm)
- Commonwealth of Australia (2021). Digital Economy Strategy 2030. Retrieved from <https://pmc.gov.au/cca>
- Crossman, A. (2020). Understanding the purposive sampling, an overview of the method and its application. Retrieved from <https://www.thoughtco.com/purposive-sampling-3026727>
- Delloitte (2017). The Future of Procurement in the Age of Digital Supply Networks, Deloitte. Available: <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/process-and-operations/us-cons-digital-procurement-v5.pdf>, 2017.
- De Cazalet, B. and Zapatrina, I. (2021). E-procurement for PPPs and Concessions: Current Trends and Opportunities. Retrieved from DOI: 10.21552/epppl/2021/2/7
- Dreyer, M. and Nygaard, K. (2020). Governments encourages SMEs to Adopt New Technology. Retrieved from <https://som.yale.edu/blog/governments-encourage-smes-to-adopt-new-technology>.
- European Institute for Gender Equality (2023). Gender-responsive public procurement. Retrieved from <https://eige.europa.eu/gender-mainstreaming/toolkits/grpp/post-procurement-stage>
- Fluet, B. (2021). What is Descriptive Research? Retrieved from <https://invoke.com/blog/what-is-descriptive-research>.
- Funda, P. (2019). Aligning Public Procurement Process to Improve Performance: A Case Study of University of Zambia Purchasing System. Retrieved from [https://www.researchgate.net/publication/333878013\\_Aligning\\_Public\\_Procurement\\_Processes\\_to\\_Improve\\_Performance\\_A\\_Case\\_Study\\_of\\_University\\_of\\_Zambia\\_Purchasing\\_System](https://www.researchgate.net/publication/333878013_Aligning_Public_Procurement_Processes_to_Improve_Performance_A_Case_Study_of_University_of_Zambia_Purchasing_System)
- Gartner, 2018a. IT Glossary - Artificial Intelligence. [Online] Available at: <https://www.gartner.com/it-glossary/artificial-intelligence/>
- Government Procurement Policy Board, Republic Act 9184. Retrieved from <https://www.gppb.gov.ph>
- Government Procurement Policy Board (2016). Republic Act 9184. The 2016 revised IRR was approved by the Government Procurement Policy Board (GPPB) through its Resolution 13-2016, dated 9 August 2016, and published in the Official Gazette on 29 August 2016. Retrieved from [https://www.gppb.gov.ph/assets/pdfs/Updated%202016%20IRR\\_31%20March%202021.pdf](https://www.gppb.gov.ph/assets/pdfs/Updated%202016%20IRR_31%20March%202021.pdf)
- Han, T. C. (2021). The role of the government in e-commerce development. Retrieved from <https://www.csc.gov.sg/articles/the-role-of-government-in-e-commerce-development>

- Hanna, N. (2018). A role for the state in the digital age. *Journal of Innovation and Entrepreneurship* ISSN 2192-5372, Springer, Heidelberg, Vol. 7, Iss. 5, pp. 1-16. Retrieved from <http://dx.doi.org/10.1186/s13731-018-0086-3>
- Hargrave, M. (2021). Standard Deviation Definition. Retrieved from <https://www.investopedia.com/terms/s/standarddeviation.asp>
- Ikram Lebhar, Latifa Ezzine, Afaf Dadda (2022) The Future of Digital Procurement and its Benefits in The Global Supply Chain <http://ieomsociety.org/proceedings/2022istanbul/660.pdf>
- Iowa Stae University (2017). Competitive Procurement. Retrieved from <https://www.policy.iastate.edu/policy/procurement/competitive>
- Karmehag, J. & Lofnertz, E. (2018) How Digital Technologies will Impact the Procurement Process and Organisation <https://publications.lib.chalmers.se/records/fulltext/255153/255153.pdf>
- Klünder, T., Dörseln, J. N., & Steven, M. (2019). Procurement 4.0: How the digital disruption <https://www.scielo.br/j/prod/a/38NLCfDKvnX5dbM9tzRkJKQ/?format=pdf&lang=en>
- KPMG International (2020) Digitalization in procurement: Sustainable added value through digitalization. <https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/10/digitalization-in-procurement.pdf>
- Lavilla, D. S. (2020). Innovation and digital transformation: How are Philippine MSME's performing? Retrieved from <https://www.pwc.com/ph/en/business-unusual/innovation-and-digital-transformation-how-are-philippine-msmes-performing.html>
- Layaq, M. W., Goudz, A., Noche, B. & Atif, M. (2019). The impact of digitization on tactical procurement and its risks management. *International Academic Journal of Procurement and Supply Chain Management* [https://iajournals.org/articles/iajpscm\\_v3\\_i1\\_217\\_234.pdf](https://iajournals.org/articles/iajpscm_v3_i1_217_234.pdf)
- Mabhodha, S. and Choga, F. (2021). The Impact of Information and Communications Technology on Procurement Processes: Case of Zimbabwean Urban Councils (2009 to 2018). Retrieved from <https://centerprode.com/ojit/ojit0401/coas.ojit.0401.03025m.pdf>.
- Malacina, I., et. al. (2022). *Journal of Purchasing & Supply Management* 28 (2022) 100745. Retrieved from <https://doi.org/10.1016/j.pursup.2021.100745>
- Meynhardt, T., 2021. Public value is knowable, public value creation is not. *Adm. Soc.* 53 (10), 1631–1642.
- Miller, F.A., Lehoux, P., 2020. The innovation impacts of public procurement offices: the case of healthcare procurement. *Res. Pol.* 49 (7), 104075.
- OECD (2019), “Digital transformation of public procurement”, in *Government at a Glance 2019*, OECD Publishing, Paris. <https://www.oecd-ilibrary.org/docserver/603bd7ed-en.pdf?expires=1669386899&id=id&accname=guest&checksum=7D9224AFCD8BB3C8E32DA8C2B40174A9>

- OECD, 2019. Report on the implementation of the recommendation of the council on public procurement. available at: [https://one.oecd.org/document/C\(2019\)94/FINAL/en/pdf](https://one.oecd.org/document/C(2019)94/FINAL/en/pdf).
- Ofoma, C. (2021). Digitalization Driven Public Service and Service Delivery: The Nigeria Experience. Retrieved from <https://doi.org/10.47743/jopaf1-2021-22-05>
- Organization for Economic Cooperation and Development (2017). Key Issues for Digital Transformation in the G20. Retrieved from [www.oecd.org/innovation](http://www.oecd.org/innovation).
- Patrucco, A.S., Walker, H., Luzzini, D., Ronchi, S., 2019. Which shape fits best? Designing the organizational form of local government procurement. *J. Purch. Supply Manag.* 25 (3), 1–17.
- Radell, Coleman, Schannon David (2018) The Benefits Go Far Beyond Efficiency [https://www.bain.com/contentassets/72e381c9155b467db6e8e4ac93ee6ac1/bain\\_brief\\_digital\\_procurement\\_the\\_benefits\\_go\\_far.pdf](https://www.bain.com/contentassets/72e381c9155b467db6e8e4ac93ee6ac1/bain_brief_digital_procurement_the_benefits_go_far.pdf)
- Rodriguez, D. (2019). Transparency is the key feature of successful procurement. Retrieved from <https://precoro.com/blog/transparency-is-the-key-feature-of-successful-procurement/>.
- Roy, N. (2020). Readiness For The Digitalization Of Procurement In The Private Sector of Bangladesh. Retrieved from [http://dspace.bracu.ac.bd/xmlui/bitstream/handle/10361/14938/18182006\\_BIGD.pdf?sequence=1&isAllowed=y](http://dspace.bracu.ac.bd/xmlui/bitstream/handle/10361/14938/18182006_BIGD.pdf?sequence=1&isAllowed=y)
- Schnellbacher, Wolfgang & Weise, Daniel (2020) THE FUTURE OF PROCUREMENT IS DIGITAL. Retrieved from <https://web-assets.bcg.com/26/a2/3410a17c49448235b4b50d127aa4/jumpstart-to-digital-procurement-book-excerpt.pdf>
- Stradner Sascha & Brunner Uwe(2022) Analysis of Potential Benefit and Maturity Level of Digital Procurement <https://tore.tuhh.de/bitstream/11420/13940/1/Stradner%20and%20Brunner%20%282022%29%20-%20Analysis%20of%20Potential%20Benefit%20and%20Maturity%20Level%20of%20Digital%20Procurement.pdf>
- Streif, A., et. al. (2021). Digital procurement: For lasting value, go broad and deep. Retrieved from <https://www.mckinsey.de/~media/McKinsey/Business%20Functions/Operations/Our%20Insights/Digital%20procurement%20For%20lasting%20value%20go%20broad%20and%20deep/Digital-procurement-For-lasting-value-go-broad-and-deep.pdf>
- UNESCO International Institute for Educational Planning (2017). Information and Communications Technology. Retrieved from <https://learningportal.iiep.unesco.org/en/glossary/information-and-communication-technologies-ict>
- United Nations (2017). Procurement Principles. Retrieved from <https://www.unicef.org/supply/procurement-principles>
- United Nations Conference on Trade and Development (2019). The value and role of data in electronic commerce and the digital economy and its implications for inclusive trade and



development. Retrieved from  
[https://unctad.org/meetings/en/SessionalDocuments/tdb\\_ed3d2\\_en.pdf](https://unctad.org/meetings/en/SessionalDocuments/tdb_ed3d2_en.pdf)

Van Staden, A., Fourie, D. J., & Holtzhausen, N. (2022). Development of an accountability framework in the public procurement system: Case of the emerging market. *Corporate Governance and Organizational Behavior Review*, 6(2), 71–84.  
<https://doi.org/10.22495/cgobrv6i2p7>

Weingarth, J., Richter, J., & Rosenkranz, C. (2018). Information technology-enabled enterprise agility and environmental turbulence – a configurational literature review. *Proceedings of 39th International Conference on Information Systems, ICIS 2018*, p. 9.

Ylinen, M. (2021). Incorporating Agile Practices in Public Sector IT Management: A Nudge toward Adaptive Governance. *Information Polity* 26 (2021) 251–271, IOS Press. Retrieved from DOI 10.3233/IP-200269.

Young, J. (2020). Frequency Distribution. Retrieved from  
<https://www.investopedia.com/terms/f/frequencydistribution.asp>

Young, J. (2020). Procurement. Retrieved from  
<https://www.investopedia.com/terms/p/procurement.asp>

[Actor Network Theory, Bruno Latour, and the CSI". \*Social Studies of Science\*. 53 \(2\): 169–173. doi:10.1177/03063127231158102. ISSN 0306-3127. PMID 36840444. S2CID 257183188.](#)