Measuring the Familiarity and Utilization of Documentation Software for Project Document Administration in the Construction Industry of Region 3

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Abstract

In today's modern technological advancement, continuous transformation within the construction sector is present wherein managing project documents correctly nowadays is one of the keys to project success and compliance of the industry standards. Traditional document management methods are becoming less essential as the project becomes more complicated and larger in size since streamlined workflow processes and accuracy are needed. This research paper presents the awareness and usage of documentation software across the construction industry of Region 3 in the Philippines. This paper aims to understand how well the document software is incorporated into project management activities, examine the factors hindering the adoption of digitalized documentation work and process, and identify improvement measures. The study demonstrated that most of the respondents employ digital documentation tools in their projects indicating a considerable swing toward digital applications. However, some respondents still utilize traditional methods exhibiting that there is a quite gap in full digital adoption. While most respondents possess moderate awareness regarding documentation software, the interface and functions, difficulty in grasping the documentation software's specific features, and formal training challenges are evident. Although the documentation software is effectively utilized for report generation and seamless integration with other tools, challenges were encountered such as low self-confidence in using the software independently, usability issues, and insufficient technical support. The research clearly outlines the familiarity and usage of document software based on company size, project scale, professional roles, and integration of software into daily activities. Even though most construction firms acknowledge the benefits of documentation software, studies indicate that training employees to use it on company/project implementation is still a challenge. Overall, this study presents the current state and usage of documentation software practices in region 3 to further improve the adoption and effectiveness across the construction industry.

Keywords: Documentation Software; Document Control; Document Management System; Construction Technology; Construction Documentation

1. Introduction

1.1 Background of the Study:

The construction industry is one of the least digitalized sectors, as highlighted by Katharina & Xia [1]. This observation was initially made by the McKinsey Global Institute in 2015, and it appears that little progress has been made in the past decade (Abioye et al., 2021; Agarwal et al., 2016; Chen et al., 2024). Despite this concern, the construction industry is currently experiencing a significant shift towards digitization due to various International Projects being developed here in the Philippines nowadays that implements software documentation. This type of documentation is essential in the document management of projects due to the ease of use, traceability, timely update, streamlined workflows, and organized archival of records compared with the traditional documentation work and procedure. The investigation on the significant movement in the Philippines' construction sector in relation with the digitalized documentation can be traced specifically in region 3 since it is one of the active areas with the diverse and rapidly growing construction industry under the government's Build Build Build program with numerous railway and airport projects. The study of Mitima [2] underscores the importance of Information Communication Technology (ICT) in the construction industry, asserting that ICT is considered essential, and it is radically altering domestic and global environments in today's construction industry. Documentation tools can improve the efficiency, efficacy, accuracy, and accessibility of the project-related documents which is important for the timely and successful execution of a project. Regardless of these potential benefits, there is still limited research available on the awareness and usage of documentation tools among construction professionals. This paper aims to address this gap by investigating the awareness and utilization of project management software in the regional context. The result of this research will be beneficial for the construction industry itself and to the software developers.

1.2 Research Problems:

1. What is the current level of awareness and familiarity with documentation software among the construction professionals situated in region 3?
2. What is the usage frequency of documentation software applications in the execution of project documentation management within the construction industry in region 3?
3. What are the factors that influence the adoption and use of construction documentation software?
4. How does the awareness and utilization of documentation software applications among construction professionals impact project efficiency and document management?

1.3 Scope of the Study:

According to the study Pourkeyvan & Mohammad [3], one of the main issues that engineers have in their day-to-day role was coping with the vast amount of data which is being generated and transferred rapidly that is crucial to manage. When efficient engineering documentation management software is in place, it can help contractors and stakeholders to work in a faster and proactive approach. This study will focus on and involve the construction professionals and firms situated in region 3 with the target respondents of project managers, engineers, architects, consultants, and document controllers. The objective of this study will scrutinize the level of familiarity and extent of utilization of documentation software in relation with the corresponding day-to-day operation and duties in their respective organizations. Through this study, various types of documentation tools utilized in today's construction projects for tracking, processing, and monitoring documents and submittals among project parties and the company itself (e.g., project management systems, document control systems, and collaboration tools) will be covered.

1.4 Significance of the Study:

Investigating how the documentation software is used and recognized among the construction industry provides an understanding of adoption and application levels of the digitalization that may support revised training programs, project-specific software development and project management practices tailored with the project's specific needs. This study will also provide insight into the current state of digital tool adoption within the construction industry of region 3 that will enable stakeholders to identify areas of improvement and technology advancement for further reference. In addition, the study will contribute to the broader body of knowledge in line with the digital transformation within the construction sector.

2. Review of Related Literature

The study conducted by Rathnayaka et al. [4] highlighted that documentation has an important role in managing the cost of construction projects. Though this is stressed, the traditional document management systems utilized in different countries such as Sri Lanka continues to be an impediment to achieving the expected cost targets. The study conducted by Mitima [2] pointed out that the reliance on outdated methods of information, documentation, communication, and data delivery poses significant challenges in the construction sector in the Democratic Republic of Congo (DRC) including the face-to-face meetings and manual delivery of papers, drawings, instructions, and specifications that concludes the need for a global shift towards innovative construction methods is essential for improving productivity and output. The study of Katharina & Xia [1] further underscores that the construction sector is still regarded as one of the least digitalized sectors globally. This results in project inefficiencies such as but not limited to low productivity, cost overruns, project delays, and quality deficiencies. Addressing these are important for economic efficiency, sustainability, and adapting to demographic changes. This emphasized the needs for digitalization through the study of Jahanger et al. [5] that through construction or document management software that offers contract administration, document management, workflow management, and activity tracking and control can enhance project administration and delivery processes.

The study conducted by Rathnayaka et al. [4] suggested that compared with traditional documentation methods, Electronic Document Management Systems (EDMS) offer a higher value to megaprojects for multiple reasons such as functionality, neutrality, more aligned, objective, consistent approach, and better compatibility, convenience, reversibility and delivery speed. The study also addresses the transformation issues and proposed enablers in the transition to EDMS and the potential implications for using the proposed EDMS with respect to cost management in megaprojects in other developing countries. The study of Mitima [6] highlighted several benefits of using Information and Communication Technology (ICT) in construction, including improved efficiency in production processes, reporting, and decision-making among project participants, leading to increased output. Further advantages were highlighted also on this study based on the research conducted by Hassan and Hassan, (2011) such as the following: improvement in the quality of work, productivity improvement, better data management, information management, contract administration, enhances decision-making information, communication, collaboration, time saving through a 24-hour operation capability, cost reduction, high-quality documents, reduction of errors and paperwork, increases information quality, reduction of new work proportion, improved teamwork, technical skills development, staff selection, client satisfaction, response rate through quick replies to inquiries, increased market share through strategic intelligence and market leadership, and enhances growth and success. Furthermore, the study of Pourkeyvan & Mohammad [3] emphasized that effective management is necessary for all kinds of projects, regardless of the industry, complexity, scale, and type, and for all projects, managerial capabilities for planning, organizing, leading, and monitoring is important. Project managers also need to have the information systems that would aid in project planning, organizing, monitoring, controlling, reporting, and decision making towards a more organized management system to reach optimized management systems.

As highlighted in the study conducted by Hassanein & Nemr [7], poor documentation management and the prevalence of oral change orders or poor notification procedures in public contracts resulted to obstacles in claims management in the Egyptian industrial sector leading to lost change orders and rights due to improper documentation and lack of contract awareness among site teams. And since the construction industry is fragmented into structure, applicable also to site and documentation works, and project-based nature, this hinders joint development and investment in solutions in different aspects. The study of Katharina & Xia [1] discusses the internal barriers in a company that prevent effective digital transformation such as a lack of technical expertise and resulting skepticism that calls for the need to expand technical knowledge aligning it with the internal structures to support digitalization and drive industry-wide change. Factors such as lack of standardization, incompatible technologies, tendering structures favoring price over innovation, and

financial limitations continue to minimize the potential for innovation and digitalization. Organizational barriers between companies are also present that includes a lack of clear internal change, high initial investment, uncertainty of the return of investment for innovation, and the gap between the management teams and the operational team's digitalization strategies which can restrict progress, teamwork, and development. Meanwhile, the study of Jahanger et al. [5], suggested there was a limited amount of available information on how practitioners, such as project owners, are utilizing software systems within project management considering their influential role within the project management process. This gap needs to be addressed, particularly in the public sector, to encourage the use of the digital construction phase information management systems. Furthermore, the study of Kiu et al. [8] identified that there are limitations in current EDMS in the construction industry such as system maturity, high cost, slow technology adoption, and security concerns. Challenges like costs, block chain scalability, industry knowledge, culture, and hardware are also present and need to be addressed before block chain-based EDMS can be widely applied in the construction industry.

2.1 Theoretical Framework:

The area of project document management in the construction industry in the Philippines, specifically in region 3, is undergoing a digitization. Document software is engineered to make project documents more efficient, accurate, and accessible compared with the traditional documentation in place. The theoretical framework of this study highlights the variables, factors, and relationships which will then be examined to measure the familiarity and usage of documentation software among construction professionals in region 3 that is the focus of this study. The Technology Acceptance Model (TAM) will be adopted for this research. TAM is chosen as it explains perception of ease-of-use factors that have direct significant effects on actual usage and acceptance of technology in the construction industry. In today's world, people are increasingly using different types of information systems to help them perform their daily work. Recent studies have displayed a valuable role that documentation software can play in various industries. Nevertheless, it is important to consider how users respond to privately held information stored within documentation software. Although preservation management is relevant to address the scarcity of information technology solutions that engage with the preservation of digital data within documentation software, it is also important to consider that there are few existing solutions that address these concerns. According to Marikyan & Papagiannidis [9], TAM explains the acceptance of information systems by individuals. TAM postulates that the acceptance of technology is predicted by users' behavioral intentions. The primary objective of TAM is to illuminate the processes underpinning technology acceptance, thereby predicting behavior and providing a theoretical explanation for the successful implementation of technology. TAM helps in understanding how these factors affect the familiarity and usage of documentation software in the construction industry. According to this model, two main factors influence technology adoption as can be seen in Figure 1 – Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). The degree to which an individual believes that utilizing a specific system would improve their performance at work is referred to as perceived usefulness, while the degree to which people believe that using a system requires no effort is known as perceived ease of use. These two factors affect the Behavioral Intention to Use (BI) that refers to the individual's intention to use a system at some future point in time. The TAM theory will be used in this research to evaluate the impact of usefulness and on familiarity and use of documentation software among construction professionals in the targeted region to support smooth implementation and transition for digitization of project documentation management.

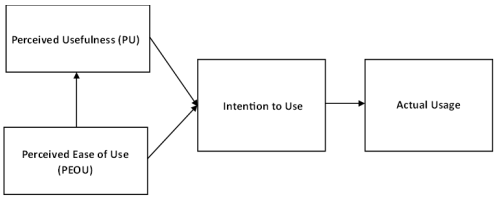

Figure 1. Technology Acceptance Model (TAM)

2.2 Conceptual Framework:

The conceptual framework of the study aims to measure awareness and the utilization of documentation software for construction project documentation in the construction industry specifically in region 3. A diagram of this framework shows the interactions between key variables such as awareness, usage, affecting variables, and efficiency as indicated in Figure 2.

Familiarity assesses the extent to which construction professionals understand and apprehend the documentation software. This encompasses the type of formal training received, awareness of the software, knowledge of its integration with other tools, and opportunities to the resources and communities. All of these can affect the awareness, skill, preparedness, and readiness to use the software in relation to their role and work in the industry. Then utilization measures the extent to which documentation software is actively used for project document administration. Key aspects include the frequency of use in daily activities, the purposes for which the software is used (such as collaboration, tracking changes, and generating reports), integration with other software applications, and backup practices and data sharing. These factors highlight how embedded the software is in routine project management tasks. The elements that affect the familiarity and utilization of the instrument variables are covered by the influencing factors. These include the availability and quality of training provided to the users, the functionalities and features, the level of user

support that is provided to the users, and the perceived benefits and challenges of using the software as identified by users. These issues can either ease or impede the use and effectiveness of documentation software and can further define the impact on efficiency affecting the project management and document control itself. Efficiency indicators include the timeliness of document processing, reduction in errors and rework, and the ability to meet project deadlines. These criteria demonstrate the rational value of using documentation software to enhance project outcomes.

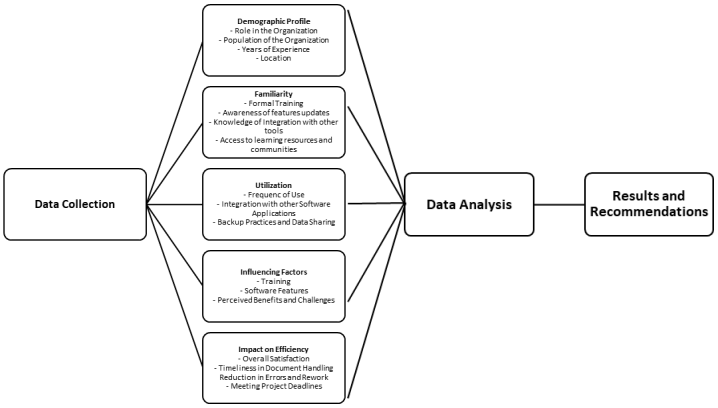

Figure 2. Paradigm of the Study

3. Methodology

A quantitative data collection survey in a descriptive cross-sectional design was utilized for this study to gather information on the level of awareness and usage of documentation software among construction professionals situated in region 3. This allows data collection at a particular point in time from a sample that represents the population that can provide a general view of present practices and opinions. The targeted population for this study included the firms involved in designing, constructing, supplying, regulatory activities, developing, and architecture as they play major roles in the construction industry and in accordance with the study conducted by Mitima [2]. Due to geographical distances between these parties, effective communication is critical for simplifying workloads and ensuring project performance. Therefore, the study focused on construction professionals including project managers, site engineers, and document controllers around region 3.

Given that the population is large, and it may not be feasible to survey all members in a short period, a representative sample was selected using stratified random sampling. The stratified random sampling addresses similar sectors of the population to ensure that the researchers got a representative sample.

To gain a deep understanding of respondents' familiarity, frequency of use, and receive benefits or challenges of documentation software, a structured questionnaire was developed whereas each item has a 5-point Likert Scale. A Likert scale allows respondents to express their opinions, attitudes, or feelings about a particular issue in a quantifiable manner Nemoto & Beglar [10]. The questionnaire was designed to focus on the psychological construct of familiarity and utilization of documentation software following a construct-centered approach Messick [11]. A pilot test was conducted within a selected group of respondents from the construction sector to ensure the clarity and relevance of the questions in line with the study being conducted. Feedback from the pilot test was further used to improve the survey instrument before the final distribution.

For broader respondents, the final questionnaire was distributed both electronically and in paper form. Electronic distribution was facilitated through an online survey platform (Google Form) while hardcopies were readily available during the data gathering process for those who prefer it in pen and paper format. To encourage participation, a brief background of information, the right to voluntary participation, and assurance that responses will be kept confidential was provided to the respondents upon taking the survey with regards to the importance of this study. Additionally, the researcher adheres to strict ethical principles, anonymity, and confidentiality of all responses ensuring the targeted participants that their rights will remain protected, and privacy will be maintained.

Quantitative data collected from the surveys afterwards was analyzed using appropriate statistical methods. Descriptive statistics summarize the data to establish a comprehensive understanding of the awareness and usage of documentation software by construction professionals in the targeted area. Additionally, this study will recognize the benefits and challenges associated that the respondents perceive from the use of documentation software and provide recommendations for better implementation and use of the documentation software within the construction industry through the analysis of the gathered data.

4. Results

The following presentation provides a comprehensive analysis of survey results gathered from fifty-five (55) construction professionals across region 3 in the Philippines exploring their experiences and perspectives with regards the familiarity and usage of documentation software in their daily operations. The survey results show a clear trend towards digitalization with 62% of respondent's project/organization having adopted such technology in line with the global trend of digitizing project management due to the need for better management, accuracy, and access to project documents. The following data below offers valuable insights into the current levels

of familiarity, frequency of utilization, preferences and satisfaction, as well as the benefits and challenges associated with documentation software offering a glimpse of the software's implication on project management efficiency. The Likert Scale Interpretation for the succeeding results were shown on Table 1 for easy comparison and interpretation. Table 2 and Figure 3 depict a detailed breakdown of the survey responses across different categories. For each statement within these categories, the table lists the average scores obtained from the survey participants and provides an interpretation based on the Likert Scale used. Meanwhile, Table 3 presents a summary of the survey response for each of the four categories with the range of average scores and general interpretation of the data collected. This also demonstrates the areas for improvement and suggests ways to enhance the adoption and effectiveness of documentation software within the construction industry. The tables below represent an overview of each category highlighting the collective perception of familiarity and utilization of document software from the survey respondents.

Table 1. Likert Scale Interpretation

Strongly Disagree	1.00 – 1.80
Disagree	1.81 – 2.60
Neutral	2.61 – 3.40
Agree	3.41 – 4.20
Strongly Agree	4.21 – 5.00

Table 2: Detailed Scores and Interpretations of Data Gathered

QUESTIONS	AVERAGE
General Familiarity	**3.71**
1. Familiar that documentation software was being used in the construction industry.	4.11
2. Familiar with various types of documentation software used in the industry.	3.75
3. Attended/Received formal training on documentation software utilization.	3.31
4. Aware of the latest features and updates on the documentation software being used by the company/project.	3.27
5. Knowledgeable on the integration of documentation software with other project management tools.	3.31
6. Knowledgeable about troubleshooting common issues with documentation software.	3.20
7. Familiar with best practices for document management using software.	3.42
8. Adequate access to resources (e.g., manuals, help desks) for documentation software learning.	3.51
9. There are trends or advancements in documentation software for construction.	3.85
10. Documentation software improves efficiency in various construction projects.	4.29
11. Documentation software is important for the success of construction projects.	4.36
12. Frequent usage of documentation software in daily work.	4.02
13. Adequate level of awareness regarding documentation software available for construction professionals.	3.85
Utilization of Documentation Software	**4.05**
1. Regular/Frequent usage of documentation software in daily work activities.	3.76
2. Documentation software is essential for managing project documents related to the workloads involved.	4.05
3. Documentation software is being used for collaboration with team members, client, and other involved personnel on project documents.	4.04
4. Documentation software is being used to track changes and updates related to project documents.	4.07
5. Documentation software is being used for generating reports and summaries related to project documents.	5.00
6. Documentation software is being used to store and manage large volumes of project documentation.	4.22
7. Documentation software is being used for quality control and assurance documentation.	4.15
8. Documentation software integrates well with other software applications used in the project.	4.07
9. Back up of the documents stored in documentation software is being regularly practice preventing data loss.	4.20
10. Documentation software allows easy transfer of documents with the external stakeholders.	3.95
11. Confident enough in using documentation software without assistance.	3.55
12. Overall reliance on documentation software.	3.64
13. Regular utilization of document software to review and view project documents and records.	3.95
Preferences and Satisfaction	**3.99**
1. Documentation software were being used with ease.	3.69
2. Overall satisfaction is given by the documentation software used in the project.	3.82
3. Usage of documentation software to other professionals in the construction industry is recommendable.	4.16
4. Documentation software significantly improved the efficiency of project document administration.	4.13
5. Documentation software has enhanced the overall project management experience with the organization/project.	4.16

6. Overall satisfaction with the level of support and training provided for documentation software.	4.04
7. The documentation software met the expectation of the project staffs in terms of functionality and performance.	3.91
8. Feedback regarding documentation software is taken into consideration within the project and/or organization for future improvements.	3.85
9. Documentation software has facilitated better communication and coordination among project team members.	3.93
10. The documentation software's reporting features meet the needs of the project documentation requirements.	3.91
11. Consideration of adopting new documentation software in the near future can be proposed.	4.05
12. Willingness to participate in a pilot program for new documentation software.	4.09
13. Recommendation of documentation software to other construction professionals.	4.13
Benefits and Challenges	**4.06**
1. Documentation software provides easy access to project documents from any location at all times.	4.15
2. Documentation software enhances collaboration.	4.18
3. Usage of documentation software has led to reduction of project document-related errors.	3.98
4. Documentation software helps in meeting project deadlines more effectively.	4.13
5. Documentation software is an effective project management tool.	4.16
6. Documentation software has improved the overall quality of project documentation.	4.25
7. Documentation software provides better security for sensitive project documents compared to traditional methods.	4.18
8. The cost of documentation software is justified by the benefits it provides.	4.00
9. Documentation software has a user-friendly interface that makes it easy to navigate and use.	3.96
10. Technical support for documentation software is readily available when necessary.	3.84
11. Integration of documentation software into the project makes the workflow seamless.	4.04
12. Challenges were faced while using documentation software for project administration.	3.89
13. Documentation software can be improved to better meet your needs in project document administration	4.07

Additional comments/suggestions/insights regarding documentation software within Construction Industry:

- Make it more intuitive to use, like the use of MS software for it to be user friendly for the beginner user.
- In the construction industry, some documentation software has exceptional features that need support of seminars or trainings, to utilize the full functionality of this; also, suggest utilization of documentation software in a proper and systematic way in the construction project is crucial and vital for better management for volumes of documents.
- Document software should be sold in a cheaper price so everyone can access to it.
- Companies must select their documentation software considering their needs and the features of the documentation software. Different software has their own pros and cons and it's effectively depending on if the features align with the needs of the users.
- I have zero knowledge about documentation software. Therefore, I cannot say it's essential or will benefit in Construction Industry.
- It's very helpful for me to identify anything.

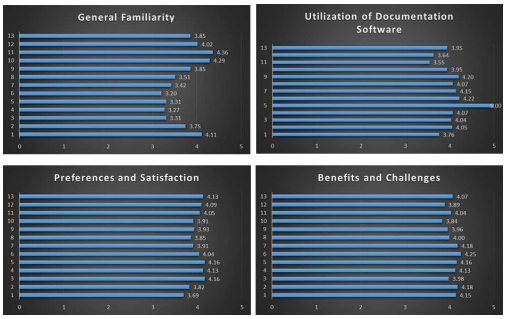

Figure 3. Detailed Scores and Interpretations of Data Gathered

Table 3. Summary of Categories with Range of Scores and Overall Interpretation

Category	Score Range	Overall Interpretation
General Familiarity	3.20 – 4.36	Neutral to Strongly Agree
Utilization of Documentation Software	3.55 – 5.00	Agree to Strongly Agree
Preferences and Satisfaction	3.69 – 4.16	Agree
Benefits and Challenges	3.84 – 4.25	Agree to Strongly Agree

5. Discussion

A thorough examination of the research exposes the demographic background of respondents to identify and understand the diverse background of the respondents involved. The Interpretation of Results is also laid herein to extract the meaning and implications which provides insight into the aspects of the research. This research also presents strategic plans to further enhance the usage and effect of documentation software across the construction industry.

5.1 Demographic Profile of the Respondents

This section discusses the demographic characteristics of the 55 respondents who took part in the research focusing on their professional roles within the construction industry and scale of the organizations they represent. To add meaningful insights and interpretations regarding knowing and using documents software within region 3, it is important to analyze demographics of the participants gathered from the survey conducted.

Most respondents, as can be seen in Figure 4, 35 out of 55 (64%) are Engineers, illustrating a huge representation of technical and project management positions in this survey. Eight respondents (15%) from Document Controllers indicate people who often deal with document handling programs. Ten respondents (18%) are representatives of Environmental Health and Safety (EHS), showing how essential safety and compliance are in the sector. A limited group made up of two respondents (4%) are Laboratory Technicians standing for technical works as well as testing jobs involved in the construction industry. Based on organizational size as reflected in Figure 5, it is predominantly from very large companies comprising 38 respondents (69%) indicating that the survey captured insights from significant industry players. While no respondents were from small companies with 1-10 employees, but 7 medium-size company representatives (13%) are included in this research who employ between 11-50 individuals. Large companies, defined as those with 51-200 employees with 10 respondents (18%). Regarding the use of documentation software, 34 respondents equivalent to 62% reported using digital documentation tools in their companies indicating a trend towards embracing contemporary project management techniques. However, 21 individuals (38%) stated that they were still relying on conventional methods for their documentation work suggesting that a considerable portion of the industry has yet to fully shift into digital systems. Figure 6 below shows the comparison for the companies that are now utilizing the document software and those that are still into traditional documentation.

This demographic profile provides an outline to further understand the survey outcomes more comprehensively because it helps to comprehend the different professional backgrounds as well as organizational contexts that inform knowledge and usage of documentation software within region 3's construction industry.

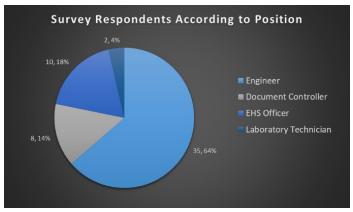

Figure 4. Position/Role Distribution

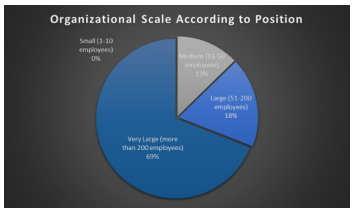

Figure 5: Organizational Scale

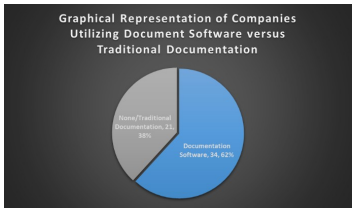

Figure 6: Utilization of Document Software versus Traditional Documentation

5.2 Interpretation of Results

The interpretation of results in this study provides a critical analysis of the data collected on the familiarity and utilization of documentation software within the construction industry of region 3. By examining the responses from various professionals, the analysis offers insights into the current state of digital documentation practices, identifying key trends, challenges, and opportunities. This section aims to contextualize the findings, shedding light on how documentation software is being used across different roles and organizational sizes, and what this means for the future of project document administration in the region.

a. General Familiarity

The survey results reveal that professionals in the construction industry of region 3 have a general understanding of the documentation software, with moderate to strong familiarity, but need further study. The highest score of 4.11 indicates that most respondents acknowledge that software designed for documentation is used in the current working environment suggesting that the documentation software was broadly accepted in the construction field. However, the familiarity with more specific aspects, like formal training (3.31) or awareness of new features in the software (3.27) is less strong. These figures suggest that while the existence and general utility of the software is acknowledged, deeper understanding particularly on the updates and technical capabilities is less common. This distinction could point out generally that while professionals are using documentation software, it is not being leveraged into its full potential thus offering rooms for opportunities to enhance project management efficiency could be potentially missed.

b. Utilization of Documentation Software

The utilization of documentation software in the daily activities of construction professionals is quite high with an average of 4.05 which falls into the "Agree to Strongly Agree" range. This suggests that the document software is well-integrated in the workflow

of construction professionals and is essential for their day-to-day operations. The perfect score for generating reports and summaries (5.00) suggests also that the documentation software is important in producing accurate and timely project reports that is of high importance in construction wherein documentation is one of the key aspects included into the project management and compliance. The combination of documentation software with other project management tools and regular backup practices also rates highly (4.07 and 4.20) suggesting that these tools are well integrated into project workflows. The lower score for confidence in using the software without assistance (3.55) is significant and suggests that there may be reliance on outside assistance and may indicate shortfalls in user training or the intuitiveness of the software. This reliance on assistance may hinder productivity especially in time-sensitive situations. The reliance on documentation software for important functions by the industry stresses the importance that all users have the ability and confidence to use documentation software which could be easily facilitated through further comprehensive training programs.

c. Preferences and Satisfaction

The average rating in the preference and satisfaction section is 3.99 indicating that the users favorably viewed the documentation system but there are opportunities to make it better. The ratings tell us that the users find the documentation software effective with particularly high satisfaction associated with both agreeing to recommend the software to other professionals (4.13) and the software's impact on project management (4.16). These indicate that users find the documentation software valuable beyond its functionality contributing to an improved overall experience in project management. However, the software might not be as user-friendly as it could be due to its average of 3.69. This average if combined with the feedback considerations with an average of 3.85 suggests that the software might benefit from a more intuitive interface and better mechanisms for incorporating user feedback. This may further improve the user satisfaction and increase adoption of the software.

d. Benefits and Challenges

The respondents rated the advantages of documentation software highly with an average of 4.06 indicating that the software positively impacts project management within the "Agree to Strongly Agree" range. The high scores in areas like quality improvement (4.25) and improved collaboration (4.18) reveals that the software might generally help projects produce better outcomes. These benefits are crucial in an industry wherein precise documentation and coordination are essential for the project success. Notwithstanding these advantages, challenges were identified. Some of the lowest scores included a request for better technical support (3.84) and for a more user-friendly way to interact with the software (3.96). It is essential that these are observed in line with the benefits of the documentation software as these could possibly prevent the full potential and leverage the work of the project.

The additional information gathered from survey responses provides valuable insight into concepts, challenges, and perspectives in terms of the documentation software in the construction industry. These responses provide specific areas where software developers, companies, and industry personnel can target to enhance the effectiveness and usability of documentation software.

1. *Intuitiveness and User-Friendliness*. This pertains to the need to make the documentation software more natural like Microsoft (MS) software emphasizing the importance of user-friendly interface. This reflects a common concern that while documentation software is powerful, its complexity may become a challenge to new users. The comparison to Microsoft (MS) software suggests that the current documentation software may benefit from being more natural and easier to navigate leading to the reduction of learning curve for new users. Creating a simpler user experience may facilitate broader adoption and more effective utilization.
2. *Importance of Training and Systematic Utilization*. It is important to provide adequate seminars and training to use the distinctive features of the documentation software. It is also evident that without proper training and systematic utilization, the full potential of the documentation software will not be achieved. This further points to a gap between the software's capabilities and the users' ability to leverage it effectively.
3. *Affordability and Accessibility*. The suggestion to make the documentation software more affordable is also important particularly in industries wherein costs is one of the significant considerations. An affordable documentation software provides options to various users on a budget especially for the smaller companies or independent contractors. Lowering the cost or offering tiered pricing models will open the market and encourage a wider range of companies to use documentation software. Adding more solutions to documentation software could include offering a range of basic software packages with the ability to upgrade to more functions as a business grows could also be an option.
4. *Customization and Alignment with Needs*. Companies or projects shall select documentation software based on the specific needs and available software features necessitates customization and alignment to suit the specific needs/requirements. This means that each documentation software has individual strengths and weaknesses and often 'one-way fits all' is not the most productive. This can assist reduce the risk of misuse and errors while ensuring that the chosen documentation software adds real value to the specific project management program.
5. *Knowledge Gaps and Awareness*. The acknowledgement of having a "zero knowledge" on documentation software is an important insight that emphasizes the necessity of raising awareness and utilizing it more in the construction industry. This also indicates that there is a significant proportion of the workforce that remains are not familiar with or trained in the various forms of document software available in this modern technological development. For construction professionals to fully utilize

these tools, it is necessary to raise awareness on the importance and provide an entry-level of training such as introductory workshops, tutorials, and hands-on sessions designed to familiarize all users with the basics of documentation software to close the knowledge gap.

6. *Utility and Effectiveness*. When the documentation software is used effectively, it becomes a valuable tool in the construction industry. The straightforward feedback of "very helpful" reflects the general sentiment in the construction industry that despite the challenges and room for improvement, documentation software is important to project management and document handling.

The strategic implications derived from the interpretation of results in this study highlight the wider impact of documentation software utilization on the construction industry's operational efficiency and project management practices across region 3. This section delves deeper into the adoption and familiarity with the documentation software influenced by organizational performance, decision-making processes, and overall project outcomes. Through this, industry stakeholders can better align their strategies/techniques with emerging trends to remain competitive and effectively manage complex operations through digital transformation.

1. *Improved Training Programs*: More training programs covering the advanced features, troubleshooting, and integration with other project management tools in conjunction with fundamental knowledge could potentially help increase the users' familiarity and confidence with a variety of documentation software used in the construction industry.
2. *User Experience Improvements*: Development of the software's interface and functionality into more intuitive and user-friendly may also reduce the need for additional assistance while ensuring enhancement of the user experience and raising satisfaction levels.
3. *Feedback Incorporation*: Gathering user feedback and taking appropriate measures would also be an advantage in improving user satisfaction and potentially boost the documentation software's effectiveness.
4. *Tailored Software Selection*: Careful and appropriate selection of documentation software aligning with the project's specific requirements is valuable. This may also entail a more customized approach wherein various types of documentation software are used.

6. Conclusion

The survey results generally show that the attitude towards documentation software is positive among construction professionals across region 3 due to sufficient understanding of its benefits and heavy reliance on its features. This indicates that professionals clearly apprehend how this tools/technology can enhance the work processes of project management. However, there are still some challenges associated that need to be addressed such as teaching the users how to use the software, making the software easy to use, and continuous customer support. Addressing these issues could not only boost the effectiveness of the document software but can also increase their adoption within the construction industry.

Furthermore, the additional comments from the respondents also gave useful information about what they need and expect from document software. The need for more customization, easy-to-use software, greater accessibility at affordable prices, and targeted training programs to unlock the full potential of various documentation software was emphasized. In addition, it is important to select document software that suits the specific needs of the project. By focusing on these areas, the construction industry can see huge improvements in the usage and how well the document software works, resulting in better project results and effective project documents management.

This research shows that about 62% of the respondents in the construction industry across region 3 are now using digital tools for record and document keeping highlighting a significant trend towards digitalization. Most of the people surveyed were engineers and document controllers that have a critical role in the project execution indicating the importance of good record-keeping for managing different projects. However, the study also reveals that a considerable portion of the industry still relies on traditional documentation methods. This means that even though digital tools are being used, effort shall be exerted in terms of broader adoption and training.

In conclusion, while the construction industry in region 3 is moving towards embracing digital solutions for documentation, it is not fully developed. There is a great opportunity to enhance and promote the value of documentation software and provide targeted support to organizations to quickly adopt these. By doing so, various projects and/or companies can increase the efficiency and effectiveness of project documentation leading to better results for all parties/stakeholders involved.

6.1 Recommendations:

To gain a better understanding of the familiarity and utilization of documentation software in the construction industry of region 3, the recommendations below are laid to develop a more comprehensive understanding of the knowledge and documentation software used. This approach will facilitate creating specific plans to increase the usage of documentation software and make project management more effective and efficient in various construction settings across region 3.

1. *Expansion of the range of respondents:* Expanding the number and diversity of respondents is important to obtain a broad representative understanding of information software use. This ensures that the sample is representative of the various locations, locations and geographies within the construction industry. Furthermore, expanding the number of respondents would also be useful and beneficial for the subsequent studies.

2. *Targeted Outreach Strategy:* Implement a targeted outreach strategy to increase respondent diversity and reach. This can be conducted through different communication channels such as social networks, conferences, electronic mailings, and strategic collaborations within industry organizations and influencers that can help reach a broader number of respondents encouraging different perspectives to strengthen the study.
3. *Adopting a Mixed-Method Approach:* A combination of exploratory interviews, surveys, and quantitative analysis will help facilitate an in-depth analysis of the data. This comprehensive approach will help identify the key trends, challenges, and opportunities related to the successful adoption and usage of document software in the construction industry.
    a. *Exploratory Interviews:* Incorporate exploratory interviews as part of the research methodology. Further questions during the interview proper can lead to a better understanding of familiarity and the usage of the documentation software through the respondent's experiences and perspectives. This approach could qualitatively assess and improve the understanding of the usage of practices, as well as the familiarization of documentation software which may not be accessible through surveys. Semi-structured or structured interviews can ensure consistency and allow flexibility in data collection.
    b. *Quantitative Surveys:* In addition to qualitative interviews, a quantitative survey and analysis can be conducted with larger and more diverse respondents. This method provides detailed statistical data on the use of experience and familiarity of documentation software in the construction industry setting that provides a comprehensive analysis and comparison between different groups of respondents.
4. *Enhance Data Collection and Analysis:* By combining the qualitative and quantitative data collection methods, the study topic can be understood in a more accurate and meaningful manner. This mixed-method approach allows the collection of detailed information and allows broader statistical analysis making it more possible to formulate effective measures and as well as policies on how documentation software is used in a variety of projects and companies.

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