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An Analytical Study on Digital Documentation and Its Effects on Productivity and Faculty Perception in Higher Education

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Abstract

This study examines the transition from print to digital documentation at BITS Pilani, Manipal University Jaipur, and Banasthali Vidyapith in Rajasthan. The research aims to determine how faculty members view the digitization of work processes in terms of ease and efficacy, and how this transformation affects faculty productivity in their academic roles. The mixed method study collects faculty experiences with digital documentation using quantitative questionnaires and qualitative insights. The poll compares digital tools' ease of use and efficacy to older ones and investigates how digitization affects productivity. The findings aim to provide a complete understanding of the benefits and drawbacks of digital transformation across academic institutions to help other universities with sustainability initiatives.

Keywords- Higher Education, Digital Documentation, Paperless Transition, Indian Universities

Introduction

Digital technology in higher education, especially for document preparation, have been advantageous. Digital documentation simplifies administrative processes, improves accessibility, and boosts efficiency for institutions. Digital tools make creating, distributing, and storing academic content easier, enabling real-time professor and student cooperation. This change improves academic record management and minimizes paper use's environmental impact. Digital documentation systems frequently provide search functionality and automated backup, which improve data management and security. Digital solutions in document production are a major step toward a more sustainable and efficient higher education system.

In higher education, there are many tasks that require printing out documents and preparing files. During NAAC and NIRF visits, the experts primarily focus on hard copies. However, if

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all these tasks could be managed in soft versions, it would greatly ease the workload of staff and faculty members. Often, documents are printed multiple times due to formatting issues, leading to not only a waste of paper but also a loss of electricity and time. Digitalization is the integration of digital technologies into everyday life. Such integration is possible by the digitization of information. Digitization is defined as the process of converting physically collected information (e.g., sensors, written information, etc.) and knowledge into a computer-readable language. [1] The capacity of the digitization of higher education to bring about significant changes in the lives of internet users is the primary reason for the widespread attention that is being paid to this phenomenon. The development and dissemination of knowledge, the interaction between teachers and students, and the formation of the learning process are all examples of the many aspects of education that have been altered because of this movement. [2] The proliferation of technology has resulted in an increase in the interconnectedness and adaptability of education. This has made it possible for students to acquire knowledge while having greater flexibility in terms of both time and money. [3] Integration of digital technologies in education has led to more personalized learning experiences, expanding access to education and fostering greater student engagement. [4] [5] In this context, the importance of digitization is further underscored by national initiatives such as India's Digital India policy, launched by Prime Minister Narendra Modi in July 2015. This policy aims to enhance digital literacy and ensure widespread internet connectivity, thereby supporting India's integration into the rapidly expanding global economy. Digitalization, as prioritized by this policy, focuses on leveraging digital technology, software, internet, and ICT-enabled technologies to improve work processes. In higher education, digitization has revolutionized knowledge delivery, making it more efficient and accessible. Digital transformation in India is an ongoing journey with significant potential to revolutionize governance, service delivery, and citizen engagement. By leveraging technology and embracing digitalization, India can drive economic growth, enhance access to information and services, and create a more inclusive and empowered society. [6] India has made remarkable progress in technology and science, positioning itself as one of the leading economies in the developing world. [7] Despite these benefits, many universities still do not fully embrace digital documentation. They prefer to handle everything from timetables to course files and result processing in hard copy. Some universities are working towards a paperless concept but have not yet fully achieved it. Even processes such as conducting exams and question moderation still rely on hard copies. [8]

Review Literature

Digitisation is increasingly recognised for its potential to reduce environmental impact. Research by Naylor et al. (2019) [9] highlights that digital documentation can significantly lower paper consumption, which in turn reduces deforestation and waste. The study notes that while the production of electronic devices and data centres does contribute to carbon emissions, the overall net benefit of reduced paper use and lower resource consumption often outweighs these costs.

Several studies emphasize the benefits of digital documentation in educational settings. According to a study by Miao et al. (2021) [10] digital documents facilitate more efficient information management, enhance accessibility, and support the development of a paperless culture within academic institutions. The authors argue that digitization leads to improved

operational efficiency, easier document retrieval, and streamlined communication among faculty and students.

Despite the advantages, the transition to digital documentation presents several challenges. Bowers et al. (2020) [11] identify key barriers such as resistance to change, initial costs of technology implementation, and the need for training. These challenges can impact the overall effectiveness of the transition and necessitate careful planning and support to ensure successful implementation.

Several institutions have undertaken similar transitions with notable success. For example, a study by Green et al. (2018) [12] provides an analysis of a paperless initiative at a large university in the United States, highlighting strategies that led to successful adoption of digital documentation. Key factors included strong administrative support, comprehensive training programs, and clear communication of benefits to stakeholders.
National policies also play a crucial role in promoting digitalization. The Digital India initiative, as mentioned in the introduction, aims to enhance digital infrastructure and literacy. Studies by Sharma et al. (2020) suggest that such policies provide a supportive framework for digitization efforts in educational institutions by encouraging investment in technology and fostering a culture of innovation.

Objectives
1- To examine how faculty members perceive the digitization of work processes in terms of convenience and effectiveness.
2- To evaluate the impact of digitization on faculty members' productivity in their academic responsibilities.

3- Research Methodology
This study utilizes a mixed approach to evaluate the environmental sustainability initiatives related to the transition from printed to digital documentation at three universities in Rajasthan—BITS Pilani, Manipal University Jaipur, and Banasthali Vidyapith. These three universities were selected because all of them received NIRF rankings from Rajasthan in 2024.A structured questionnaire is designed to assess faculty perceptions regarding the transition to digital documentation. The questionnaire includes 11 questions that address various aspects such as convenience, effectiveness, and impact on productivity. Questions are framed to capture both the frequency of digital document usage and faculty members' experiences with digital tools compared to traditional methods.
To finalize the sample size for this study, Cochran's sample size formula has been used. The calculated sample size of approximately 331 provides a representative subset of the total population of 2476 faculty members across BITS Pilani 979, Manipal University Jaipur887, and Banasthali Vidyapith 610, ensuring that the result of the study is significant and reliable. To assess faculty members' perceptions of the digitization of work processes in terms of convenience and effectiveness, a questionnaire comprising 12 questions was distributed among selected sample size.

Parameter	Value
Total Population (N)	2476
Confidence Level (Z-value)	1.96
Margin of Error (E)	0.05
Estimated Proportion (p)	0.5
Initial Sample Size (n_0)	(1.962×0.5×(1−0.5))0.052\frac{(1.96^2 \times 0.5 \times (1 - 0.5))}{0.05^2}0.052(1.962×0.5×(1−0.5))
	3.8416×0.250.0025=384.16\frac{3.8416 \times 0.25}{0.0025} = 384.160.00253.8416×0.25=384.16
Adjusted Sample Size (n)	n01+n0−1N\frac{n_0}{1 + \frac{n_0 - 1}{N}}1+Nn0−1n0
	384.161+384.16−12412\frac{384.16}{1 + \frac{384.16 - 1}{2412}}1+2412384.16−1384.16
	384.161+0.159=384.161.159≈331.31\frac{384.16}{1 + 0.159} = \frac{384.16}{1.159} \approx 331.311+0.159384.16=1.159384.16≈331.31
Final Sample Size	Approximately 331

Table-1- Cochran's sample size formula Table

Total Faculty Population	BITS Pilani: 979 faculty members Manipal University Jaipur: 887 faculty members Banasthali Vidyapith: 610 faculty members **Total Population:** 2,476 faculty members (as per NIRF Report)
Calculated Sample Size	331 (based on Cochran's formula)
Sampling Technique	Simple Random Sampling
Sampling Framework	- Compile a comprehensive list of all faculty members across the three universities
Sampling Procedure	Used random sampling tool to select 331 faculty members from the compiled list.
Proportional Representation	Ensure sample proportions reflect the total population distribution: larger sample from universities with higher faculty counts.
Questionnaire Distribution	Distribute a 11-question survey electronically to the selected 331 faculty members

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Response Monitoring	Track responses and follow up with non-respondents to maintain representativeness of the sample.

Table-2- Sampling Technique Steps

Analysis

The details for email ID, name, and university name were taken from question numbers 1 to 3.

Q4- How frequently do you use digital documents compared to printed documents in your daily work?

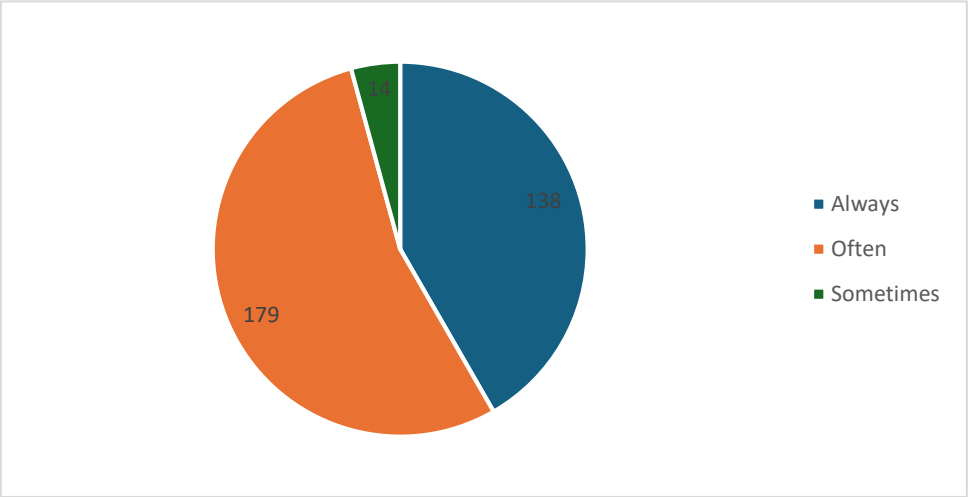

Figure 1

The data indicates that a significant proportion of participants regularly participate in the activity under quantification, with 179 respondents reporting 'Often' and 138 respondents reporting 'Always.' Merely a minute proportion, namely 14 out of 331, indicated occasional participation, therefore underscoring a prevailing uniformity in the respondents' conduct.

Q5- How convenient do you find digital documentation compared to printed documents?

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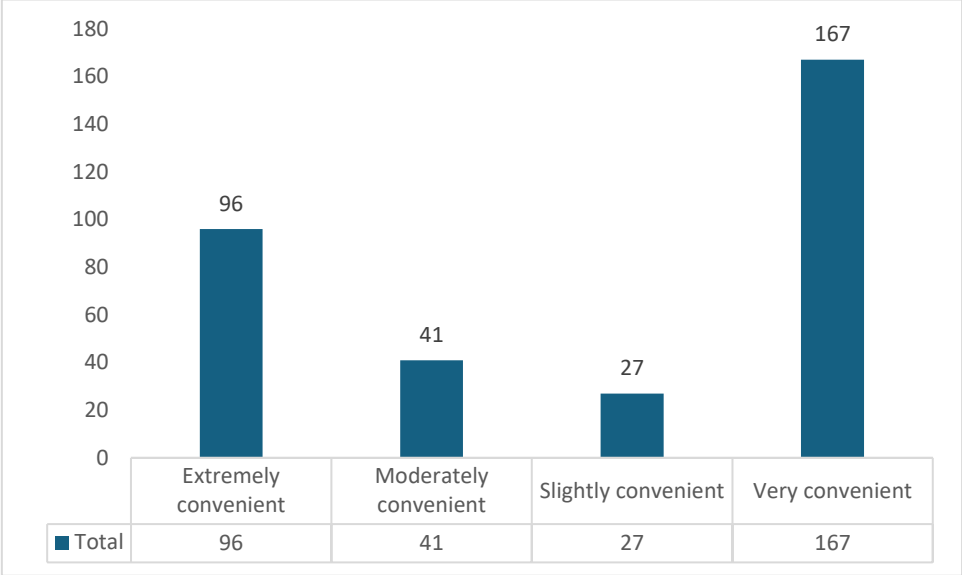

Figure 2

Over half of the participants expressed a high level of convenience towards the activity, with 167 respondents rating it as Very convenient and 96 as Extremely convenient. Less than half of the respondents regarded it as Moderately convenient (41) or slightly convenient (27), indicating a generally positive view of convenience.

Q6- In your opinion, how has the transition to digital documentation impacted your work efficiency?

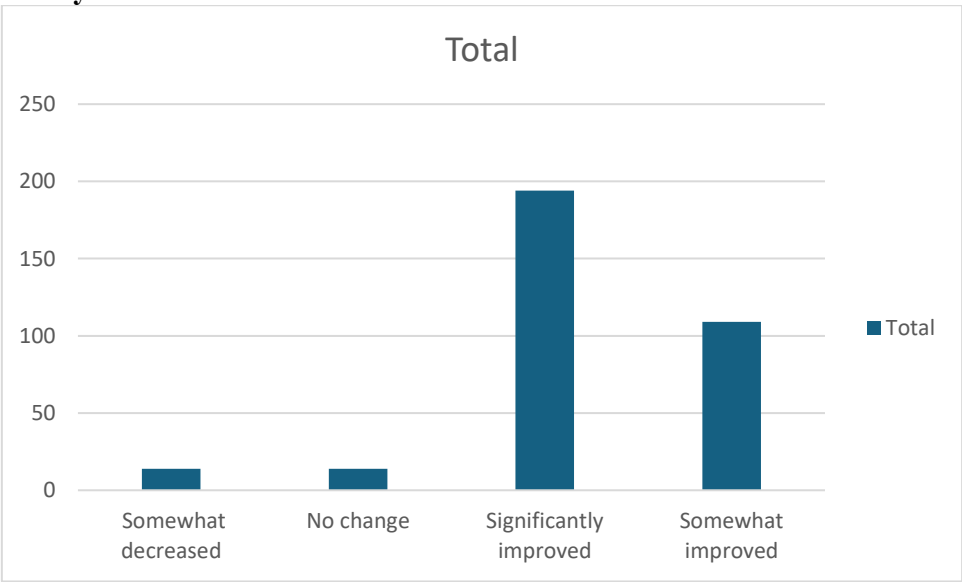

Figure 3

Many participants indicated a favourable shift, with 194 reporting a substantial improvement and 109 stating a moderate improvement. Only a minority of individuals reported no change (14) or a slight decline (14), indicating an overall enhancement in the assessed region**.**

Q7- Have you experienced any challenges with digital documentation?

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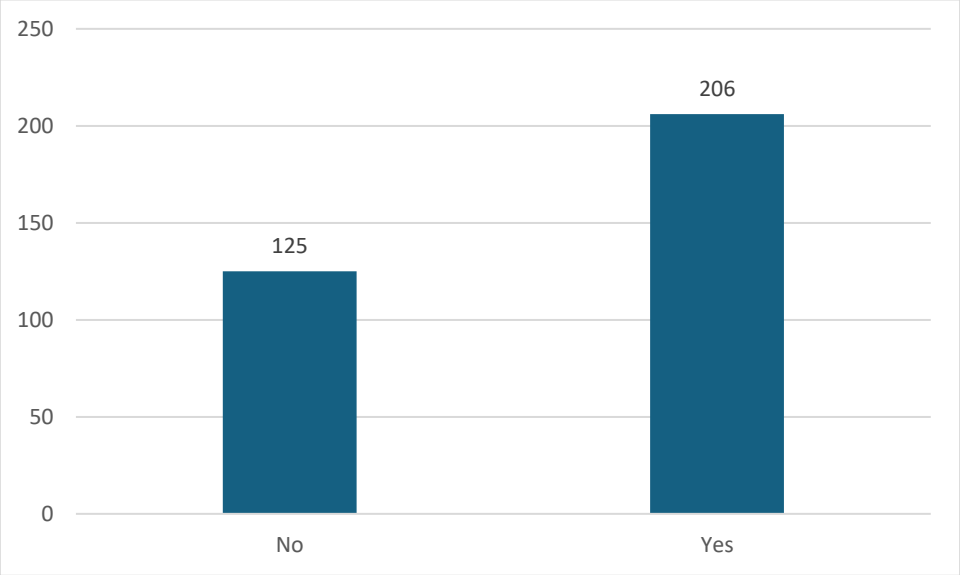

Figure 4

Many respondents, totalling 206, answered Yes, while 125 answered No. This indicates that more respondents had a positive response to the question posed, suggesting a consensus or agreement.

Q8- What types of support or resources do you believe are necessary to facilitate the transition to digital documentation?

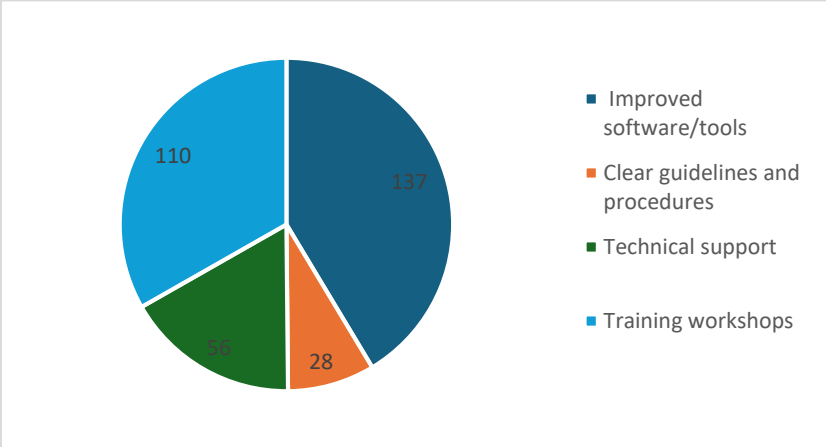

Figure 5

The most cited need for facilitating the transition to digital documentation is improved software or tools, mentioned by 137 respondents. Training workshops and technical support were also important, with 110 and 56 mentions respectively, while 28 respondents highlighted the need for clear guidelines and procedures.

Q9- How has the digitization of documentation affected your daily academic and administrative activities?

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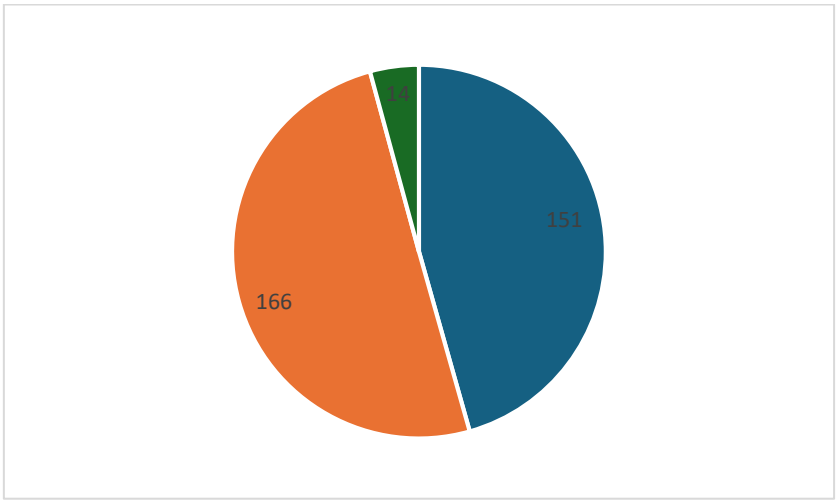

Figure 6

The digitization of documentation has had a positive impact on most respondents' daily academic and administrative activities, with 166 stating it has greatly improved and 151 noting it has somewhat improved. Only a small number, 14 respondents, reported no effect, indicating widespread benefits from the transition to digital documentation.

Q10- How has the transition to digital tools and platforms affected your overall productivity in managing academic tasks such as research, teaching, and administrative duties?

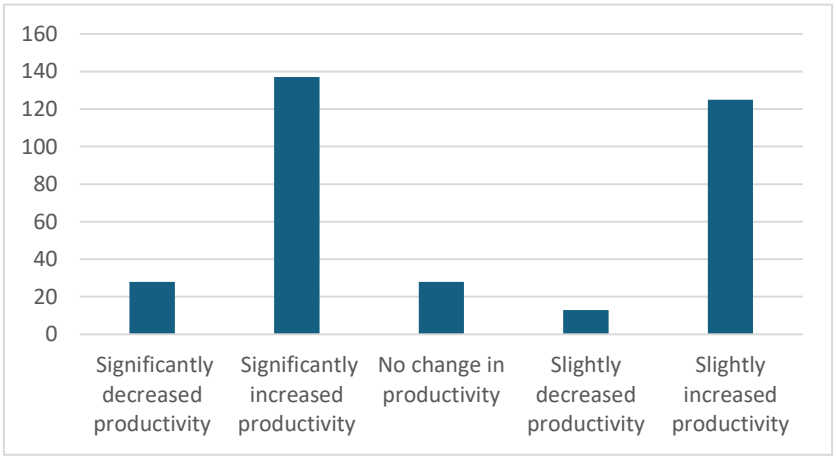

Figure 7

The data suggests that productivity has been positively influenced by digitization, with 137 respondents reporting a significant increase in productivity and 125 noting a minor increase. Nevertheless, a small number of respondents reported a decrease in productivity, with 28 indicating a significant decrease and 13 reporting a minor decrease. This suggests that productivity may have been affected in a mixed manner for some individuals.

Q11-What challenges or benefits have you experienced because of digitalization in terms of time management and work-life balance within your academic responsibilities?

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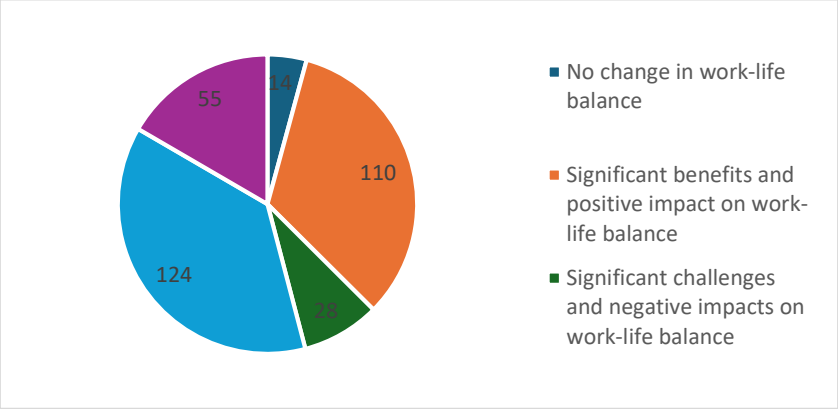

Figure 8

Most participants indicate that digital documentation has made a beneficial contribution to work-life balance, with 124 reporting minor advantages and 110 highlighting substantial benefits. However, a considerable proportion also encounters difficulties, with 55 individuals experiencing minor adverse effects and 28 encountering substantial difficulties.

Findings and Conclusions

Findings

The digitization of work procedures is frequently assessed by faculty members as being highly convenient and effective. Fifty percent of the participants assessed digital documents as either 'Very convenient' or 'Extremely convenient,' and a significant number indicated significant enhancements in job productivity because of digital technologies. Most individuals regularly use digital documents, showing little opposition to the change, which suggests a favourable response to the transition towards digital operational processes.

The adoption of digital documentation has had a notable and beneficial effect on the productivity of many faculty members. A considerable percentage of respondents indicated a rise in productivity, with 137 reporting a big increase and 125 perceiving a slight improvement. Notwithstanding certain cases of reduced productivity, the general pattern indicates that digitalization leads to improved efficiency in handling academic assignments.

In conclusion:

Generally, faculty members view the digitization of work procedures favourably, as they consider digital documentation to be both convenient and efficient. This transition has resulted in significant strides in productivity, augmenting their capacity to effectively handle academic obligations. While obstacles persist, they are surpassed by the advantages, emphasizing the effective incorporation of digital technologies into academic processes and emphasizing the need for ongoing support and resources to tackle remaining obstacles.

Implications for further research

Digitization's long-term implications on faculty productivity and engagement could be studied. Comparative academic discipline and institution research would assist discover if distinct subjects or contexts face unique obstacles or benefits. Qualitative investigations, including as interviews and focus groups, may illuminate faculty digital tool experiences. Testing digital

adoption training and support programs and their effects on student results may also be useful. Finally, research might establish and evaluate policies or best practices to maximize digitization's benefits while addressing its drawbacks, providing meaningful advice for institutions' digital transformation efforts. Universities across Rajasthan and other regions could be included in future studies to provide a broader perspective on digital transformation efforts.

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