How Information Technologies Help in the Educational Process of Higher Educational Institutions

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Abstract

Information technology (IT) inclusion into service delivery is increasingly viewed as a unique approach to assist the modernization of institutions around the globe. Furthermore, due to significant concomitant expenditures in IT, certain organizations in underdeveloped nations, like Rome, have found that IT does not bring critical output to university services. As a result, university managers seem to have a lot of concerns about IT-organizational integration. The tactical, sociocultural, and technical aspects of this integration are considered. Numerous precursors (synchronization techniques) for achieving an adequate suit among IT and institutions have been proposed in the literature for successful IT-institutional synchronization. Furthermore, a number of researches on IT alignment concentrated primarily on normal commercial enterprises, and there is still a dearth of comparable study that concentrates on higher education institutions. In order to accomplish its dual objectives, this study first sought to investigate the nature of IT inclusion into universities before going on to suggest a contextual approach for IT-institutional synchronization in the setting of universities. After assessing the current situation and obstacles associated with IT inclusion into education, training, investigation, and university administration, an IT-Institutional Alignment Model (ITIAM) was also offered as the study's key output. Thus, by implementing the idea of IT alignment inside the context of universities and by articulating the contextual synchronization methods that have been experimentally evaluated and are described.

1. Introduction

Organizations today strongly depend on IT to facilitate service delivery at all levels and to boost organizational efficiency. As a result, massive expenditures in IT are intended to generate economic value, yet institutions don't always get the accompanying benefits (Bowen, et al, 2007). The education industry is also showing signs of this trend. Information and communication technologies (ICTs) seem to play a significant impact in upgrading education, training, investigation, and administrative services at institutions around the globe. Technology improvements have had a massive effect on higher education systems during the past few years. (Bates, 2000). However, in certain growing locations, academic establishments have been unable to use IT expenditures to their benefit, and there has been no advancement in university procedures (Buabeng-Andoh, 2012). A frequent issue with this breakdown is that the newly procured IT systems are not in line with an institution's functions. As a consequence, a discrepancy among IT and institutional preferences causes a struggle to incorporate IT into service delivery (Luftman et al, 2012). As a result, given that the method of integrating technology encompasses a variety of aspects, including institutional structure, policy, human resources, and IT, it is possible to study the issues associated with IT-organisational alignment from both technical and non-technical viewpoints.

Due to significant IT expenditures, academics and industry professionals assert that there is still a mismatch among modern advancements and institutional services, especially in emerging economies (Kashorda & Waema, 2011). In HEIs in emerging economies, this issue frequently occurs. The adoption of ICT within HEIs may in certain circumstances be governed by no strategic approach or explicit guidelines, making it even more difficult to assess if a given technology has improved upon the available university services. This issue stands out in especially in some of Universities and HEIs.

The research often defines IT-business integration as the degree of synchronization between IT approaches and IT architecture, and also between business plans and organizational design (El Mekawy et al, 2015). When institutional objectives and actions match up with the IT systems put in place within the institution, this synchronization is successful. This issue no longer just pertains to the organisational leadership due to the significance of IT-business alignment. Consequently, institutional senior managers' recent worries centre on how to build, enhance, and perpetuate this integration throughout all divisions.

Universities are responsible for the planning, procurement, deployment, and administration of IT programs, much like any other structure of management, to guarantee their full implementation and beneficial effect on the institution's functioning. Technology and business alignment are issues for academic institutions and also ordinary business enterprises, as stated by (Brown and Motjolopane, 2005). Therefore, it is believed that integrating IT with educational activities is crucial for improving performance of an organisation and also realising the full potential of IT expenditures. According to Wang et al. (2015), the sophistication of some university institutions' incorporation of IT systems keeps rising, which has a negative impact on the acceptance and application of new technologies. Therefore, it is necessary to establish strategies, models, and methodologies to direct professionals in developing and evaluating the synchronization of technological and academic services. A collection of practises that can be comprehended from both a social and

technological standpoint help to accomplish this synchronization.

1.1 Research Problem

The incorporation of technology in higher education has been hampered by issues with inadequate ICT abilities, insufficient Internet connectivity, and poor ICT architecture, especially in Rome. Numerous approaches, methodologies, and strategies have been established by scholars and researchers with the goal of evaluating and directing the deployment of technology within HEIs. These artefacts, nevertheless, are unclear, incomplete, and lack concentration when it comes to the procedures that ought to be used to develop and measure correspondences between academic services and IT. Because of this, artefacts pertaining to the inclusion of IT into academic institutions do not explicitly emphasize the idea of IT-business congruence. In addition, many of the approaches and strategies already in use in the research ought to be modified for particular settings, like the higher education market in Rome.

1.2 Research Aim

This study has two goals in mind. In the beginning, it aims to comprehend how and how much IT is incorporated into academic procedures. The project's second goal is to create a model of contextual IT-institutional alignment that includes practical methods for enhancing organizational efficiency in HEIs through efficient acceptance and application of technology.

1.3 Research Objectives

By focusing on the next three study goals, the primary goal of this study was accomplished.

- To comprehend how and how much ICT is incorporated into management, training, and education processes.
- To create and refine a contextual IT-institutional integration approach with applicable best practises for Rome's higher education.
- To assess the effectiveness of higher education institutions in Rome using a contextual IT-institutional alignment approach.

1.4 Research Questions

1. How much do the higher education system's ICT policies promote methods for ICT competence building?
2. How important do professors and scholars claim an online thesis management system would be in terms of enhancing the research process?
3. How do teachers at the University of Rome intend to employ and implement an updated e-learning platform?
4. How acquainted are University of Rome first-year students with the newest technology in university?
5. How complicated is the integrated educational management, and how much has the University of Rome adopted it?

2. Literature Review

Ali, (2020) As concerns about the spread of the COVID-19 virus and calls for its control have grown, an increasing number of universities throughout the world have failed to provide adequate in-person instruction. As we face unpredictable prospects, it is clearer than ever that society needs an education system that is malleable and flexible. In order to

emphasise the significance of continuous learning in these pioneering periods, a meta-analysis approach was employed for this study, and pertinent academic references were examined. Universities all across the globe are putting more and more emphasis on digital training, or E-Learning, as per studies. The findings also demonstrate that staff expertise, student availability, and enthusiasm all contribute significantly in ICT-integrated learning, in contrast to resources. This experimental report claims that staff members should use technology devices to enhance education, especially under these atypical conditions. The COVID-19 pandemic-related findings also suggest that online and distant education will be essential during times of shutdowns and social isolation.

Almaiah et al, (2020) A glaring vacuum has been found in the understanding of the important problems and components of e-learning employment during the COVID-19 pandemic as a result of the absence of consensus regarding the critical issues and elements that mould the prospective usage of e-learning systems during this pandemic. As a result, this study intends to interrogate the major elements that encourage the usage of e-learning systems during the COVID-19 pandemic and also the significant problems that face the existing e-learning systems. This study used the interview method and NVivo software for thematic analysis. The results of this study provide policy-makers, architects, manufacturers, and investigators with helpful recommendations that will help them become more familiar with the essential elements of effectively using e-learning systems during the COVID-19 pandemic.

Ratheeswari, (2018) ICT (information and communication technology) currently affects every aspect of modern life. They perform a significant role in the organization, in commerce, in learning, and in recreation. The fact that ICTs are change - makers that influence everything from working conditions to how data is stored and distributed to how it is instructed and learnt to how it is retrieved for academic experiments is also widely acknowledged. In the technology era, using ICT in the classroom is essential for giving people the opportunity to acquire and employ the essential 21st-century abilities. ICT improves instruction and learning, and it's crucial for lecturers to use it as they fulfil their responsibility as atmosphere designers. ICT facilitates a trainer to interact his lessons in an engaging manner and can be used by students in educational programmes at any level. In India nowadays, educational training structures are made more engaging and pertinent by the usage of ICT.

Lawrence & Tar, (2018) ICT, or information and communication technology, is playing a bigger role in both our daily lives and our educational system. More options for instructors and students to collaborate more effectively in the worldwide digital age are made available by the acceptance and incorporation of ICT into learning and teaching settings. Whether used for administration, online learning, or other operations, ICT has the possibility of playing an important role in education. This research attempts to pinpoint the elements that can affect teachers' choices about the integration of ICT in the learning process. The study was picked due to the strategic significance of ICT in education and in specific due to its enormous possibility of altering how instruction is delivered in the classroom. At the personal, group, and societal levels, it offers prospects for greater flexibility, interactivity, and availability for engaging teaching and learning. In-depth case studies constructed inside the qualitative method technique will be utilised to create a thorough description and explanation of the phenomena in order to meet the study's objectives.

Popenici & Kerr, (2017) The paradox of the growth of artificial intelligence in university education's procedures of instruction and learning is examined in this paper. It

looks into how new technology may affect how schools teach and change in the future in terms of how students learn. Significant technological advancements and the expanding use of technological innovations are being looked at in attempt to predict the future of higher education in an environment where artificial intelligence is pervasive in our institutions. When using these innovations for teaching, learning, student services, and management, universities of higher learning and individuals may run into a number of challenges. We also highlight some possible future study topics.

Sun et al (2019) The acceptability of ICT in higher education institutions is examined in this essay. utilising the objectives of the mobile information system for education. The data from 250 surveys of Chinese students and foreign universities was examined by a quantitative approach, which revealed numerous aspects impacting the use of mobile educational apps. A research model was suggested depending on existing adoption approaches and concepts. Since several writers suggested that there might be some discrepancies in various nations, industries, and IT kinds, this study was done to look into potential alterations in these influencing elements. The findings indicate that students' status quo bias will decrease their encouragement to use educational apps; their anticipated task-technology fit will certainly impact their perceptions of the apps' utility and usability; and students' perceptions of the descriptive norms surrounding the use of mobile apps will certainly influence their adoption purposes. The study validates the applicability of the perceived task-technology fit and the technology acceptance model in understanding technological behaviour. The research also looks at how status quo prejudice affects adoption intentions and how task-technology fit, societal standards, and status quo bias interact.

3.   Research Methodology

In order to get started, this study looked at the literature on developing ICT competence and integrating technology more generally in higher education. Additionally, a number of ongoing IT implementation initiatives in various universities were observed. The emphasis was mostly on higher educational institutions from underdeveloped countries, particularly universities.

Understanding the alignment practises that result in the academic effectiveness of HEIs via the usage of IT systems was the initial objective of this study project. The creation of the IT-institutional alignment model, which demonstrates how synchronisation practises affecting academic effectiveness in the context of universities, came next. It was appropriate to hypothesise a correlation effect between these practises (controlled variables) and academic performance because the major objective was to generate a tested and built approach emphasizing the impacts of IT synchronisation practises on academic effectiveness. (Dependent variable).

3.1 Data Collection Techniques

A variety of data collection approaches were employed depending on the sorts of data to be gathered for this study. In order to do this work, data collecting and analysis tools were created for each individual study, adhering to predetermined standards for each chosen study approach. These instructions included: defining the goals of each study; designing suitable strategies for data collection; gathering pertinent data; processing and analysing the gathered data; and disclosing the research's findings.

As a result, this research used survey questionnaires, interviews, document surveys, and observations. The purpose of each research and the issue that would be highlighted

across the three research activities guided the choice of each data collection method.

Survey tools like questionnaires are mostly used to gather organised numerical data. In rare circumstances, respondents in study can be given questionnaires to complete without the researcher present. A researcher can get more precise opinions and thoughts on a particular study area in a specific realistic situation by using the interview method , which is frequently employed by scholars in educational study . However various researchers have proposed a number of classifications for interviews, these are typically categorised as unstructured, structured, and semi-structured interviews. Semi-structured interviews were used in this study. This method was occasionally triangulated using survey questions, observations, and document surveys in order to gather more data to support and validate the quantitative findings of the aforementioned investigations.

This method of data gathering makes it possible to get secondary information on the study setting. Website pages, institutional letters and memos, policies, publications from newspapers, periodicals, and the government, among other forms of documents, can all be used as secondary sources of information. As a result, a variety of papers, including academic publications, reports, and policy documents pertaining to the development of ICT capability in HEIs, were gathered for this study's further examination.

To determine how engaged respondents were in implementing and utilising IT systems in the academic workplace, participant observation was used in this study. In these investigations, observation was done to understand more about the difficulties and problems with integrating technology into teaching, education, investigation, and management in the case study organizations. This method was used when the survey respondents were conducting the research utilising IT technologies.

3.2 Data Analysis Approaches

To find the answers to the study questions, a methodical analysis of the acquired data was required. An investigator must think about how data analysis will be carried out in order to be ready for this work. Three different approaches to data analysis were used, including exploratory data and content analysis, based on the research methodologies and data gathering methods used in this study.

Exploratory data analysis (EDA) is a method where a researcher examines broad patterns, their classifications, and latest in the data that have been gathered in an effort to get a sense of how these data might address the research issue. This method of analysis was used to examine the information gathered through questionnaires. This method of qualitative analysis is used to extract structures and patterns from a collection of texts. The two categories of this methodology are conceptual analysis and relational analysis. Researchers utilise a content analysis approach to quantify or define the existence, significance, and connections of key phrases and ideas. With this method, inferences can be drawn based on details from textual data. After gathering qualitative data, conceptual content analysis was used to examine the collection of regulations and other academic papers pertaining to ICT and education. With consideration to the applied theoretical concepts, the goal of applying the content analysis method was to get an empirical comprehension of the patterns and ideas from interviews and document texts in order to be able to effectively respond to the study queries through investigation.

4.   Results And Discussion

The availability, proprietorship, and employment of various digital gadgets and the internet by the pupils were taken into consideration when determining the degree of acquaintance with applications. This research was equivalently concerned with determining the recurrence of use of various digital tools by the students because it is assumed that having access to and responsibility of digital gadgets and the internet does not undoubtedly translate into an elevated level of acquaintance with technology if they are not used. The findings shown in Figure 4.1 below show that, at least for the sample of students who took part in this research, the degree of access to both digital gadgets and the Internet was comparatively low. This can be addressed by the reality that the majority of participants had either restricted access to desktop computers (69%) or none at all (43.6%). The accessibility of laptop computers showed a similar pattern, with 53% of participants only restricted access and 29.3% having none at all.
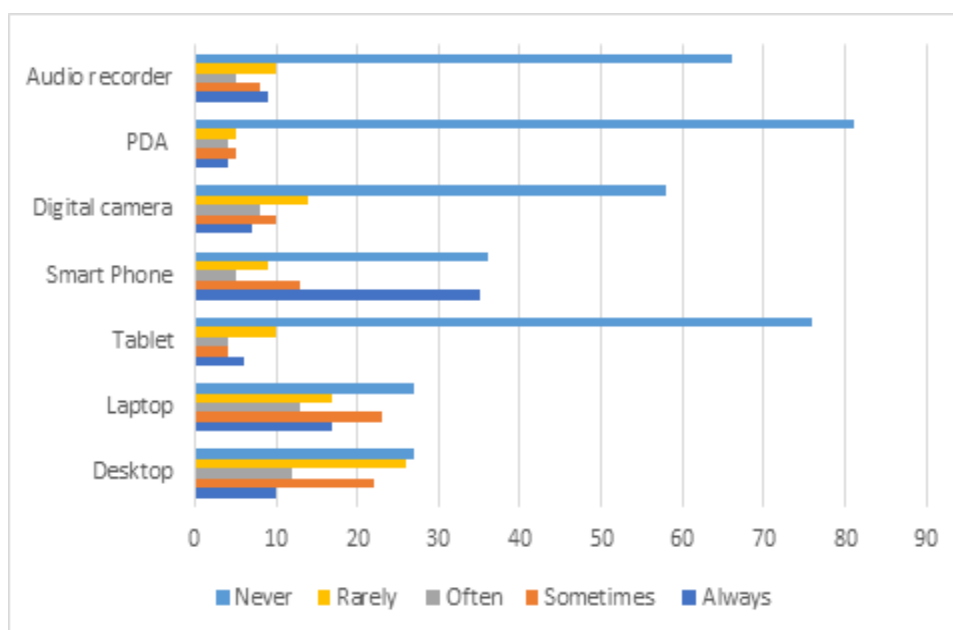

Fig.4.1. *Respondents' frequency of use of digital tools*

The chart above shows that compared to first-year students who used computers, smartphones, or other suggested digital tools moderately or frequently, the ratio of first-year students who hardly or never utilised these IT tools was much higher.

According to the data shown in Figure 16 about students' access to digital tools, many students had little to no access to tablets, smartphones, digital cameras, audio recorders, and personal digital assistants (PDAs).

Analogous trends can be seen when looking at the data on students' internet usage. Only 21.8% of the sample mentioned having unlimited access, compared to 53.6% of participants who had restricted access and 49.5% who had no access at all. Additionally, just 9.68% of students claimed to have access to cable internet, while the remainder had either restricted (47.9%) or no WiFi internet access (61.8%). Most of the sample had either very limited (54.3%) or no access to the modem internet (59.1%). (See figure 4.2)
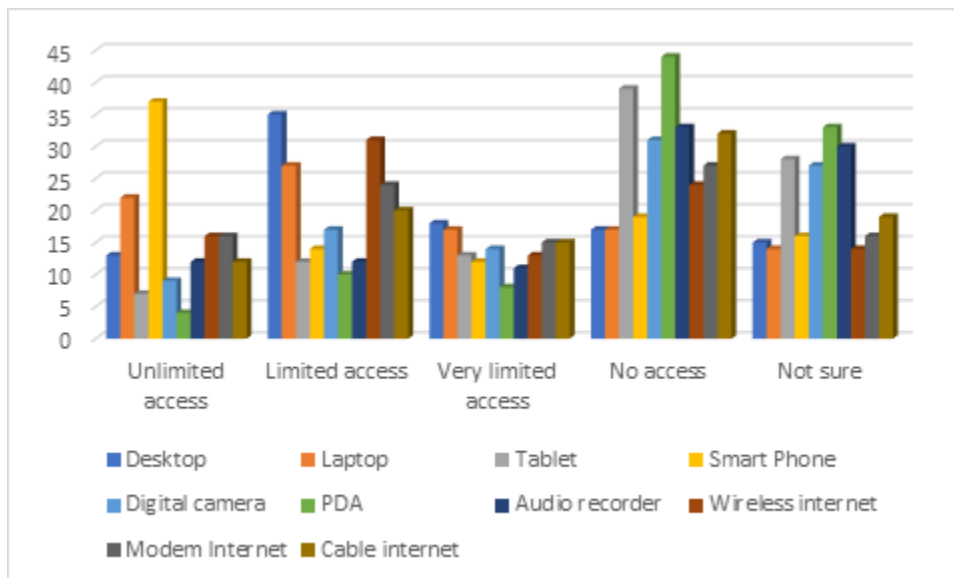
Figure.4.2. *Students' access to technological tools and the internet*

Respondents of the research were asked to list the digital devices they owned before to enrolling at UR in order to gather information about the possession of digital devices by the incoming students at UR. Figure 4.3 below provides an overview of the research data about the proprietorship of digital tools.
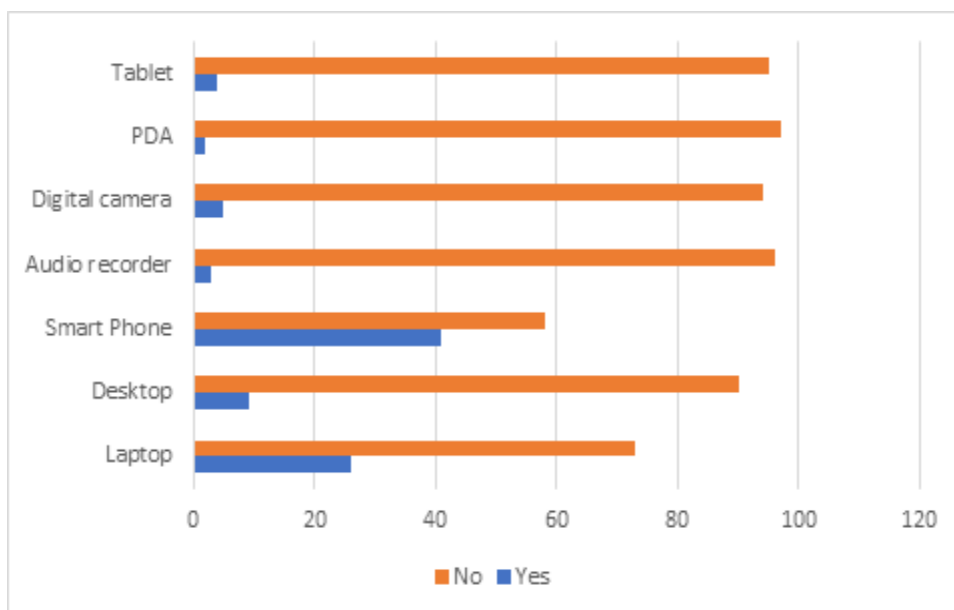

Figure.4.3. *Proprietorship of digital gadgets by students*

Figure 4.3 shows that despite smartphones were the most commonly owned digital tool (52.41% of participants), a sizable chunk of the sample (67.6%) did not. Less than 9% of the prospective students at UR who participated in this research had the other six digital tools, and only 17.3% of participants had their own laptops.

Since earlier computer and IT-related training can influence how familiar students are with technology, the first-year students taking part in this study were asked to self-report their prior computer-based training.
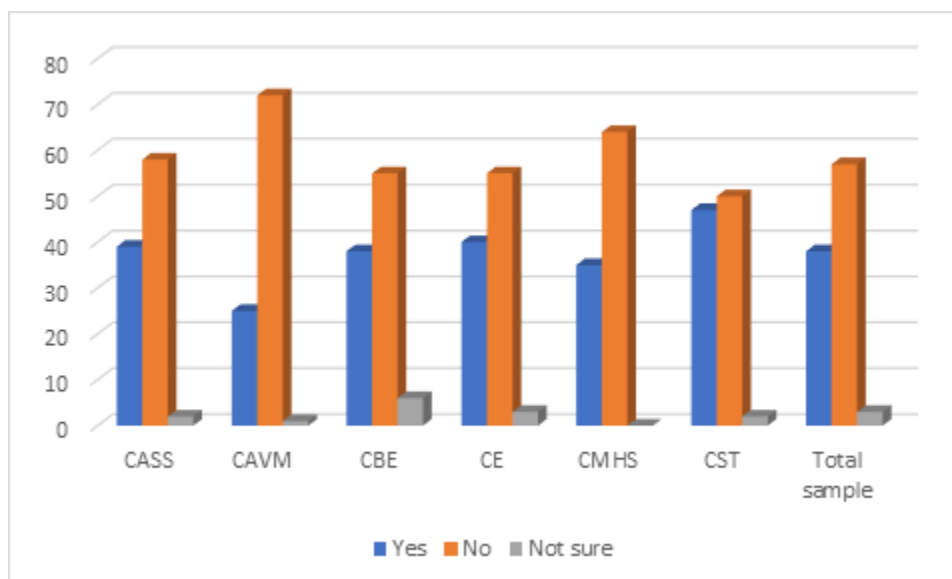
Figure4.4. *Students' previous computer-based training*

According to the findings shown in Figure 4.4, 68.1% of the participants in this research had no prior IT-related training when they enrolled at UR. More than 49% of the first-year students enrolling at each college of UR had no prior experience with computer programmes, according to the statistics in Figure 19. This is particularly concerning because the statistics for the College of Agriculture and Veterinary Medicine (81.5%) and the College of Medicine and Health Sciences (72.6%) were significantly higher.

The findings of the computer-based training helped us realise that many first-year students at UR lack the necessary digital skills and competencies to succeed in the university's current online learning environment. Therefore, approaches for facilitating ICT-related refresher courses on fundamental and developed digital abilities must be developed by the institutions at the start of the first semester for these new prospective students in order to ensure effective synchronisation among the new university students and the current online learning atmosphere.

5.   Conclusion

From a practical standpoint, this research informs various stakeholders on the present integration and utilisation of IT systems and the accompanying issues in and other contexts that are similar. The suggested framework for coordinating IT with academic activities can also be used as a guide by researchers to evaluate and preserve a compatible match among new IT systems and academic pursuits. More specifically, the developed, tested, and evaluated model for IT institutional alignment can be used as a management tool by CIOs, IT managers, IT governance experts, and lecturers with managerial accountability to efficiently design, counterpart, and assess the synchronisation of IT into academic services.

According to the study, effective IT-institutional alignment practises are created based on both the social and technical dimensions. As a result, the obtained hardware and software must be contextualised within a specific academic setting, and alignment practises that address social factors should be given priority. The latter includes, among other things, the creation of pertinent IT-related policies, participation of higher management, a clear IT governance structure, the growth and upkeep of pertinent IT abilities, the installation of suitable communication platforms, and routine evaluation of the institution's IT-driven value.

Low and detrimental academic institution performance as well as poor returns on IT investments may come from an ineffective management of this IT-institutional alignment process.

In terms of its scope and operationalization, this endeavour has constraints just like any other type of research. With regard to the practise of IT-organizational integration for institutional effectiveness as a consequence of efficient IT integration in service delivery, the investigation shown in this research aims to close the knowledge gap. As a result, from the standpoint of the body of current literature, this research is classified as IT alignment inside HEIs. Additionally, the scope of this study was restricted to examining the current state of the art for ICT installation, integration, and use in teaching, learning, research, and administration, with an emphasis on the context of universities in emerging nations. Owing to time restrictions, this study specifically only looked at three IT systems that were being integrated at UR. Private institutions, which are also a component of universities, had very little engagement.

Public universities conducted the exploratory portion of this study, which is diverse from private HEIs in terms of ICT policy, technology adoption, ICT funding strategies, and ICT resources. The associated types of IT mismatch should therefore be investigated in future studies in private institutions in HEIs or other contexts in developing nations. In order to improve this model and increase its degree of generalizability to other Higher Education Institutional settings, additional empirical research is also advised to test and assess the established ITIAM in private institutions. The generated ITIAM was only validated theoretically due to the little time provided for this research. The ITIAM can be used to evaluate and preserve the integration of an IT system during its installation in a specific case study institution, but further practical evaluation is advised in order to establish its consistency and applicability within a specific practical setting. By providing a more practical and operational understanding of a particular group of people, an IT system, and a real-world setting, this kind of practical evaluation can broaden the knowledge base of IT-institutional alignment. In order to generalise the results of this research, theoretical and practical assessments of the suggested ITIAM should be made in other research settings.

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