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Automation of Information Technology System Infrastructure: An Improved Management Information System Productivity in the Higher Education Institutions

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Abstract: Information Technology (IT) automation is key to IT modernization. Higher education such as colleges and universities nowadays are facing a lot of challenges, specifically, in their operational processes. Aiming to advance in order to cope up and overcome these challenges with paper forms, E-mails, and spreadsheets or anything that is not automated may cause significant slowdowns and delays.

In line with this, IT automation can help reduce human errors, make things run smoothly in the higher education institutions, and with the help of their Management Information System (MIS) workforce it can be achieved. With IT automation MIS workforce must become even more productive, innovative, and involved in more complex activities in order to help cope with the increasing global competition and meet consumer demands.

The main objective of the study was to determine if automation of IT system infrastructure can improve MIS productivity in the Higher Education Institutions (HEIs). The current productivity and performance of the MIS workforce were evaluated based on the current level of automation that has been implemented in the academe. An assessment was made to determine if there is an increase in productivity with the automation implemented in the IT system infrastructure.

In order to find a solution to the problem stated, the data gathered was processed statistically using the following descriptive and inferential statistics: percentage, frequency distribution, mean, standard deviation, and lastly, Pearson correlation with Cramer's V analysis. The gathered data were processed using SPSS at the CEU Center for Data Processing.

Findings showed the analysis of the relationship of IT system infrastructure management and MIS productivity in meeting the demands of the service level requirements and minimizing pressure on operational processes and routine

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administrative tasks. It can be concluded that the automation of IT system infrastructure can improve and increase the productivity of the MIS workforce of the HEIs.

This paper recommends that other researchers along the field can look into the conduct of similar studies that would highlight the automation of IT system infrastructure in improving the MIS productivity in the HEIs involving the whole Region 3 and throughout the country but with a bigger sample size. Moreover, HEIs can discuss and review the development program needed for the MIS workforce such as more seminars and training to keep them abreast with the latest technology and trends to increase performance and output in their daily tasks.

Keywords: IT Automation, IT system infrastructure, Higher Education Institutions, increased MIS Productivity

1. Introduction

Automation is key to digital transformation. Along with this, the modern and dynamic IT environments need to scale faster than ever, and IT automation is vital to making that happen. Considerably, infinite flexibility is now required from IT architectures that are continually changing and growing.

Rouse (2019) defined IT automation as the use of instructions to create a repeated process that replaces an IT professional's manual work [1]. The automation software tools can conduct tasks with minimum human intervention. Automation can be integrated and applied to anything from network infrastructure, application deployment, provisioning, and configuration management [1].

According to Usman (2015), every aspect of management in the modern age relies heavily on information to progress and succeed. It is generally believed that information is power and that whoever has it has power. In the light of understanding the idea behind building MIS, Usman (2015) further explained that the concept of management, information, and Information Systems (IS) must be fully grasped to be appreciated [2].

He viewed management as the effective utilization of human and material resources to achieve organizational goals. It consists of Planning, Organizing, Staffing, Directing, Co-Coordinating, Reporting, and Budgeting (POSDCORB). The word “information”, on the other hand, is used in daily routine jobs. In MIS, information has a precise meaning and is different from data. It brings clarity and forms an intelligent human response in mind. IS is a computerized database design to accept, store, process, transform, make useful, and analyze data to report results. This function can be done on a regular or ongoing basis [2].

Various readings and literature reflect the automation process as a holistic approach that can help get repetitive and manual processes out of the hands of the MIS workforce. This allows them to have more time for productivity and innovation, reduce task errors, collaboration improvement, and time can be spent on more meaningful, valuable work.

Elhoseny, Metawa, and Hassanien (2016) designed a system that provides an automation tool that avoids unnecessary and redundant tasks associated with quality assurance in higher education. This system will help all higher education stockholders to handle and monitor their tasks. Moreover, it will help in the application of the quality standard, and to make sure they are enhanced and maintained [3]. To ensure quality in a higher education institution, MIS workforce should utilize their productivity in looking into the procedures, processes, and systems that must be applied to improve and manage the

quality of the institution's services, as well as other activities instead of focusing on routine activities that can be automated [3].

In line with this, automation-related innovations are gradually translated into the academe. Gates (2017) narrated that IT automation is transforming private HEIs. She cited a typical scenario in colleges and universities where 50 or more computers in the laboratories are installed and setup instead to make transactions be done in few clicks with the help of IT automation software [4].

Abishov, Asan, Kanat, and Erkisheva (2014) made it clear that modern HEIs use tens or hundreds of Personal Computers (PCs) used in the educational processes, or ensuring its holding. The use of computers can improve efficiently by IT significantly. They allow you to create IS to ensure effective management of the organization, the tasks of remote and automated learning, storage, document management, messaging, and collaboration on projects [5]. This kind of innovation evidently reduces the amount of labor required by IT staff and MIS workforce freed from administrative tasks and become more productive and consequently achieve operation goals.

Halawani and Khateeb (2020) posited that optimizing processes in a heterogenic environment several pain areas were identified including lack of process standardization, unnecessary customer and IT entity involvement, there were inability to track services request, and unreliable performance measurements [6]. In line with this, MIS workforces' productivity should address collecting relevant adequate data, analyzing it, mapping current processes with business Subject Matter Experts (SMEs), identifying potential optimization, studying their feasibility with the SMEs, modeling the to-be processes, developing and signing-off the support model. There is an added value for customers and the service quality without jeopardizing the possibility of achieving an adequate level of process optimization and automation [6].

Nizri (2015), on the other hand, shared that HEIs face many challenges today. Some of these are the lack of qualified MIS workforce members and a shortage of support staff with high IT skillset. With the enormous number of students, teachers, and employees who need quick answers or resolution to their many computer concerns, the MIS workforce tends to encounter difficulty in managing and operating MIS tasks successfully and efficiently. The MIS tasks become complex particularly when there are cases of students with their own laptops or campus computers encounter problems [7].

Cognizant of the HEIs concerns for quality in terms of operation and service delivery to its clientele, IT automation can significantly contribute to addressing the current challenges being faced by HEIs in the country. This automation can ultimately aid in the reduction of human error and manual labor. It can further foster empowerment among end-users to handle many of their own needs and concerns through the use of self-service portals. Likewise, IT automation can create faster turnaround time, provide a better user experience, and make MIS workforce to be more productive, and be engaged in more complex tasks.

This paper is attuned to the HEIs pursuit for continuous improvement that focuses on the evolution of job role, increased output, more time for innovation, and continuous flow of business operation. Moreover, this study may lead to the furtherance of employment empowerment with accessibility and faster business cycle time or turnaround time for a better user experience. The results will certainly aid HEIs in scaling their school operation through MIS workforce productivity that may allow them to handle the growing amount of work or scales in a cost-effective manner. This study tested the null hypothesis that there is no significant relationship between the implementation level of IT automation and the MIS productivity level of the respondent HEIs.

2. Framework

This study adopts Kaplan and Norton's Balanced Scorecard Theory (BSC) (1992), which highlights the four perspectives such as financial, customer, internal, and learning in measuring the organizational performance [8]. The BSC is a comprehensive framework that helps in translating the organization's strategic objectives into an articulated set of performance measures. This measurement becomes an integral part of the management process. As an evaluation tool, this balanced scorecard goes beyond the financial statements as an indicator of organizational success, for it focuses on balanced measurement across the four areas with a varied range of indicators [8].

Figure 1 shows the diagram of the BSC applied in IT automation. From a financial perspective, the performance measure includes profitability growth, revenue, cash flow, and return of investment. The customer perspective, on the other hand, is expressed in market share, customer retention, customer satisfaction, and customer profitability.

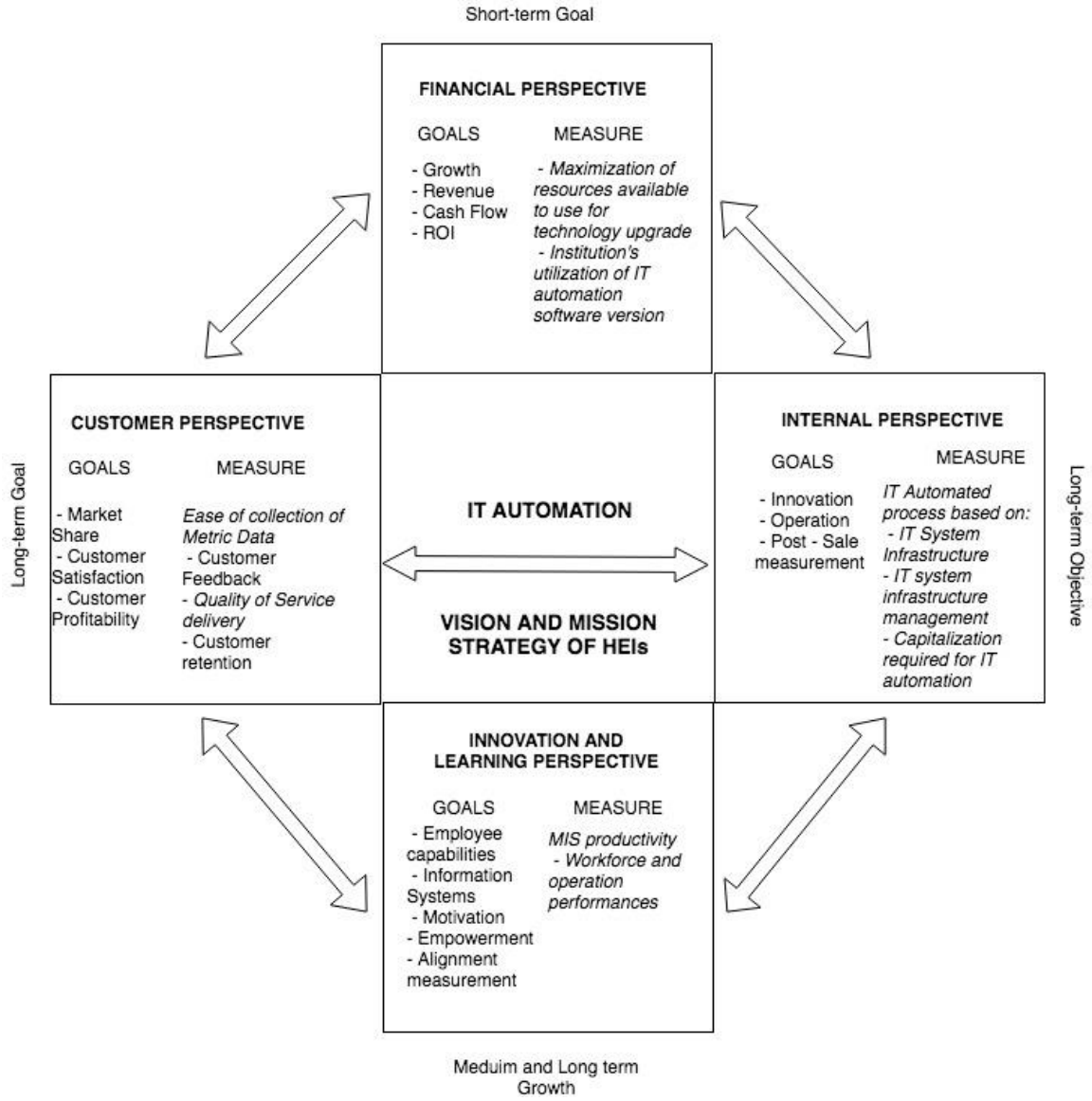

Figure 1. Diagram of the Balanced Score Card in IT Automation

The internal perspective as the third area encompasses innovation, operations, and post-sale measurements. Lastly, the learning perspective covers employee capabilities, IS, motivation, empowerment, and alignment measurement. The cited measures are indicators of continuous improvement that is achieved through the help of human resources. Furthermore, the balanced scorecard proponents claimed that BSC is a tie measure that produces a causal chain of performance, and validity testing of these hypothesized effects that guide the development of a strategy.

This present undertaking primarily translated the two interrelated perspectives, internal and learning areas. Internal perspective focuses on the IT automated process with measures covering IT system infrastructure, IT system infrastructure management, and capitalization for IT requirements. These indicators are part of the innovation applied in MIS operations.

The learning perspective, on the other hand, is expressed in measuring MIS productivity through the workforce and operations performances. These indicators determine the effect of the innovation on human resources comprising the MIS of the HEIs.

The analysis of the relationship between the research variables: IT automation and MIS productivity would indicate the success of the strategy which would then impact the financial and customer perspectives. Results on the performance measurement would further reflect the soundness of decisions relative to technology upgrading and workforce requirements in attaining the core of service delivery in the academic setting.

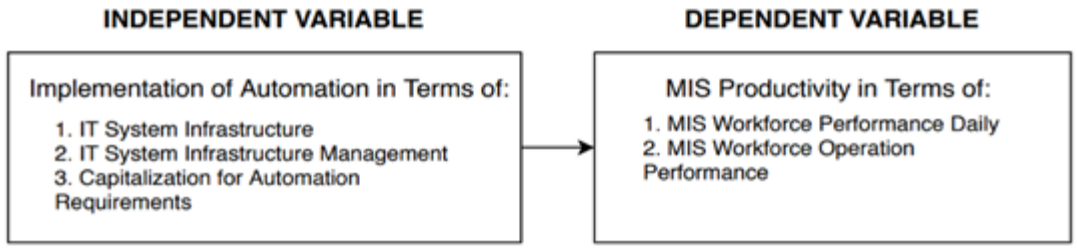

Figure 2. The Conceptual Model of the Study Showing the Relationship Between the Variables

Figure 2 shows the conceptual model of the study using the independent-dependent framework. The independent variable encompasses the implementation level of IT automation of selected HEIs in terms of IT system infrastructure, IT system infrastructure management, and capitalization for IT requirements. The MIS productivity, which is the dependent variable, is composed of an assessment of MIS workforce daily performance and MIS operation performance in terms of meeting demands for service level requirements, pressure on operational processes, routine administrative tasks, and skills upgrading activities of MIS staff.

3. Methodology

3.1 Research and Design

This research used the descriptive method in gathering and treating the data. According to McCombes (2019), a descriptive research is beyond the routine fact-finding activity. It is an undertaking with the main purpose of describing the status of phenomena and identifying relationships between and among variables [9].

Specifically, the survey-correlation design was employed involving the participation of the MIS workforce from the selected private HEIs in Bulacan and Pampanga. Moreover, the following

characteristics were observed: (1) the population of the study was carefully chosen using a non-probability sampling design to ensure validity and objectivity of data; (2) the survey instrument had been subjected to content validation and reliability testing; (3) descriptive and inferential statistics were applied to analyze the relationship between the independent and dependent variables that determined if IT automation can improve the MIS productivity among HEIs.

3.2 Setting of the Study

The study took place at the selected private HEIs in Bulacan and Pampanga, Philippines. The respondent private HEIs from the province of Bulacan include Centro Escolar University in Malolos, Baliuag University of Baliuag, and La Consolacion University Philippines in Malolos. On the other hand, the University of the Assumption in San Fernando, Holy Angel University in Angeles, and ACLC College in Apalit were selected as respondent HEIs in the province of Pampanga.

3.3 Respondents of the Study

The respondents of the study were MIS workforce composed of IT infrastructure engineers, IT decision-makers, and IT leaders from selected private HEIs in Bulacan and Pampanga. Initially, six (6) HEIs were selected using a non-probability sampling technique. The total number of respondents was based on 100 percent of the MIS workforce in the selected HEIs. The Protocol for using human subjects was subjected to the approval of the Institution Ethical Review Committee (IERC) of Centro Escolar University.

3.4 Sampling Technique

The purposive-criterion sampling technique was employed in this study. This technique, known as judgmental, selective, or subjective sampling, is a type of non-probability sampling technique. Non-probability sampling focuses on sampling techniques where the units that are investigated are based on the judgment of the researcher Lavrakas (2008) [10].

The respondent private HEIs in Bulacan and Pampanga were selected using the following criteria: (1) private HEIs are offering IT courses; (2) have produced IT graduates with at least three batches; and (3) with a minimum institutional enrolment of 1,000 students.

The MIS workforce from the respondent HEIs participated in the survey. The following criteria were observed in determining the respondent workforce: (1) IT proficiency specifically as IT staff, IT infrastructure engineer, IT decision-makers, and IT leaders; (2) familiarity with IT automation; (3) awareness/involvement in the company's MIS operation; (4) awareness on company IT infrastructure and computer operations.

3.5 Research Instrument

The questionnaire technique was used in this study. The researcher utilized a locally – constructed questionnaire in gathering data. It consisted of three parts. Part 1 elicited data on the demographic profile of the respondents in terms of sex, age, highest educational attainment, position and length of service in the HEI, tenure, proficiency in IT, and IT certification. Part 2 revolved around the items regarding the implementation of IT automation in terms of IT system infrastructure, IT system infrastructure management, and capitalization for IT requirements. The last part of the questionnaire elicited data on the MIS productivity in terms of MIS workforce daily performance and operational performance in terms of four areas, namely: (1) meeting demands for service level requirement, (2) pressure on MIS operational processes, (3) routine administrative tasks, and (4) skills upgrading activities of MIS

workforce. The pilot-tested questionnaires were processed statistically through reliability testing for the generation of acceptable Cronbach's alpha .835 as presented in Table 1.

Table 1. Reliability Testing Results of Research Instrument

Cronbach's Alpha	No. of Items
.835	87

The basis for the level of IT automation implementation is shown in Table 2.

Table 2. IT Automation Implementation Level

Level	Interpretation
1	No standard automation implementation and standard scripts utilization (using individually created scripts)
2	Using standard scripts (used by team) with automation software
3	Using standard scripts with automation software integrated to the IT system infrastructure but not platform agnostic (only one IT system infrastructure was integrated to the automation software)
4	Platform agnostic (more than one system infrastructure was integrated to the automation software)
5	Complete platform agnostic implementation of standard scripts and automation software fully integrated to IT system infrastructure with ticketing system and self-service feature.

3.6 Data Gathering Procedure

Initially, the researcher sought the Commission on Higher Education (CHED) Regional Director's endorsement to conduct the study in selected private HEIs from Bulacan and Pampanga. The endorsement letter was then distributed to the Presidents/Academic Heads of selected private HEIs for approval to conduct the study involving their MIS workforce. Likewise, the researcher requested the consent of the respondents prior to the administration of a locally – constructed instrument.

The research instrument was administered personally to the respondents to ensure clarity and objectivity of responses. The gathered data were sorted and classified based on the specific research questions and were then subjected to statistical data processing.

3.7 Statistical Treatment of Data

The gathered data were processed statistically using the following:

For the demographic profile of the respondents, percentage and frequency distribution were applied. These basic statistical measures provided a clear glimpse of the respondents' characteristics. To describe the implementation level of IT automation and MIS productivity level, descriptive statistics using central measures such as mean and standard deviation were computed.

Lastly, inferential statistics, specifically correlation test with Cramer's V, was utilized to analyze the relationship between the research variables. The gathered and collated data were processed statistically using SPSS at the CEU Center for Data Processing.

4. Results and Discussion

4.1 Demographic Profile of the Respondents HEIs

The respondent HEIs comprised of six private HEIs in Bulacan and Pampanga with 33 respondents. In terms of age, the majority of the MIS workforce in academic institutions is consisted of younger professionals to easily adapt to information processing and new technology.

For IT proficiency, the majority of the MIS workforce in the academe are intermediate level where they are no longer a beginner or novice but not yet an expert. The profile of the respondents as regards their proficiency in IT is either the respondent is novice or beginner, intermediate and advance, or an expert in the field. An IT is said to be a novice when he or she is still inexperienced or a beginner in IT industry. He needs to undergo more training and more exposure to complex IT works. While an IT who is said to be intermediate has the knowledge or skill of someone who is more advanced than a novice but not yet an expert. On the other hand, an expert is someone who has intensive and deep knowledge based on research, knowledge, and occupation.

Findings show that MIS workforces still need initiatives and exert efforts in keeping themselves abreast to upgrade skills to expert level and be updated with the latest trends in technology. On the other hand, findings show that IT certification or training is limited or minimal along their field of specialization that is necessary for the implementation of full automation.

4.2 Current Implementation Level of IT Automation of HEIs

IT System Infrastructure

- Operating System

  Microsoft Windows Operating System (OS) has the highest number of users compared to Linux and other OS because it is widely used and known for its user-friendly features as well as its convenience in usage.

- Server Hardware

  For server hardware, Hewlett-Packard (HP) is used by the majority of the HEIs due to its maturity and reliability in the server hardware industry. Built for easy setup and servicing that meet the requirement of academic institutions.

- Computer Network

  In a computer network, HEI respondents expressed that the majority of them preferred using Cisco, known for its flexibility and maturity when it comes to technology with 60.6 percentage, which certifies that it is more famous than other brands.

- Virtualization and Cloud Platforms

  VMware is most used in academic institutions due to its popularity for reliability, stability, and being the first in the industry to improve efficiency and availability of IT resources. This is ideal in the HEIs that prioritize cost savings from reduced hardware and more improved server efficiency.

- Backup and Storage

For backup, academic institutions are using other varieties of backup such as SQL, Duplicati, External Hard Drive, and Cloud, which complements their financial, and hardware requirements. Results further revealed that Network Attached Storage (NAS) is more used than the Storage Area Network (SAN). This could be traceable to the present setup of using a single storage device operating on data files instead of having a local network of multiple devices, which operates on disk blocks.

- Ticketing System

For the ticketing system, 14 HEI respondents with 42.4 percent do not use it, and 19 respondents with 57.6 percent are using it. Having a ticketing system or ticket management software contributes to an increased level of the institution, increased efficiency; users are able to communicate to the MIS workforce with their concerns to be given solutions to their problems. It is integrated into the workflow of the system that allows tracking of the communication and automatic updating of information about the tasks. Keeping records of actual communication and the ability to prioritize and monitor if the reported issue is being attended based on urgency, if not resending of notification E-mail into the right department will be triggered, ensuring that the service level requirement of providing a solution to the reported issues are met. This is also used to measure, track, and monitor the productivity of the MIS workforce operation.

- IT System Infrastructure Management
    - Standard Scripts. Results highlight that 21 or 63.6 percent of the respondents do not use standard scripts, while 12 respondents or 36.4 percent of the respondents use it in their MIS operation. This could be due to a lack of expertise in using it and maybe relying on outsourced talent or skills.

    - Automation Software. Findings on automation software show that majority of the respondents are using other software. It may be in-house software since it was not identified with the known software. Data further indicate that most of the HEI respondents opted to use other IT automation software presumably in-house, due to high cost, the complexity of the software, and lack of familiarity in the usage of these five automation software namely: Chef, Ansible Tower/Ansible Engine, Puppet, Jenkins. However, the use of in-house software does have risks to be considered by MIS operations to prevent affecting their productivity; such as incompatibility to the system infrastructure and unforeseen issues, unlike developers of known automation software, they have already managed, tested, and has solutions that can be applied to possible issues.

    - Automation Integration. HEIs mostly integrated OS in the automation software with 39.4 percentage. This is one of the most important system software in managing computer hardware, software resources, and computer programs among the HEIs. Proper automation of the OS may result in higher productivity, reliability, and increased performance that HEIs aimed to achieve.

    - Self- Service Feature. The majority of the respondents are using the self-service feature, which is a positive note. It involves the end-users to perform their own tasks and requirement without asking for assistance from the MIS workforce that can also help in the improvement of productivity.

- Automation Level of HEIs. Data reveal, that the automation level of the HEIs with a mean value of 1.76 and a standard deviation of .7511 is interpreted as "Low". We can assume that the institutions are not yet using full automation in the academe and still in the process of improvement and upgrading when it comes to technology. It reflects that they are not yet utilizing the benefits of a more productive environment and MIS workforce where routine tasks are not part of the daily jobs or tasks but more focused on more complex issues and innovation for the success and growth of the company. The basis of the interpretation of the IT automation level is shown in Table 2.

- Capitalization for IT Requirements

Holistically, the respondent HEIs recorded "Moderate Level" of implementation on capitalization IT requirements with a mean of 2.90. Findings imply that the HEIs have allocated budget for technology upgrading but due to the institution's processes involving in-depth cost-benefit analysis they resorted to utilizing an enterprise version – with paid 24/7 technical support (outsourcing) which is in the long-term more costly than giving priority to program development, specifically in system infrastructure and skills upgrading. These data further suggest that the respondent HEIs need to review their scheme for capitalization to meet the requirements for IT automation. Since funding is a vital component, the administration has to allocate sufficient funds in support of any technology development undertaking.

4.3 Current Level of MIS Productivity

Number of MIS Performance

Findings show that the HEIs maintain not more than ten MIS workforce. This could be associated with their assumption that a load of work through IT automation tool can be handled by a few manpower.

MIS Task with the Highest Volume

Data revealed that the highest volume of MIS task daily is confined to troubleshooting and remediation. This might be a product of limited system infrastructure and management that may lead to misconfigurations or an inconsistent network environment.

Volume Completed MIS Tasks

The majority of the MIS workforce in the institution can only accomplish less than 10 tasks daily. This could be explained by the HEIs limitations in IT system infrastructure to manage or fewer people to manage daily tasks.

MIS Average Handling Time

The results for MIS average handling time show that they are able to accomplish their tasks in the next few hours or within the day. The completion of the tasks depends on the nature and quantity of the tasks. Based on the results of the "MIS Tasks with the Highest Volume", troubleshooting and remediation are most significant. We can assume that troubleshooting and remediation tasks can range from simple to complex issues. Complex issues caused by human error in the configuration of the system infrastructure and inconsistency. All this can affect the productivity of the MIS operation, specifically when IT automation is not properly utilized it may result in longer turnaround time and higher average handling time.

4.4 IT Automation Implementation in Increasing MIS Productivity

Meeting Demands for Service Level Requirement

The MIS operation performance based on meeting demands for service level requirement indicators are as follows: ease of collection of metric data, excellent customer experience, and no dispute and penalties from the stakeholders. Data presented in Table 3.

Table 3. The MIS Operation Performance Based on Meeting Demands for Service Level Requirement

Indicators	Mean	Standard Deviation	Verbal Interpretation
1. Ease of collection of metric data	3.94	0.747	High
2. Excellent customer experience	3.94	0.747	High
3. No dispute and penalties from the stakeholders	3.91	1.011	High
Weighted Mean	3.9293	0.73484	High

Data revealed that IT automation resulted in "High" MIS productivity in meeting demands for service level requirement as indicated in the weighted mean value of 3.93 and standard deviation of .735 for ease of collection of metric data, excellent customer experience, and no dispute and penalties from the stakeholders.

Pressure on MIS Operational Processes

Data in Table 4 present the MIS operation performance based on pressure on operational processes; indicators are as follows: effective management of day-to-day operations based on the needs of stakeholders, the motivation of MIS team to do higher-value activities, continuous improvement of quality of work and ability of the MIS team to perform at an optimum level.

Table 4. The MIS Operation Performance Based on Pressure on Operational Processes

Indicators	Mean	Standard Deviation	Verbal Interpretation
1. Effective management of day-to-day operations based on the needs of stakeholders	4.21	.696	High
2. Motivation of MIS team to do higher-value activities	3.79	1.139	High
3. Continuous improvement of quality of work	3.88	1.023	High
4. Ability of the MIS team to perform at an optimum level	4.03	.810	High
Weighted Mean	3.9773	.79147	High

Findings resulted in "High" on all indicators with a weighted mean of 3.98 and a standard deviation of .792. This means that IT automation contributes to the effective management of day-to-day operations, the motivation of MIS, continuous improvement, and the ability to perform at an optimum level.

Routine Administrative Tasks

The MIS operation performance based on routine administrative tasks' indicators as presented in Table 5 are as follows: increase of productivity, ability to build strong management and setup organization to meet MIS goals, fast and efficient delivery of operational processes and minimization of application of low skill by MIS workforce.

Table 5. The MIS Operation Performance Based on Routine Administrative Task

Indicators	**Mean**	**Standard Deviation**	**Verbal Interpretation**
1. Increase in productivity	4.06	.788	High
2. Ability to build strong management and setup	4.03	.810	High
3. Fast and efficient delivery of operational processes	4.00	.829	High
4. Minimization of application of low skill by MIS workforce	3.88	.781	High
Weighted Mean	3.9924	.76159	High

Results revealed that routine administrative tasks garnered a weighted mean value of 3.99 and .762 verbally interpreted "High". This signifies that IT automation increases productivity, able to build strong management, efficient delivery of operational processes, and minimization of application of the low skill of MIS workforce.

Skills Upgrading Activities of MIS Workforce

The MIS operation performance based on skills upgrading of MIS workforce indicators as presented in Table 6 are as follows: attendance in MIS seminars inside and outside the university and attendance in different kinds of training for updates and new practices.

Table 6. The MIS Operation Performance Based on Skills Upgrading of MIS Workforce

Indicators	**Mean**	**Standard Deviation**	**Verbal Interpretation**
1. Attendance in MIS seminars inside and outside the university	3.52	0.972	High
2. Attendance in different kinds of training for updates and new practices	3.42	0.936	Moderate
Weighted Mean	3.47	0.9432	Moderate

Data reflected that respondents disclosed a mean value of 3.47 and standard deviation .943 verbally interpreted “Moderate”. This indicated that they are able to attend seminars inside and outside the university but not directly related to updates, trends, and new practices in new technology.

4.5 Relationship of Implementation of IT Automation to the Level of MIS Productivity of the HEI Respondents

The results in the analysis of the relationship of implementation of IT automation in terms of system infrastructure and management to the level of MIS productivity expressed in MIS workforce daily performance and MIS operation performance indicated a significant relationship. Interestingly, available server hardware, computer network, backup, and storage including ticketing system software resulted in meeting demands for service level requirements, less pressure on operational processes and routine administrative tasks.

5. Conclusion

On the basis of the findings, it can be concluded that automation of the IT system infrastructure can improve and increase the productivity of the MIS workforce of the HEIs. Likewise, it is worth investing to the upgrading of IT in academic institutions for continuous improvement and long-term profitability.

Future researchers along the field, can look into the conduct of similar studies that would highlight the automation of IT system infrastructure to improve MIS productivity involving the whole Region 3 and throughout the country with a bigger sample size, more comprehensive research considering Free and Open Source Software (FOSS) in automating the operational processes in the school and evaluation study focusing on the need analysis and proper utilization based on the current IT automation implementation of the HEIs.

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