Effectiveness of Information Systems on Automation of Business Processes for Nonprofit Organizations in Arusha City

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Abstract:
The study examined the effectiveness of information systems on automation of business processes for nonprofit organizations in Arusha City. The study had two specific objectives namely; identify the existing information systems for automation of business processes for nonprofit organizations in Arusha City and to determine the extent to which information systems have improved automation of business processes for nonprofit organizations in Arusha City. The study used descriptive survey research design and quantitative research approach. A sample of 63 respondents was drawn from the population of 75. The study used simple random sampling technique where data were collected through structured questionnaires. Descriptive statistics and Pearson correlation was used to analyze the quantitative data. Findings indicated that there are many information systems but not all of them exist in non-profit organizations in the study area. It was further found that to high extent information systems have improved automation of business processes for nonprofit organizations due to improved supply chain, improved Human Resources management, improved planning and projections, improved sharing of organization data, improved customer service, improved customer relations and improved time management. The study recommends that to achieve their objectives, non-profit organizations should invest in information systems. This can be done through having adequate experts, adopt the sophisticated information systems and train the users of the adopted sophisticated information systems. Moreover, the study recommends that to ensure effectiveness of information systems on automation of business processes for nonprofit organizations; proper ICT infrastructure should be initiated to facilitate the implementation of information systems.

Keywords: Information Systems, Automation of Business Processes, Nonprofit Organizations.

Introduction
In the global landscape of both profit and nonprofit organizations, the integration of information systems (IS) has become pivotal, enhancing operational efficiencies and informed decision-making (Rainer and Prince, 2021). IS play diverse roles, from bolstering customer service to enabling continuous system availability, Bolton, Machová, Kovacova and Valaskova (2018). Despite their transformative potential, challenges such as legacy system integration and skilled labor shortages persist, Ivanova, et al., (2019).

Across nations, studies underscore the significance of IS in business automation. In

In nonprofit organizations, IS usage varies, impacting service delivery and efficiency (Rainer and Prince, 2021). Recognizing disparities, this study explores the effectiveness of IS in automating nonprofit business processes in Tanzania. Delving into novel IS implementation strategies, this research aims to illuminate innovative pathways within a concise framework.

**Literature Review**

**Theoretical Review**

The study was guided by Diffusion of Innovation (DOI) theory. The theory was developed by Rogers in 1962. It is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. Adoption means that a person does something differently than what they had previously. In the context of this study, adoption means the situation where the nonprofit organizations shift from using manual ways to the automated business through the use of IS (Scott & McGuire, 2017).

According to Lee, (2021), adoption of IS as innovation does not happen simultaneously in organizations; rather it is a process whereby some organizations are more apt to adopt the innovation than others. Researchers have found that organizations who adopt an innovation early have different characteristics than those who adopt an innovation later. When promoting an innovation to a target organization, it is important to understand the characteristics of the target organization that will help or hinder adoption of the innovation.

Sun, et al., (2018) argues that there are five established adopter categories, and while the majority of the general population tends to fall in the middle categories, it is still necessary to understand the characteristics of the target population. When promoting an innovation, there are different strategies used to appeal to the different adopter categories including innovators, early adopters, early majority, late majority and laggards. The stages, by which organizations adopts an innovation, and whereby diffusion is accomplished, include awareness of the need for an innovation, decision to adopt or reject the innovation, initial use of the innovation to test it, and continued use of the innovation. There are five main factors that influence adoption of an innovation including relative advantage or the benefits of the technology adopted, compatibility, complexity which is associated with challenges for adoption, triability and observability (Scott & McGuire, 2017). This theory relate directly to this study under investigation since the study focuses on examining the effectiveness of IS on automation of business processes for nonprofit organizations.

**Empirical Literature Review**

Ivanova, et al., (2019) examined digitalization of organizations: current issues, managerial challenges and socio-economic risks. The study indicated that there are IS that are used in many organizations through generic software, such as word processing, spreadsheet, and database applications, or specially written records management applications. Computers can be stand alone, or linked using networks such as WANs, intranets, or the Internet, and can use a wide range of peripheral devices such as scanners, bar code readers and printers.

Computer network: A grouping of computers and peripherals connected together by telecommunications links to enable a group of users to share and exchange information. Local area network: A computer network located within a relatively limited area such as a building, agency or university campus. Wide Area Network (WAN): A computer network that covers a large geographical area. Internet: A collection of local, regional and national
computer networks that are linked together to exchange data and distribute processing tasks. 

Intranet: An internal computer network that belongs to an organization and is accessible only by that organization’s members.

Brous, Janssen and Herder (2020) studied the dual effects of the Internet of Things (IoT): A systematic review of the benefits and risks of IoT adoption by organizations indicated that there are several factors that can induce individuals to use or not to use technology. These factors can be broadly categorized into three groups: personal factors, organizational factors, and environmental factors. Individual factors and organizational factors are also termed as internal factors because they involve decisions regarding the organization and its capabilities like infrastructure, budgetary constraints and IT-human resource capabilities. External factors include pressure from competitors, oversight bodies and the demand of the e-business environment which, sooner or later, is predicted to demand a real time assurance.

A study conducted by Aguirre and Rodriguez (2017) on automation of a business process using robotic process automation found that robotic process automation emerges as software based solution to automate rules-based business processes that involve routine tasks, structured data and deterministic outcomes. Most of these applications were carried out on back office business process where the customer is not directly involved. It was further noted that productivity improvement is the main benefit of robotic process automation. Therefore the study proved the existence of the IS applied in automation of business processes.

Another study conducted by Rainer and Prince (2021) on introduction to information systems. It was revealed that every information system plays several roles for businesses with varying degrees of importance depending on the organization’s needs. Among them includes; first, store and analyze information - sophisticated and comprehensive databases, sometimes cloud-based, are used to store and analyze information pertaining to business functions, customers, transaction data, and both employee and customer activity. Second, assist with making decisions – IS can compare in-house analyses to external sources. Decision-makers use these insights to review the adequacy and quality of their strategic decisions. Third, assist with business processes – IS are used to develop value-added systems for business functions. Business processes can be simplified and unnecessary activities can be streamlined through the use of IS adapted to common business tasks, such as manufacturing, supply chain, and employee processes.

According to Ghaleb, et al., (2021) internal factors to technology adoption outweigh the external factors. They argue that internal factors, which involve cost-benefits analysis, carry more weight on the decision to use technology in auditing. External pressure, especially the e-business environment, is the distinct key driver for technology adoption. The arguments among these scholars suggest that both internal and external factors can have a significant impact on IS-adoptions decision in organizations.

A study by Trantopoulos, et al., (2017) examined external knowledge and information technology: Implications for process innovation performance. The study found that the use of IS has several advantages in the organization including; detection of errors and fraud, testing correctness of electronic files, confirming aging of all accounts receivables, selecting a required sample from the original files, sorting items of transactions which have the same features, finding evidence regarding the effectiveness of controls and calculating the representativeness and completeness of the inventory.

From global context, studies have indicated IS are effective on automation of business processes. Reviewed literatures have shown that business automation has been an initiative among nonprofit organization. The application of information systems in business operation has improved efficiencies, cost reductions and supply of information to decision-making. It was further pointed out that automated business processes enhances better customer service, continuous availability of the systems and growth in communication capabilities and
methods (Rainer and Prince, 2021; Bolton, Machová, Kovacova and Valaskova, 2018; Ivanova, et al., 2019; Rainer and Prince, 2021; Aguirre and Rodriguez, 2017).

In Tanzania studies about IS and automation of business have been conducted. For instance, Goodluck, (2020) examined the impact of automation on employment in manufacturing industry: a case of Coca Cola company in Tanzania. This study however based on profit organization and linked the automation of business and employment. Nzowa (2022) examined factors influencing students’ acceptability of mechatronics engineering course at Mbeya University of Science and Technology, Tanzania. The study only focused on factors influencing students’ acceptability of the course. Moreover, Katamba, et al., (2017) studied IS utilization by external auditors in Tanzania. The study focused on the benefits of IS for auditors thus created knowledge gap. Therefore, to fill this gap, this study examined the effectiveness of IS on automation of business processes for nonprofit organizations in Arusha City. The findings of this study will inform the nonprofit organizations on the effectiveness of information systems on automation of business processes. This in turn will help the organizations to be aware of how best they can improve automation of business processes through application of information systems.

Materials and Methods

Study Design

This study employed a descriptive survey research design. The proposed design was used to explain the relationship between information systems and the automation of business in nonprofit organizations. The descriptive survey research design was chosen because it allowed the researcher to collect quantitative data through surveys, which aligns with the main objective of the study.

Population and Sampling Procedures

The target population for this study included the management and the employees of the World Vision Tanzania and SOS Children's Village Arusha. The sample size was calculated using Krejcie and Morgan’s (1970) table for determining sample size. The study used a simple random sampling technique, ensuring that each member of the population had an exactly equal chance of being selected. This method was chosen because it provided an equitable means of selecting the sample, allowing every member of the organization an equal chance of inclusion in the study.

Data Collection Methods

Primary data were collected using structured questionnaires. The questionnaire technique facilitated simultaneous data collection from all groups included in the study. The structured questionnaire was prepared in the English language and included five options for respondents to indicate their level of agreement or disagreement as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Questionnaires were administered to individuals in their workplaces.

Data Analysis

In this study, data were collected, coded, and then entered into the software (SPSS version 22.0). Frequency and percentage were used to analyze the demographic characteristics of respondents, while descriptive statistics, such as mean and standard deviation, were used to analyze the data.

Ethical Considerations

The validity of the instruments for data collection was ensured through expert review. To guarantee the reliability of data collection instruments, a pilot study was conducted. The reliability of the questionnaire was assessed using the Statistical Package for Social Science (SPSS), which yielded a Cronbach’s Alpha of 0.794 for existing information systems for automation of business processes and 0.856 for the extent to which information systems have improved automation of business processes, as shown in Table 1.
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**Results**

A total of 63 questionnaires were distributed all (100%) were completely filled and collected. The aim of the researcher was to identify the existing information systems for automation of business processes for non-profit organizations in Arusha City. Respondents had to respond by showing their degree of disagreement or agreement by ticking the most appropriate option ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Scale of mean score interpretation was as follows: Mean scores from 1 to 1.80 were interpreted as strongly disagree. Mean scores from 1.81 to 2.60 were interpreted as disagree. Mean scores from 2.61 to 3.40 were interpreted as Neutral/Undecided. Mean scores from 3.41 to 4.20 were interpreted as agree and mean scores from 4.21 to 5.00 were interpreted as strongly agree. The results of analysis for the existing information systems for automation of business processes for non-profit organizations are shown in table 2.

As reflected in table 2, mean score of items differed from one item to another. This shows that respondents had different opinion about existing information systems for automation of business processes for nonprofit organizations. The findings specifically indicated that respondents agreed that among the existing information systems for automation of business processes for non-profit organizations includes the workloads automation, business process software, business management software, low code/ no code software and cloud platforms with the mean score of 3.74, 3.59, 4.06, 3.89 and 3.55 respectively. The findings imply that there was an existing information system for automation of business processes for nonprofit organizations.

| Table 1. Reliability Results |

<table>
<thead>
<tr>
<th>Objective</th>
<th>Items</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing information systems for automation of business processes</td>
<td>7</td>
<td>.794</td>
</tr>
<tr>
<td>The extent to which information systems have improved automation of business processes</td>
<td>7</td>
<td>.856</td>
</tr>
</tbody>
</table>

**Source:** Field Data (2023)

| Table 2. Perception of Respondents on the Existing Information Systems for Automation of Business Processes for Non-Profit Organizations |

<table>
<thead>
<tr>
<th>Existing information systems</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev</th>
<th>Overall rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robotic process automation</td>
<td>63</td>
<td>1.76</td>
<td>.97364</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Workloads automation</td>
<td>63</td>
<td>3.74</td>
<td>.84920</td>
<td>Agree</td>
</tr>
<tr>
<td>Business process software</td>
<td>63</td>
<td>3.59</td>
<td>.93631</td>
<td>Agree</td>
</tr>
<tr>
<td>Business management software</td>
<td>63</td>
<td>4.06</td>
<td>.58543</td>
<td>Agree</td>
</tr>
<tr>
<td>Low code/ no code software</td>
<td>63</td>
<td>3.89</td>
<td>.76715</td>
<td>Agree</td>
</tr>
<tr>
<td>Cloud platforms</td>
<td>63</td>
<td>3.55</td>
<td>.80646</td>
<td>Agree</td>
</tr>
<tr>
<td>Process Maker's intelligent</td>
<td>63</td>
<td>2.73</td>
<td>.77758</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

**Source:** Field Data (2023)
Findings further indicated that respondents were neutral that process maker’s intelligent was among the existing information systems for automation of business processes for non-profit organizations with the mean score of 2.73. Table 2 further revealed that respondents strongly disagreed that robotic process automation is among the existing information systems for automation of business processes for non-profit organizations with the mean score of 1.76. The findings give an expression that despite the fact that there is various information systems for automation of business processes, not all exist for automation of business processes for non-profit organizations.

Moreover, the researcher sought to determine the extent to which information systems have improved automation of business processes for nonprofit organizations in Arusha City. Respondents had to respond by showing their degree of disagreement or agreement by ticking the most appropriate option ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4= Agree, 5= Strongly Agree. Scale of mean score interpretation was as follows: Mean scores from 1 to 1.80 were interpreted as strongly disagree. Mean scores from 1.81 to 2.60 were interpreted as disagree. Mean scores from 2.61 to 3.40 were interpreted as Neutral/Undecided. Mean scores from 3.41 to 4.20 were interpreted as agree and mean scores from 4.21 to 5.00 were interpreted as strongly agree. The results of analysis for the existing information systems for automation of business processes for non-profit organizations are shown in table 3.

Table 3. Perception of Respondents on the extent to which Information Systems have Improved Automation of Business Processes for Non-Profit Organizations

<table>
<thead>
<tr>
<th>Extent to which information systems have improved automation</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev</th>
<th>Overall rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have improved supply chain</td>
<td>63</td>
<td>4.63</td>
<td>.67493</td>
<td>Very high extent</td>
</tr>
<tr>
<td>Have improved Human Resources management</td>
<td>63</td>
<td>4.58</td>
<td>.69025</td>
<td>Very high extent</td>
</tr>
<tr>
<td>Have improved planning and projections</td>
<td>63</td>
<td>3.62</td>
<td>.85466</td>
<td>High extent</td>
</tr>
<tr>
<td>Have improved sharing of organization data</td>
<td>63</td>
<td>4.84</td>
<td>.67101</td>
<td>Very high extent</td>
</tr>
<tr>
<td>Have improved customer service</td>
<td>63</td>
<td>3.75</td>
<td>.82647</td>
<td>High extent</td>
</tr>
<tr>
<td>Have improved customer relations</td>
<td>63</td>
<td>3.67</td>
<td>.80646</td>
<td>High extent</td>
</tr>
<tr>
<td>Have improved time management</td>
<td>63</td>
<td>4.06</td>
<td>.78834</td>
<td>High extent</td>
</tr>
</tbody>
</table>

Source: Field Data (2023)

Table 3 present findings about the extent to which information systems have improved automation of business processes for nonprofit organizations. Findings indicated that respondents had varying perception regarding the extent to which information systems have improved automation of business processes for nonprofit organizations. Specifically, respondents had a view that to very high extent information systems have improved automation of business processes for nonprofit organizations through improved supply chain, improved human resources management and improved sharing of organization data with the mean score of 4.63, 4.58 and 4.84 respectively. Findings further revealed that respondents had a view that to a high extent information system have improved automation of business processes for nonprofit organizations through improved planning and projections, improved customer service, improved customer relations and improved time management with the mean score of 3.62, 3.75, 3.67 and 4.06 respectively. The findings presented in table 4.6 imply that to high extent information systems have improved automation of business processes for nonprofit organizations due to the mentioned advantages. Therefore, findings in table 4.6 confirm those presented in table 3 that there are existing information systems for automation of business processes for nonprofit organizations.
Discussion

Findings about the existing information systems for automation of business processes correlate with those of Rainer and Prince (2021) who conducted a study on introduction to information systems. It was revealed that there are several information systems for automation of business process such as various business process software, business management software and cloud platforms. It was further indicated that every information system plays several roles for businesses with varying degrees of importance depending on the organization's needs. Among them includes; first, store and analyze information - sophisticated and comprehensive databases, sometimes cloud-based, are used to store and analyze information pertaining to business functions, customers, transaction data, and both employee and customer activity. Second, assist with making decisions – IS can compare in-house analyses to external sources. Decision-makers use these insights to review the adequacy and quality of their strategic decisions. Third, assist with business processes – IS are used to develop value-added systems for business functions. Business processes can be simplified and unnecessary activities can be streamlined through the use of IS adapted to common business tasks, such as manufacturing, supply chain, and employee processes.

Moreover, the study findings were supported by those of Gekara and Thanh Nguyen (2018) who conducted a study in Australia and report that workloads automation and robotic process automation has been among the information systems for automation of business processes as they help to integrate multiple systems together. This has an opportunity to automate various functions across departments and previously disparate systems. For example, some employee processes might require manual usage of finance or accounting systems, project management applications, and shipping/logistics. By introducing BPA, companies that automate interconnected processes that take up a considerable amount of time and also can be error prone due to the perils of manual entry.

On the other hand, findings about the extent to which information systems have improved automation of business processes for nonprofit organizations has been supported by other past studies. For instance in China, Barton, et al., (2017) report that to a higher extent, information systems are applied in every business to make it automated. For instance, robots have been used in business for simplifying scheduling especially in complex organizations. Through the use of information systems, there have been improvements of Human Resources management, sharing of organization information as well as simplification of supply chain within the organization. Therefore, these findings confirms that higher extent, information systems have improved automation of business processes.

Furthermore, Velikorossov, et, al., (2020) argues that information systems have improved customer service, time management among employees and have improved customer relations to a very large extent in both profit and nonprofit organizations. It was further noted that Information Systems in an organization are an excellent way to streamline operations and drive business growth. Information systems are designed to replace human labor with machine labor so the organization can put those human resources to work elsewhere in the business. To realize the full potential of information systems, businesses need to consistently utilize proven automation software and best practices across all workflows from creating faster, digital customer experiences to simplifying internal processes.

Conclusions and Recommendations

Basing on the findings of this study it is concluded that, there are many information systems but not all of them exist in non-profit organizations in the study area. The existing information systems for automation of business processes for non-profit organizations in the study area includes workloads automation, business process software, business management software, low code/ no code software and cloud platforms. Moreover, the study further concludes that to high extent
information systems have improved automation of business processes for nonprofit organizations due to improved supply chain, improved Human Resources management, improved planning and projections, improved sharing of organization data, improved customer service, improved customer relations and improved time management.

The study recommends that to achieve their objectives, non-profit organizations should invest in information systems. This can be done through having adequate experts who will be used to install ICT devices and solve several ICT challenges. Furthermore, the study recommends that, non-profit organizations should adopt the sophisticated information systems and train the users of the adopted sophisticated information systems so that they are able to use and avoid some ICT challenges. Finally, the study recommends that to ensure effectiveness of information systems on automation of business processes for nonprofit organizations; proper ICT infrastructure should be initiated to facilitate the implementation of information systems.

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Conflict of interests

No conflict of interest.

References


Cola company in Tanzania (Doctoral dissertation, Mzumbe University).


