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Intelligent decision support systems in higher education institutions in developing countries: A Systematic Literature Review

Vusumzi Funda
University of Fort Hare, South Africa.
vfunda@ufh.ac.za

Abstract

The rapid evolution of technology has made it an essential tool for individuals in their daily routines. Understanding the adoption of technology and its determinants has become critical due to its significance. This paper conducts a systematic analysis of intelligent systems that support decision-making in higher education institutions, particularly in developing nations. The review aims to identify relevant literature and assess the significance and practicality of such systems. A full-text systematic review was conducted of articles selected between 2010 and 2022, and a PRISMA-P was applied for their quality assessment. The study found that IDSS is an integrated approach that combines human-computer interaction to assist individuals in effectively utilizing data, models and structured processes to address uncertainty when making decisions. However, there is limited research analysing decision problems with simple additive weighting.

Keywords
intelligent systems, decision support systems, artificial intelligence, higher education institutions, developing countries.

1 Introduction

While it is widely recognised that education is one of the important social public resources, within the context of developing countries, it continues to lag behind. This, therefore, poses a threat to these countries' national development of education and the optimal allocation of resources for their economic growth (Bonczek et al., 2014). Sauter (2014) argues that this is a result of long-term educational decision-making relying on leadership intuition or even on societal trends, which do not follow the scientific decision theory. Therefore, strengthening the decision-making process of these institutions will require the consolidation and unification of the administration of massive data sets, as well as the

use of a matching algorithm to analyse them (Fernandes et al., 2015). Consequently, decision-makers will be able to access a vast quantity of data quickly, enabling them to understand and address strengths and weaknesses of existing educational realities more effectively. This has led many developed countries to deploy high-tech, scientific education management decision-support systems through ever-expanding technological innovations (Nunes et al., 2017). According to Nunes et al. (2017), more academic institutions have developed management intelligent decision-support systems (IDSS), Studies (Govindan, 2020; Guo et al., 2015) indicate that an HEIs development would be significantly impacted by the addition of an IDSS. The IDSS approach is becoming used at colleges in developing countries. While making decisions to improve their schools, educators, administrators, and other stakeholders in the education sector might find value in the tools' perceptive analysis and recommendations (Sarjiyus et al., 2019).

The IDSS framework may be used by colleges to identify the attributes that enable them to accomplish their goals and make more informed choices (Sauter, 2014). Moreover, Bonczek et al (2014) add that the implementation of IDSS often serves as a guide for universities' administration in that it allows them to collect vital real-time data, which they, in turn, use to anticipate institutional growth. Subsequently, they are able to act to ensure the strategic objective of university performance is met. Furthermore, Arnott and Pervan (2016) and Navarro-Hellín et al (2016) conclude that the increasing positive evidence of the use of IDSS in the educational sector suggests that the public, politicians, enterprise system vendors, the mainstream media, and funding agencies are becoming more interested in the possibilities offered by IDSS and data-driven AI-based algorithms for decision-making. While certain studies highlight the negative implications of an IDSS or AI in this sector, no systematic attempt has been made to appraise the empirical evidence relating to the application of IDSS in higher institutions. Also deficient in this area is research on emerging nations, which have a substantial potential for data-driven IDSS.

Individuals and groups may use IDSS to make well-informed decisions. These systems take advantage of human abilities, information representation, and data analysis. Using IDSS is standard procedure in business, education, and healthcare. According to Latif et al. (2021), universities in developing countries may get support with their particular issues via the IDSS. More specifically, poor schools might benefit from the IDSS. Outdated infrastructure, little resources, and poor education are the issues. Belcuig and Gorunescu's 2020 research led them to the conclusion that IDSS may improve academic achievement, lesson planning, and resource efficiency in schools. As per Qasem et al. (2023), this methodology is often used to design and implement tactics that augment schooling for kids hailing from economically disadvantaged households. The techniques schools use to improve pupils' academic performance are the main subject of this study. A few examples are customised lesson plans, adaptable course materials, and timely feedback.

This paper examines the utilisation of AI-based decision support systems in higher education institutions in developing countries (DCs). Scholars assert that developing countries are sovereign states that lag behind more developed nations in terms of manufacturing and industrial capability. This, in turn, impacts the countries' ability to provide their citizens with high-quality healthcare, education and living conditions. The rationale for doing this research stemmed from the systematic review's comprehensiveness and objectivity. Finding relevant academic articles on a research subject, assessing them, and compiling the findings in line with preset criteria are the steps involved in this process. Systematic reviews eliminate prejudice since they are technique-driven. According to Tawfik et al. (2019) they quantify and highlight the uncertainty in the results.

2 Problem Statement

DCs must improve higher education institutions' operational effectiveness, strategic planning, and quality of instruction. IDSSs are critical to this process. These technologies are said to benefit educational institutions because they make use of artificial intelligence (AI), data analytics, machine learning and predictive modelling (Qasem et al., 2023). These tools support executive, teachers and administrators in making wise judgements in a range of situations. According to Ali et al. (2023), IDSS has significantly impacted the academic and management goals of institutions in developing countries. In any case, these institutions' IDSS adoption rates have been rising. Universities in developing countries have seen legislative and technological developments. The primary obstacles to the successful deployment of IDSS, however, are a lack of infrastructure, concerns over data security, and resistance to change. The uneven and erratic assistance provided by governmental and non-governmental groups just exacerbates the situation. This study examines the benefits and drawbacks of IDSS from the viewpoint of educational establishments in developing nations.

This study examines the advantages and disadvantages of intelligent decision-support systems in universities in developing countries. We will also evaluate IDSS's application in university settings in underdeveloped countries, along with the pertinent data and analysis, as it has the potential to enhance education in such countries.

3 Literature Review

The implications of making competitive and strategic decisions has elevated the significance of IDSS to unprecedented levels. Consequently, previous research also explored elements that lead to successful utilisation and management of IDSS in strategic decision-making processes in HEIs. Ikhu-Omoregbe and Ehi (2010) assert that organisations need to possess the ability to measure the worth of IDSS in order to ensure their success and to have knowledge and understanding of how they contribute to the creation of value and wealth. Despite the fact that IDSS are primarily designed to satisfy the strategic information requirements of senior executives, they are often utilised by middle managers who have supporting responsibilities. (Vohra, 2012; Sharif, 2017). Accordingly, Sharif (2017) assert that many top executives are sceptical that the IDSSs will match their investments, despite the fact that they are widely regarded as being essential to any business' success. Consequently, few organisations fully reap the benefits of their IDSS investments because of top executive support (or involvement) in using IDSS applications (Sam, 2022). Additionally, it may be that management teams and decision-makers lack the knowledge necessary to utilise and oversee the advantages of these technologies (Latif et al, 2021; Kashada, & Kashadah, 2016).

Therefore, it is vital to comprehend IDSS users' needs to ensure that the system can accurately meet them and, further, that it is utilised (Vohra, 2012). Additionally, metadata must be designed to assist with making decisions to prevent them being made based on data that is insufficient, erroneous, ambiguous, incorrect, untimely, or difficult to access (Moses et al., 2017). According to Moses et al. (2017), the efficacy of an IDSS in attaining the pertinent information required is contingent upon decision-specific characteristics that are influenced by the particular environment of an organisation. Such factors include whether the decision-maker is an individual or a group, the objective of the decision, and organisational environment. Furthermore, it is imperative that any system is equipped with a dedicated and well-informed executive supporter, a proficient workforce, appropriate technology, robust data control practices, a clearly established alignment with business objectives, effective strategies to manage organisational resistance, efficient management of system evolution and expansion, and explicit information and system requirements (Sharif, 2017; Sam, 2022; Al Shobaki et al., 2017b).

3.1 Rate of technology adoption

Individuals vary in terms of their behavioural intentions and technological expertise, with some being early adopters of technology and others who may never embrace it. As such, early adopters invest more time and effort in learning how to use new technologies, while more simplicity, usability, and support are needed for later adopters. Therefore, it is crucial to comprehend the extent to which certain individuals in their social networks will be receptive to new ideas in order to influence and boost technology adoption rates. This emphasizes the significance of identifying methods to increase technology adoption rates by understanding the unique characteristics of individual social systems (Sam, 2022).

Merely introducing technologies does not guarantee universal adoption, as different individuals will adopt them at different rates. Adoption process models were therefore developed to better comprehend how innovations are adopted. These may concentrate on the technology itself, with an emphasis on the perspective of the creator or developer (source-centred models). Alternatively, they may center on the technology used as the unit of analysis, with consideration given to whether the user is an individual or an organisation (user-centred models). The former, namely source-centred models, analyse how new technology is adopted and account for steps like diffusion, marketing, and assessment (Ikhu-Omoregbe & Ehi, 2010). According to Sam (2022), distinguishing between adopters and non-adopters of IDSSs may depend upon multiple factors, including the adopters' willingness to assume risks associated with the system. Consequently, several studies have various factors that can impact the behavioural intention of adopters and non-adopters of IDSSs. Moses et al. (2017) assert that the adoption of information technology necessitates a thorough exploration of how HEIs go through the adoption process for Information Technology to guarantee the expected level of support, both as an organisation and as individuals. Additionally, Latif et al. (2021) suggests that while users' acceptance of technology is a person’s willingness to engage with it, adoption pertains to their first use after deciding to accept it. Moreover, when examining the adopters and non-adopters of technology, most studies tend to focus on how the technology relates to personal use, such as personal computers, mobile devices, and home appliances. However, when the individuals are part of an organisation that bears the cost of the technology, the adoption decision becomes an organisational decision rather than an individual one. Therefore, examining the behavioural intention of individuals within organisations can provide insights into their acceptance of a particular technology, especially when it is new. In such cases, acceptance models tend to focus more on understanding the behavioural intention of individuals.

4 Research Method

For this investigation, the raw data was analysed from July 2010 to June 2022. PRISMA-Ps is one approach assisted us in identifying and assessing reliable information sources. Chukwuere (2022) states that the PRISMA-P technique is comprised of four stages: a critical evaluation of the scientific data, a meta-analysis, a critical review, and a critical assessment. This collection of papers aims to inform readers about the current advantages of the Intelligent Decision Support System (IDSS). Items in this series were released between 2010 and 2022.

4.1 Search Strategy

The research literature from 2010 to 2022 was examined over to find studies that give useful details about IDSS and how it is used in higher education institutions in developing countries. The researchers looked at many sources, some of which hold "grey literature," such as Google Scholar, Scopus, Web of Science, and others. The databases that were chosen were an easy choice because they have a great reputation for being trustworthy and respected academic sources. As a result, the reliability of the

study's sources is increased. As part of their search strategy, the researcher also found publications that may not have been published because of inadequate findings. This action ensured that relevant materials were thoroughly examined. This was done to make sure that studies that could be pertinent were not overlooked. The search queries employed were composed of three distinct subjects, each of which provided relevant pertinent background information that complemented the papers obtained from the research database. The keyword phrases utilised for the search are detailed in Table 1, presented below.

Theme	Representation
Intelligent decision systems and AI	“artificial intelligence” or “intelligent decision system” or “computerised decision system” or “agent system” or “expert system”.
Education	“Higher education” or “student” or “college” or “university”
Context and application	“Developing countries” or “Management” or “tutoring” or “assessment” or “administration” or “in Africa” or “personalized content” or “admission" or “adoption” or “motivation”

Table 1: Keyword phrases

4.2 Eligibility Criteria

The studies deemed eligible were those that mainly centred around data-driven Artificial Intelligence decision-making systems or IDSS in HEIs setting. Studies conducted in developing countries and published in English were chosen. The studies that were excluded from the analysis were those that were not conducted in developing countries or those that did not align with the research objective of the study. This encompasses studies that explored technologies that are not typically linked to IDSSs and as mentioned, those conducted in developed countries. The researcher analysed the titles and abstracts of the papers identified by the searches to ensure they meet the eligibility criteria.

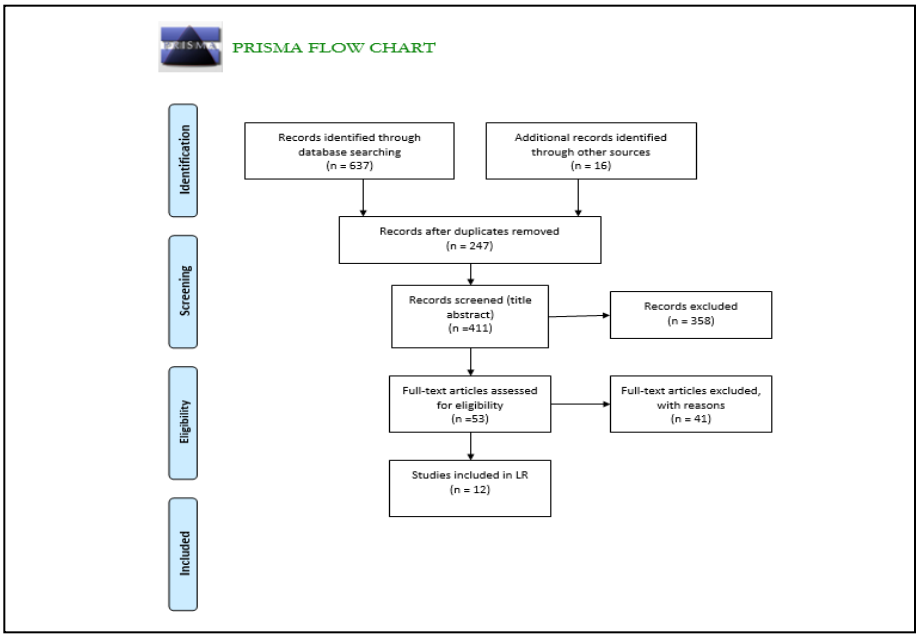

Figure 1: Image Prisma Flow

Consequently, a total of 637 articles matched the search criteria. The researcher then eliminated any duplicate research and completed an abstract review, after which 53 full-text publications were selected for examination. Of these 53 publications, several were then excluded, either because they do not focus on the application of an IDSS or do not apply to higher education settings in developing countries. Consequently, and after assessment, only 12 articles were analysed. Next, the researcher extracted relevant data onto a Microsoft Excel sheet, which was designed specifically for data extraction. The following section will discuss the research results, levels of evidence, discussion, and present relevant conclusion.

5 Results

Among others, this extensive literature review aimed to evaluate previous research and determine how IDSS can be applied within higher education and factors, which possibly affect its adoption in developing countries. The selected articles formed the foundation for addressing this particular research objective and pertained to the application, success factors, and rate of adoption of intelligent systems in higher institutions in developing countries. Eleven (11) developing countries were represented in these research findings and the years of publication range from 2010 to 2022. These studies presented their research on decision support systems from two viewpoints: the primary objective of IDSS research in creating dedicated tools that facilitate decision-making (Al Shobaki & Naser, 2017; Vohra, 2012; Sharif, 2017; Al Shobaki et al., 2017; Ikhu-Omoregbe & Ehi, 2010; Kashada, & Kashadah, 2016), and,I DSS as a mechanism for modelling (Latif et al., 2021; Oumran et al 2021; Al Hallak et al 2019; Moses et al., 2017; Sam, 2022). Consequently, they assisted the research to better understand the decision process. Table 2 below provides the characteristics of each selected article.

Author and title	Country	Study objectives	Major findings	Comments and knowledge gaps
Latif, S., XianWen, F., & Wang, L. L. (2021). Intelligent Decision Support System approach for predicting the performance of students based on a three-level machine learning technique.	Pakistan	The goal of this paper was to examine the performance of Pakistani students using a through a three-tier machine learning (ML) approach and an IDSS.	Using the suggested three-level approach increased the classifier's accuracy from 83.2% to 88.8%, as shown by the results. Compared to the ML approach of individual-level classifiers, this prediction has produced exceptional outcomes.	Here, decision system employed consisted of data warehouses and an online analytical process (OLAP). The given framework is deployable on multiple platforms and operating systems aimed at paving the way for policymaking in Pakistan's higher education sector in order to fully adopt its integration.
Sarjiyus, O., Goni, I., & Jamilu Ahmed, E. (2019). Intelligent Decision-Support System for University Admission and Placement.	Nigeria	The primary aim of this project was to create and implement a web-based system for admitting and placing potential students in Nigerian universities.	The most qualified applicants were chosen by using an automated process that is quick, thorough, and impartial. Furthermore, the system ensures that eligible applicants who fail to satisfy the prerequisites for a particular program are automatically enrolled in alternative courses for which they qualify, and which have available spaces.	In addition to guaranteeing that the best applicants are admitted to Nigerian universities, The IDSS s' efficient model and structure processes could also eliminate irregularities and automatically enrol applicants in alternative courses for which they are best suitable. By enabling applicants to self-screen, it will also provide credibility and transparency to the admissions process.
Al Shobaki, M. J., & Naser, S. S. A. (2017). Usage Degree of the Capabilities of DSSs in the Al-Aqsa University of Gaza.	Palestine	This study attempts to ascertain the extent to which DSS capabilities are used at the Palestinian university, Aqsa, in Gaza.	The study found that respondents agreed with the paragraphs outlining the general use of DSS capabilities and that the university's senior management supported the construction of DSSs.	In this study, data mining (DM) and DSSs were linked, and there was an increased interest in the practical and technical aspects of employing these systems. The human resources accessible for DSSs are becoming more and more popular. investing in the development of integration techniques and other information

				technology skills using readily available university knowledge.
Vohra, R. (2012). Intelligent Decision-Support Systems for Admission Management in higher education institutes.	India	This paper's objective was to propose a conceptual framework that may provide necessary decision-support, particularly during planning for decision-making in higher education management.	The study presents a proposal for the components of a DSS that would aid in the development of student admission policies in a higher education institution or university, as well as the architecture of a DSS, based on an enterprise resource planning (ERP) system. Subsequently, the article elaborates on how the integration of an IDSS with an Enterprise Resource Planning (ERP) system can address the limitations of the latter when used alone in higher education institutes.	In this research, the authors showed admissions activities in higher education institutions where DSSs are essential for the admissions process. Future efforts should concentrate on adopting the suggested education system design.
Sharif, N. (2017). Technical education assessment in both Belarus and Lebanon and its improvement using the intelligent decision-support system.	Lebanon and Belarus	The research used IDSS as a method to assess the quality of choices and, as a result, improve the efficacy and efficiency of technical education in developing nations, such as Lebanon and Belarus.	To improve the quality of the educational process and administration, DM and DSS were deemed acceptable technologies for offering decision aid in a higher education context since they generate and provide pertinent facts and information.	IDSSs, are produced when artificial intelligence and DSSs are combined, and they appear to be a useful tool for improving technical educational practices.
Al Shobaki, M. J., & Abu Naser, S. S. (2017). Requirements for Applying DSSs in Palestinian Higher	Palestine	This study aimed to explicate the prerequisites for implementing DSSs in Palestinian higher	The approval rate for "support of senior management for the use of DSSs" is 62.60%, while the approval	This research indicates that it is advantageous for a university to depend only on DSSs since they provide the institution's

Education Institutions-Applied Study on Al-Aqsa University in Gaza.		education institutions.	rate for "available resources for the use of DSSs" is 69.03%, and the approval rate for "type of DSSs used" is 69.73%.	administration with the necessary accurate information. The IDSS was anchored on DM.
Oumran, H. M., Atan, R. B., Binti Nor, R. N. H., Abdullah, S. B., & Mukred, M. (2021). Knowledge management system adoption to improve the decision-making process in higher learning institutions in the developing countries: a conceptual framework.	Malaysia	This research examines the elements that influence the choice to accept or reject a knowledge management system.	According to the technology adoption theories and the literature assessment, eleven (11) criteria were considered in terms of their impact on the choice to embrace or reject knowledge management systems (KMS).	Using DM, expert verified and ranked each factor individually.
Al Hallak, L., Pakštas, A., Oriogun, P., & Novakovic, D. (2019). DSSs for University Management processes: an approach towards dynamic simulation model.	Syria	This study aimed to explore the possibilities of employing dynamic simulation models to simulate decision-support processes in a university setting.	This research showed that the demands of higher education institutions, such as universities, cannot be met by present DSSs, and, therefore, promoted the development of an interactive DSS in the form of a simulation model for university processes.	This study's goal was to explore different methods for simulating university decision-making processes, with a focus on a typical Syrian private university. The employment of Systems Dynamics modelling approaches was anticipated to further aid in the development of higher education.
Ikhu-Omoregbe, N., & Ehi, O. I. (2010). Design and development of a tertiary institutions DSS (TIDSS).	Nigeria	This study outlined the design and development of a TIDSS to address the primary issue of confusing university/course selection.	The TIDSS offers users from all over the globe decision assistance, consulting, repositories, up-to-date useful information, a powerful search engine, virtual tours of universities (where accessible), and an independent platform,	The system was created utilising a computer-based methodology and the recognised Unified Modelling Language standard for designing object-oriented systems (UML).

			eliminating/reducing the cost and danger of a trip to locate schools.	
Kashada, A., Li, H., & Kashadah, O. (2016). The impact of user awareness on the successful adoption of DSS in Developing Countries: THE Context of Libyan Higher Education Ministry.	Libyan	This study examined and assessed the impact of user awareness and other awareness-related aspects to the effective adoption of the DSS in developing nations.	The findings demonstrated that poor user knowledge remains a key factor in the low adoption rate of decision assistance systems in underdeveloped nations. Awareness of the many advantages of DSSs is particularly low among those older than 40 years of age, although age is the most important factor in the usage of DSSs.	Youths in developing nations make extensive use of technology, mostly for social networking and other purposes. To achieve high rates of adoption and awareness of DSSs, more educational classes must be done to inform individuals about the significance and use of these systems in their businesses.
Moses, K. M., Islami, P. A., Lestari, M. N., & Wibawa, A. P. (2017) Application of DSS for Selecting Candidates for Scholarship Using Simple Additive Weighting in Uganda.	Uganda	The purpose of the study was to propose an application of SAW to shortlist applications received via a web/online application to serve as an interface between applicants and the selection panel. In addition, SAW was used to provide scores and weights for each candidate based on the chosen criteria.	The DSS model, which used the SAW approach, was shown to be effective and valid in the selection of scholarship recipients.	In the use of the simple additive weighting approach, the evaluation criteria and their related weights must be set in advance to calculate the final score for each applicant through matrix multiplication.
Sam, C. (2022). Intelligent decision-support systems for managing the diffusion of social computing in school-based ubiquitous learning.	South Africa	The purpose of this project is to examine social media-driven IDSSs by using real-time data to aid instructors and students in managing the dissemination of social computing in school-based ubiquitous learning.	The results identified the most accurate and mathematically-approved social media apps and gadgets to enhance u-learning in schools. As a research outcome, an automated application based on research	Fuzzy Technique of Order Preference Similarity is a multi-criteria decision-making algorithm. Ideal Solution was used to rank social media apps according to reduced-dimensionality criteria based on the subjective judgements of professional decision-makers.

			findings and using IDSSs was developed.	

Table 2: Table of Articles

Based on the research, various authors coupled IDSSs with data warehouses and online analytical processing (OLAP) (Latif et al, 2021), while others contextualised decision-support as DM (Al Shobaki, & Naser, 2017 a; Al Shobaki, & Naser, 2017; Oumranet al., 2012). According to Sharif (2017), IDSS is the process of automating decision-making through the use of artificial systems, which may computer algorithms, expert systems, intelligent agents, robotics, and similar technologies. Furthermore, only Moses et al. (2017) addressed the framework for analysing choice problems with simple additive weighting. Another theme generated from the literature was the significance of IDSSs in decision-making within higher institutions. Research by Oumran et al (2021) and Al Hallak et al (2019) claim that IDSS have the potential to impact decision-making since they facilitate collaboration and engagement amongst individuals within the organisation with regard to decision-making responsibilities. Furthermore, they can enhance the overall operational efficiency of an organisation by coordinating and managing the implementation of internal processes and aiding in its interactions with external parties and the public (Oumran et al 2021; Al Hallak et al (2019). Additionally, Kashada & Kashadah (2016) and Sam (2022), note that including a DSS in decision making process has the potential to expedite the identification of issues and opportunities with greater accuracy, speed, and quality, thus resulting in faster and better-quality judgments.

6 Discussion

Previous research has established that in developing countries, the purpose of IDSS is often to facilitate the decision-making process by breaking it down into manageable parts, considering available information, uncertainties, relevant preferences, and possible alternatives, and combining them to arrive at the best solution. Strategic decision-support systems are designed to offer informed decision-making in higher education institutions through better information, alternatives, and models to make more informed decisions. Unlike other decision-support systems that provide a single optimum decision, strategic decision-support systems allow decision-makers to analyse options in detail and enhance the effectiveness and structure of their decisions by drilling down to lower-level information. This helps decision-makers to make more informed decisions by enhancing their understanding of available options (Doulos et al, 2019). Accordingly, it can be argued that IDSS are the most suitable systems for effectively merging and integrating data, models, and software to facilitate informed decision-making, especially for decisions that lack clear guidelines or structure, as pointed out by Angeles (2014). Given that strategic decision-makers often require systematic support in making good or sound decisions, IDSS can provide them with the necessary assistance, particularly when dealing with qualitative data that is external to the organisation. Therefore, according to Angeles (2014), the contrast in worth between making correct and incorrect decisions highlights the significance of acquiring reliable information. Additionally, the effectiveness of decisions is dependent on the data quality used, as well as managers' skills to solve problems and make decisions (Arnott & Pervan, 2015). Moreover, quick decision-makers depend on up-to-date information obtained through constant monitoring of the organisation and its surroundings, both internally and externally. In contrast, those who make decisions at a slower pace depend on formal systems for gathering data and performing analysis.

By offering efficient operational models, IDSS have the potential to completely transform universities in developing countries.

The adoption of university IDSS in underdeveloped nations may be impeded by the digital gap between various socioeconomic categories and urban and rural locations. Due to resource limitations, institutions in developing countries may find it challenging to adopt IDSS (Belciug & Gorunescu, 2020). These limitations may increase the difficulty of developing and running such systems.

Thus, to make wise strategic decisions in a complex and dynamic environment, a company has to hire qualified people with good strategic judgement abilities. Making wise strategic decisions has not been difficult in and of itself in recent years; rather, the difficulty has been coming up with creative ways to get the required information. IDSS technologies provide better decision-making by sifting through large datasets to find relevant information and by offering suitable models for issue analysis, alternative design, and evaluation. Below is further information on these methods. Hazir (2015) emphasises the value of IDSS in raising the quality of decision-making. Universities may make better, faster evidence-based decisions with the aid of IDSSs since the information they get is precise, pertinent, full and current.

7 Conclusion

Given the complexity of the HEI environment and the abundance of related data, relying solely on intuition can be difficult for decision-makers, especially when it comes to significant decisions that involve semi-structured and unstructured problems. To address this complexity and uncertainty, it is recommended to use computers to support decision-making. The studies that were reviewed investigated the application, success factors, and rate of adoption of intelligent systems in HEIs in the specific context of developing countries. This review highlighted the importance of IDSSs and their role in organisations. It determined that an IDSS is a synthesis of communication technology and informatics technology, along with other closely related technologies. Enhancing how people interact and do business affecting the emerging global economy and causing significant changes in society. The particular reasons for the use of these technologies include general benefits such as increased productivity, information exchange, communication, and quicker knowledge gathering, distribution and application, while IDSS tools improve cooperation among different groups within the organisation. Consequently, effective utilisation of IDSS can result in better decision-making and decrease the isolation experienced by relevant parties, as they can now collaborate, share information, and exchange ideas to assist the decision-maker in formulating alternative decision.

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