



Emerging Science Journal

(ISSN: 2610-9182)

Vol. 8, Special Issue, 2024 "Current Issues, Trends, and New Ideas in Education"



Empowering Higher Education Through Digital Transformation and Strategic Planning for Academic Advancement

Ibrahim Rashid Al-Shamsi ^{1*}

¹ College of Business, University of Buraimi, Al-Buraimi 512, Oman.

Abstract

The digitalization of strategic planning is crucial for Oman's postsecondary higher education. This study focuses on the impact of automating and digitalizing strategic planning management to bridge gaps and improve decision-making. Aligning strategies with goals through digitalization enhances academic excellence and global recognition, providing valuable insights for Omani higher education managers. Investigating strategic planning automation in non-Western settings, it advocates for integrating digital tools to advance academia globally. The main objective is to assess how automation and digital information affect these institutions' effectiveness, accuracy, and efficiency in strategic planning. Structural Equation Modeling (SEM) used as the primary methodology. The dataset consists of 224 participants and 15 indicators. Both the measurement model and structural model were employed for analysis and testing. The results show that a twotailed test with t=-1.96 at a 95% significance level found automation significantly affects strategic planning (B=0.36, t=2.97, p=0.000), and digitalization significantly affects strategic planning (B=0.30, t=2.68, p=0.01). Mediation analysis of automation as a mediator revealed a noteworthy indirect relationship between digitalization and effective strategic planning (B=0.30, t=2.96, p=0.000). While automation offers many advantages, digitalization enables a more comprehensive and fundamental change that supports various strategic goals. By integrating digitalization into their strategic planning, organizations can create a robust digital infrastructure that improves data capabilities, encourages innovation, and boosts agility, providing a sense of security about the future of Omani higher education. This positions them for long-term success and resilience in the face of changes in the business environment.

Keywords:

Strategic Planning;
Digitalization;
Automation;
Higher Education;
Higher Education.

Article History:

Received:	21	September	2024
Revised:	14	January	2025
Accepted:	19	January	2025
Published:	12	February	2025

1- Introduction

Education is one of the most vital social institutions, providing general cultural and professional knowledge to cultivate socially significant student skills. It is crucial that the content of education, which serves as a driver of economic and social progress, aligns with the current state of science and the fundamental trends in the economy and society [1]. One of the global trends is the widespread integration of digital technologies into all sectors of the economy and public life, and education has not been exempt from this digitalization [2]. The critical challenge is the thoughtful implementation of digital technologies in educational organizations, and the deliberate, rather than haphazard, transformation of the academic model into the digital realm [3]. This transformation aims to meet the goals outlined in the National Program "Digital Economy of the Sultanate of Oman" In other words; a strategic approach is required for the digital transformation of education. Education at the tertiary level is one of the foundations of the development of society, as well as spiritual, thinking and economic processes. In social development aspect, it has central function of

^{*} CONTACT: ibrahim.r@uob.edu.om

DOI: http://dx.doi.org/10.28991/ESJ-2024-SIED1-019

^{© 2024} by the authors. Licensee ESJ, Italy. This is an open access article under the terms and conditions of the Creative Commons Attribution (CC-BY) license (https://creativecommons.org/licenses/by/4.0/).

preparing students for corporate culture and profession. Consequently, concept and mode of delivery must change to match the scientific prerequisites, the current status of the economy and the needs of society [4]. One of the key tendencies increasingly starting to come through in many global system levels is the concept of incorporation of information technologies within the academic systems, including those in the higher education institutions [5]. Education is perhaps the most expansive field that has seen the future transformation and accumulation of significant potential for improved strategic planning of learning processes. Education digitalization involves the utilization of digital technologies that improve the learning-teaching process, the use of ICT in improving the administrative activities and the promotion of ICT goes beyond the mere acquisition of technologies that support it; it must be done strategically within the context of institutional vision and mission, and requirements of the country and the world at large. For example, Oman has introduced the "Digital Economy" outlet as the digitization of various ideas that would contribute to the development of socio economy [10-12]. In line with this, this initiative is best underscored by the need for a systematic and strategic approach to the development of Oman's higher education sector.

This research focuses on the effects of digital transformation on strategic management in higher education institutions. It is important to understand how these technologies can be better integrated into the strategic planning process, how institutions might use them more effectively to improve decision - making, and overall how the digital planning agenda is connected to the broader objectives of the digital economy. As a result, the research aims to offer practical recommendations that will help determine how higher education institutions can optimise the use of digital technology for long-term academic development.

1-1-Research Gap

Despite the significance of strategic planning and operationalization in achieving academic excellence, very few experience-based studies have analyzed the extent to which academic stakeholders develop such strategies [13]. Therefore, much literature has insufficiently addressed the aspect of stakeholder involvement in the process of strategic planning [14-16]. It has also not discussed the extent to which strategies are operationalized and whether concrete actions are cascaded throughout the organization. This is especially true for studies conducted in the context of higher education institutions operating within the region of Arabian Gulf countries [17-19]. Most studies in the field simply discuss the nature and the level of SWOT within the context of the local environment [20-22]. Consequently, rather little emphasis is given to the process of stakeholder participation, strategic options, action plans, implementation, and evaluation of these strategic options. Strategic management research often examines leaders' perspectives and hence emphasizes management actions over those of other organizational stakeholders. However, the hierarchical nature of higher education organizations suggests that leaders play an important, but not necessarily exclusive role in academic success. Therefore, we review the literature that questions this leadership hegemony and also recognizes the strategic contribution made by a variety of higher education stakeholders including administrative and academic staff and students [23]. This helps fill a gap in our knowledge of how other stakeholders are contributing to the quality of higher education strategies that have been conceived by those in a leadership role. The existence of organizational performance implications that result from the level of stakeholder satisfaction with higher education institutions identifies a unique opportunity for these organizations to engage their stakeholder population mix in the strategic management process. Those several gaps that still persists in the existing literature are: Most work provides technological considerations, including the construction of digital networks, electronic learning solutions, and digital assets. However, significantly less is said about the strategic aspect of Digitalisation or how the concepts of Automation and Digitalisation can enhance strategic planning in higher education institutions. Furthermore, most of the work is geared towards settings in the developed world while few explore the contingencies and possibilities of digitization in the developing world, including the Arab Gulf states. However, these digital strategies of Oman have their special cultural, economic, and institutional factors that shape them in higher education more specifically. Zeesh research is required to identify that how these factors influence the process of digital transformation and its results. Another is absence of scientific literature on how different digital technologies influence the degree of detail, time, and effectiveness of strategic planning. Thus, there are no actual statistics to corroborate what theoretical frameworks indicate as advantages of digital transformation. Further, the relationship between the digital information systems and decision making in educational organizations is still not well documented.

This study seeks to fill these gaps by:

- Studying how a number of strategic planning processes being automated affects the efficiency of strategic planning process in higher learning institutions.
- Exploring how digital elements in information systems affect the accuracy and speed of strategic management activities.
- Discussing these findings in terms of Oman's national digital economy strategy, and presenting recommendations that may prove relevant to the development of other emerging regions.

Overall, this study aims to fill in these gaps and make a positive contribution to the existing literature on digital transformation in education, with specific suggestions for higher education institutions that are interested in the application of digital technologies to improve their strategic management processes.

This study aims to investigate the phenomenon of digitalization and automation in strategic planning within the education sector, focusing on its impact on the strategic transformation of higher education. The primary objectives are to examine the content and implications of automation and digitalization in educational strategic planning, to review the specific features of educational digitalization in Oman, and to develop a comprehensive concept for a digital transformation strategy in higher education.

1-2-Research Questions

- What is the impact of automating strategic planning procedures on the overall efficacy of strategic planning in postsecondary educational establishments?
- In what ways does the use of digital information improve the precision and efficiency of strategic planning in higher education?

1-3-Research Objectives

- To assess how automation in strategic planning affects the efficacy of strategic planning in higher education institutions.
- To examine how digital information influences the precision and efficiency of strategic planning in higher education institutions.

1-4-Hypotheses

- H1: The efficacy of strategic planning in educational institutions is significantly enhanced by automation.
- H2: In higher education, using digital information dramatically improves the precision and efficiency of strategic planning.
- H3: Possessing automation has a significant positive relationship with, and partially mediates, Digital Information in supporting education strategic planning.

This research framework will provide insights into how various aspects contribute to the efficacy of strategic planning in higher education institutions by addressing these questions, objectives, and hypotheses when deciding between automation and digitalization for strategic planning. The primary issue raised in this work is the difficulty in deciding between automation and digitalization for strategic planning. Both have many benefits but need thorough plans and integration with all facets of the business. This is a condensed version of the primary issue:

1-5-Principal Issue

The decision of whether to include automation or digitalization in strategic planning presents a challenge to organizations.

1-6-Each Strategy has Several Advantages

Please Digitalization makes fundamental changes possible, improving data capacities, encouraging innovation, and increasing agility, all of which contribute to long-term success and flexibility. Automation increases output, fosters creativity, and keeps businesses competitive, but it also raises ethical concerns and necessitates worker retraining. Selecting these two strategies entails weighing the possible obstacles, the thorough execution needed, and how well each corresponds with the organization's strategic goals [24].

2- Literature Review

This study examines the impact of strategic planning on Bahraini banks' performance, finding significant effects on financial, customer, and learning aspects, with moderate influence on internal business processes [25]. The study explores the role of future foresight in achieving strategic leadership for Omani educational institutions, highlighting the importance of strategic vision, environmental analysis, and strategic thinking in leadership development [26]. This study examines how motivation, transformational leadership, and involvement in strategic planning (SP) influences academic staff performance in Oman's higher education institutions. Findings show SP involvement mediates the effects of motivation and leadership on staff performance [27]. This study evaluates Biometric Attendance Technology's impact on faculty loyalty and satisfaction in Arab educational systems, revealing minimal improvements in organizational performance despite its implementation and emphasizing the need for supportive training initiatives [28].

This study investigates the role of collaborative leadership in Oman's government digital transformation. It examines four leadership attributes—self-directed teams, power-sharing, relational intelligence, and agility—using PLS-SEM analysis. Results show self-directed teams and agility significantly enhance organizational performance, offering valuable insights for improving government digital transformation strategies [29]. This study develops the Thesaurus Glossary E-learning (TGE) framework, a multilingual tool that adapts to students' cultural learning differences, enhancing conceptual understanding and improving performance by 19% among users at a private university in Oman [30]. The Human Resources Mobile Information System (HRMoIS) enhances efficiency and productivity through mobile access. This study examines its impact on employee performance in Al-Anbar, recommending improved training and resources for effective implementation in small organizations [31].

This study explores the impact of COVID-19 on an automated academic advisory system at the University of Nizwa, focusing on students' emotional intelligence. It employs the UTAUT model and analyzes data from 35 participants, confirming the reliability of all constructs through Cronbach's alpha testing [32]. This study investigates factors influencing instructors' smartphone acceptance in lectures, examining perceived usefulness, attitudes, and behavioral intentions using the technology acceptance model [33]. This paper demonstrates how the Integration Definition for Function Modeling (IDEF0), an organized technique for modeling and assessing systems and processes, is called Integration Definition for Function Modeling (IDEF0). Diagrams, offering a standardized and unambiguous means of visualizing intricate operations, represent a system's functions, inputs, outputs, and controls. IDEF0 is a popular tool for business process optimization, systems engineering, and strategic planning. IDEF0 modeling language simplifies strategic plan development, transitioning from static documents to dynamic models. Proof-of-concept examples highlight IDEF0's benefits, including clarity, flexibility, and applicability for strategy automation across various organizational sizes [34]. This article presents a framework linking technology choices, strategy, and structure, emphasizing flexible automation. It proposes superior performance when strategy and structure align with the firm's technological competencies and constraints within its external environment [35].

Rapid advances in machine learning and AI have reignited interest in automation, impacting innovation. This conceptual paper proposes a framework for the innovation process using unit process concepts, emphasizing human, organizational, and social factors, forming the Innovation-Automation-Strategy cycle (IAS) [36]. Data mining is a powerful analytical tool for educational institutions, enabling better resource allocation, staff management, and proactive student outcome management. By uncovering hidden patterns in large databases, community colleges, and universities can build highly accurate predictive models of population behavior. These models help address transfers, retention, marketing, and alum relations. Education aims to equip people, especially the young, with the knowledge and skills necessary for future societal roles and productivity. This research paper uses data mining techniques to enhance the quality of higher education. Specifically, it enables universities to predict student enrollment, manage resources, and improve strategies based on extracted knowledge. This study can significantly prepare students for future jobs, fostering an enjoyable and modern educational experience.

The findings provide a deep understanding of enrollment patterns, aiding faculty and administrators in offering additional basic skill classes, academic counseling, and policy improvements to enhance overall management quality [36]. This study analyzes consumer behavior in the e-commerce sectors of Oman and Bahrain, focusing on developing sustainable strategies to improve business technology. Using exploratory data analysis, data from Terproject.com and Statista revealed vital insights. In Bahrain's e-commerce market, revenue will rise from \$988.10 million to \$1458.00 million, and in Oman, from \$1695.00 million to \$2543.00 million between 2023 and 2028. The projected CAGR is 8.09% for Bahrain and 8.45% for Oman. Dominant sectors include beverages and fashion in Bahrain and food, drinks, and fashion in Oman. Recommendations provide a foundation for a sustainable market penetration strategy [37]. This research abstract highlights the role of search engines in the digital economy, emphasizing query formulation's importance for efficient information retrieval. It introduces the Interactive Digital Associative Tool (IDAT), improving human memory and conceptual thinking [38]. This work presents a systematic model from a case study at the University of Buraimi in Oman, aiming to address challenges in formative assessment. Adapting the process to suit Arabic cultural backgrounds, the model transforms formative assessment into a digital format using the Moodle Learning System (MLS). Results show a 90% success rate among students, with significant academic improvement [39]. The COVID-19 pandemic pushed businesses to adopt innovative technologies, and this influenced education similarly. This study uses UTAUT2 to examine factors affecting students' acceptance of online communication for learning, finding that social influence, facilitating conditions, hedonic motivation, and habit positively impact behavioral intention [40, 41].

The study analyzed the telecommunications industry's external environment, covering the overall industry and regional markets for communication services. It evaluated applying foreign companies' experience and crisis management measures from other sectors. The literature review revealed a research gap in automating educational strategic plans, particularly in the Sultanate of Oman. This study aims to address this gap by investigating the digital transformation of education, focusing on the higher education sector. The analysis identified various aspects, including opportunities, threats, strengths, and weaknesses of digital transformation in the country's education system. Challenges include limited acceptance of digital technologies by educational organizations, a relatively low digital culture among the population, and a need for consistent measures for managing digitalization and content digitalization. Additionally, the study formulates critical elements of a digital transformation strategy for higher education in Oman, emphasizing the importance of clarity and methodology in strategy formulation to enhance effectiveness.

3- Research Methodology

The scientific accomplishments of domestic and international scientists in the sphere of the digital transformation of education served as the theoretical and methodological foundation for the study. We employed various scientific techniques and methodologies, including analysis and synthesis, comparison, generalization, and scientific abstractions, to support the obtained conclusions. Figures 1 and 2 were considered. The following are the primary responsibilities for determining which structural equations are used: Path analysis, also known as causal modeling, assumes that variables have causal links. Testing theories and modifying the parameters of a causal model represented by linear equations are feasible. Manifest variables, latent variables, or both are included in causal models;

Confirmatory factor analysis extends conventional factor analysis and examines specific theories regarding the composition of factor loadings and the relationships between them. The proposed conceptual framework is presented in Figure 3.

Educational Organization

lections	Establishing partnerships with the business community, educational institutions, scientific organizations, and others. Fostering a sense of community among partners, aligned with common goals and the national interests of the country.	Reorienting structural divisions towards collaboration within a unified digital space. Implementing business process reengineering as the foundation for integrating digital technologies.
Conr	Fostering relationships among educational entities to facilitate the transfer or exchange of information, educational and scientific experiences, and collaborative implementation of digital projects.	Enhancing the digital competence of scientific and pedagogical staff and students. Tailoring educational pathways to accommodate individual characteristics.

Society

Figure 1. Matrix outlining value processes within the Digital University Model



Figure 2. Matrix outlining value processes within the Digital University Model



Figure 3. The Proposed Conceptual Framework

Where:

SPA: Strategic Planning Automation (SPA) (Independent Variables (IVs)).UDI: Utilization Digital Information (UDI) (Independent Variables (IVs)).SPE: Strategic Planning Effectiveness (SPE) (Dependent Variable (DV)).

3-1- The Procedure for Gathering and Sampling Data

There are 267 occurrences and 15 characteristics in the gathered dataset. Because of email and time restrictions, a non-probability approach was used for the sampling frame. Convenience sampling provided teachers with pertinent data. After analyzing relevant literature and establishing study objectives, we developed a questionnaire comprising two independent and one dependent variable. To guarantee clarity, experts reviewed the questions. Google Drive delivered the e-questionnaire to instructors, vice-chancellors, industry IT experts, and people in management and strategic planning roles. 224 of the 267 participants who were contacted had replied by April 23, 2024. Based on earlier research, this sample size was judged appropriate for analysis [42-44].

3-2-Procedure for Cleaning Data

We started the data cleaning procedure in SPSS after obtaining the data in CSV format from Google Forms. First, we verified that the dataset's lowest and maximum values on the five-point Likert scale (1 to 5) were accurate. After that, we looked into missing data from required form fields and looked for anomalies, but we could not locate any. Lastly, we used standard deviation (SD) to assess unusual answers. According to Table 1, the descriptive statistics indicate appropriateness for analysis based on previous research, with SD-Min = 1.065 and SD-Max = 1.384. Over 0.25 is the suggested threshold for the standard deviation (STDEV). Skewness and kurtosis are tested using descriptive statistics. Values of "skewness" between "-3 and +3" and "kurtosis" between "-10 and +10" are considered suitable for Structural Equation Modeling (SEM) [42, 43].

Name	No.	Туре	Missing's	Mean	Median	Standard deviation	Excess kurtosis	Skewness
1.(SPA-1)	1	MET	0	3.589	4	1.299	-0.503	-0.751
2.(SPA-2)	2	MET	0	3.607	4	1.245	-0.343	-0.784
3.(SPA-3)	3	MET	0	3.638	4	1.326	-0.444	-0.828
4.(SPA-4)	4	MET	0	3.853	4	1.09	0.168	-0.849
5.(SPA-5)	5	MET	0	3.804	4	1.113	-0.038	-0.818
1.(UDI -1)	6	MET	0	3.554	4	1.384	-1.008	-0.554
2.(UDI -2)	7	MET	0	3.312	4	1.306	-0.938	-0.462
3.(UDI -3)	8	MET	0	3.598	4	1.093	-0.094	-0.676
4.(UDI -4)	9	MET	0	3.348	4	1.361	-1.043	-0.394
5.(UDI -5)	10	MET	0	3.571	4	1.259	-0.713	-0.555
1.(SPE -1)	11	MET	0	3.388	4	1.256	-0.641	-0.521
2.(SPE -2)	12	MET	0	3.71	4	1.11	-0.463	-0.588
3.(SPE_3)	13	MET	0	3.665	4	1.065	0.099	-0.773
4.(SPE-4)	14	MET	0	3.402	4	1.278	-0.679	-0.619
5.(SPE -5)	15	MET	0	3.763	4	1.131	0.035	-0.829

Table 1. Descriptive Statistics

4- Data Analysis and Results

4-1-Assessment Model: Validity and Reliability

Composite Reliability (CR) and Cronbach's Alpha are used to evaluate validity and reliability. Items with factor loadings of less than 0.700 are removed from the dataset. Therefore, UD3 and SPE1 are removed as indicated in Figure 4 before and after Figure 5. This conclusion is the result of thorough testing that included AVE and HTMT. Table 2 displays the remaining items' validity, reliability, and factor loadings. All alpha values and CR above the suggested threshold of 0.700 show robust dependability. The AVE and CR values, equal to or more than 0.500 and 0.700, respectively, verified the convergent validity. Cross-loadings demonstrated discriminant validity, as factor loadings exceeded cross-loadings for every item.



Figure 4. First Conceptual Model with All Variables and Indicators

A first set of conceptual model is provided in Figure 4 where newcomers' perceptions are fully developed including all intended variables called constructs and all intended measures called indicators. It reflects hypothesized relationships and structural plan of the study in a pictorial form.



Figure 5. Final Conceptual Model after Removing All Indicators (Constructs UD3 and SPE1) Under 0.7

The final proposed model is shown in Figure 5 after omitting indicators UD3 and SPE1 that have factor loading below 0.7 in order to enhance reliability and validity of the measures. The elaborated model involves only the markers that comply with the criterion for strong marker representation of the corresponding construct. This adjustment improves the stability of structural depicted relations.

	Factor Loading	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Strategic Planning Automation (SPA)		0.838	0.845	0.885	0.607
Sp1 ← SPA	0.740				
$SP2 \leftarrow SPA$	0.774				
SP3 ← SPA	0.739				
$SP4 \leftarrow SPA$	0.843				
$SP5 \leftarrow SPA$	0.796				
Strategic Planning Effectiveness (SPE)		0.728	0.731	0.831	0.551
$SPE2 \leftarrow SPE$	0.700				
SPE3 ← SPE	0.774				
$SPE4 \leftarrow SPE$	0.774				
SPE5 ← SPE	0.720				
Utilization Digital Information (UDI)		0.772	0.787	0.852	0.590
UD1 ← UDI	0.740				
UD2 ← UDI	0.768				
UD4 ← UDI	0.790				
UDI5 ← UDI	0.773				

Table 2. Item loadings, reliability and validity

Table 2 presents method used for assess measurement model that is based on structural equation modeling (SEM) Key Metric. Here's a breakdown of its contents and purpose:

- Factor Loadings: Assesses the standardized loading coefficients through which level it measures up to the latent factors, so that each item represents the intended factor well.
- Cronbach's Alpha: Measures internal consistency reliability, and defines this as the degree to which the items in a construct are related.
- Composite Reliability (rho_a and rho_c): Computes general reliability coefficients, based on item loadings, which gives more accurate reliability figure as compared to Cronbach's Alpha.
- Average Variance Extracted (AVE): Examines the convergent validity by comparing the amount of variance that can be explained by a construct to the degree of variances that could be attributed to measurement error.

Purpose: The table helps maintain reliability and validity of the constructs in the study to complement the SEM analysis.

4-2-Predictive validity

The criteria put out by "Fornell & Larcker," additional confirmation of discriminant validity was obtained; Table 3 presents the specific findings.

Table 3 "Fornell-Larcker" Criterion

Tuble et	i or ment i		
	SPA	SPE	UDI
SPA	0.779		
SPE	0.610	0.743	
UDI	0.818	0.599	0.768

The Fornell-Larcker Criterion, method to evaluate discriminant validity in structural equation modeling, is presented in Table 3. The diagonal values (0.779, 0.743, 0.768) have been estimated by taking square root of AVE of each construct which shows the extent to which each construct represents the amount of variance in the construct. Values on off-diagonal (0.610, 0.818, 0.599) indicates inter-construct correlation which establish the correlations between the constructs. The results show substantial discriminant validity as the diagonal values are greater than the off diagonal values suggesting the constructs are indeed different. This table reduces the level of redundancy that may be observed in the relationships between a number of the constructs in the model.

4-3-Structural Model

The next stage of our research was assessing the structural models to investigate the hypotheses we had proposed as presented in Table 4.

			-	
	Original sample (O)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
$SPA \rightarrow SPE$	0.36	0.12	2.97	0.00
$UDI \rightarrow SPA$	0.82	0.02	39.28	0.00
$\text{UDI} \rightarrow \text{SPE}$	0.30	0.11	2.68	0.01
$\text{UDI} \rightarrow \text{SPA} \rightarrow \text{SPE}$	0.30	0.10	2.96	0.00

Table 4. Testing Hypotheses Directly

4-4-Testing Hypotheses Directlys

It was decided to do a two-tailed test with a t-value of -1.96 and a 95% significance level. This decision was influenced by the data reported in Hair et al. [42, 43]. In Table 4, the hypothesis findings showed a substantial influence of SPA -> SPE (B=0.36, t=2.97, p=0.000). Consequently, hypothesis H1 was supported. The SPE was significantly impacted by UDI (B=0.30, t=2.68, p=0.01) supporting hypothesis H2.

4-5-Results of the Mediation Analysis

Figure 6 illustrates the Mediation analysis "Bootstrapping" implementation and Table 5 presents the mediation results.



Figure 6. Bootstrapping implementation for Mediation analysis

Table	5.	Result	Summary

Total	leffect	Direct	Effect	Specific indirect effect							
В	Р	В	Р	Hypothesis	В	t	UL	LL	Р	Results	
0.59	0.000	0.303	0.007	$\begin{array}{c} H3\\ UDI \rightarrow SPA \rightarrow SPE \end{array}$	0.30	2.96	0.09	0.48	0.00	Partial Mediation	H3: Accepted

The goal of H3 is to evaluate how automation mediates the link between the effectiveness of strategic plans and Digital Information. According to H3's data, a noteworthy indirect relationship exists between Digital Information and effective strategic planning (B=0.30, t=2.96, p=0.000). The mediator's influence was substantial (P<0.05) when there was simply a relationship between Digital information and a significant indirect effect of the strategic plan. Based on the direct and indirect effects, and since the direct and specific indirect effect was found significant, automation partially mediates the relationship between education digitalization and strategic planning. Automation moderates the

relationship between digitalization and strategic planning. That high automation weakens the positive relationship between digitalization and strategic planning.

The details of the construct interrelations (theory connections) in the conceptual models: UDI, SPA, SPE, and the hypothesis testing are presented in the following table. Here's an explanation of its contents and significance:

Total Effect: The regression equation results of the study self-perceived efficacy (SPE) for unequal distribution of independence (UDI) testify to significant influence B=0.59, P=0.000 which support a positive and significant relationship.

Direct Effect: The direct relationship between UDI and SPE was also significant, Equal to B=0.303, P=0.007, these findings support the null hypothesis that UDI effects are independent of mediators on SPE.

Specific Indirect Effect: This considers the moderating effect of SPA on the UDI-SPE association. The mediation effect (B=0.30,t=2.96,P=0.00).

Hypothesis H3 with this analysis is therefore concludes that UDI has direct as well as mediated influence on SPE through SPA.

Importance of Results

Model Validation: The results confirm the conceptual model, underlining the role of SPA as a partial mediator.

Robustness: With the low p-values across effects all lower than 0.01 the study is statistically significant, thus increasing the reliability of the results.

Partial Mediation: This result offers finer grained insights as well as because demonstrating partial mediation means that although SPA significantly explains the relationship, it is not the only factor: UDI directly impacts SPE as well.

5- Discussion

As stated, the outcomes are (B=0.36, t=2.97, p=0.000). The following is a brief explanation of each value = 0.36(Beta Coefficient). It Measures the direction and intensity of a link between two variables are determined by the beta coefficient (B). Here, it illustrates the change in the dependent variable (strategic planning effectiveness) for every unit change in the independent variable (automation or digitalization). Positive or Negative: The two variables have a positive association, as indicated by the positive value (0.36). The dependent variable rises in tandem with the independent variable. A good impact is indicated by a value of 0.36. T-value is 2.97, measures ascertain if there is a statistically significant link between the variables, the t-value calculates the number of standard deviations from the observed value that deviates from the mean. Positive or Negative: A larger absolute t-value indicates a more significant link. Given the high t-value of 2.97, the association seems likely to be statistically significant. 0.000 is the p-value, and measures the probability that the observed results were the result of chance is indicated by the p-value. A smaller p-value suggests more evidence that the null hypothesis ,which holds that there is no link or effect is false. Positive or negative , A result with a p-value of 0.000 is considered highly statistically significant. Since a p-value of less than 0.05 is usually regarded as substantial, 0.000 is well below this cutoff, suggesting a high probability that the link seen is actual and not the result of chance. In brief, B=0.36, this indicates a somewhat favorable correlation.t=2.97, indicates a statistically significant connection. The significance level of p=0.000 indicates that the results are not the product of chance. These numbers indicate a substantial and favorable relationship between the independent variable (automation or digitalization) and the dependent variable (successful strategy planning).

5-1-Comparing with the Result of Previous Studies

Consistency: Partial mediation also supports other research done in educational and strategic planning for mediating constructs where some indirect avenues enrich overall effects.

Novel Contribution: While prior work may focus simply on various direct effects, this study makes a more nuanced contribution to understanding the role of SPA in the relationship between UDI and SPE.

Higher Effects: The total effect (B=0.59) In comparison with benchmarks of similar studies, the estimated coefficient (B = 0.59) suggests that the impact of UDI on SPE is relatively robust within the framework of this investigation.

Table 5 shows the outcome of the proposed model in enhancing knowledge on how UDI influences SPA or how SPA affects SPE. It also enhances the study's relevance and significance in the context of the literature by not only revealing direct effects, but also complex mediating pathways and specific emergent patterns, which present theoretical and practical suggestions for digital transformations and strategic management in HE.

6- Conclusion

The research framework presented in this study offers essential insights into the process of choosing between automation and digitalization for strategic planning in Omani higher education institutions. The crux of the matter is which strategy to choose, as automation and digitalization both have significant advantages but need thorough planning and integration throughout the enterprise. Digitalization encompasses broader business transformation through digital technologies.

In relation to strategic planning for digital transformation to build equity infrastructure at college, the analysis of the two emerging themes, resources for digitalization offered in colleges, and the factors influencing the successful digital transformation implementation at Oman's colleges indicates that at the Ministry of Higher Education, can play an effective role in accelerating digitalization at these colleges, increasing partnerships between local industries and different colleges in Oman to develop digital skills, and organizing faculty training and monitoring on using digital support tools to ensure students with different learning and knowledge have the chance to expand their careers through education.

These results counter previous studies. Such studies have proven the necessity for willingness and ongoing learning by employees in addition to the challenge of engaging colleges with industry in offering employment support. Consequently, a substantial portion of the changes needed seems to be the process of creating classrooms for education that are both enjoyable and fair. By advocating for digital tools, the study advances global discussions on work engagement, organizational commitment, and strategic planning in academia, particularly in non-Western contexts like Oman.

7- Declarations

7-1-Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-2-Funding

The author received partial financial support from University of Buraimi for the research, authorship, and/or publication of this article.

7-3-Acknowledgments

I sincerely thank the University of Buraimi for their invaluable support in completing this research. Their guidance, resources, and encouragement have greatly contributed to the success of this work.

7-4-Institutional Review Board Statement

Not Applicable.

7-5-Informed Consent Statement

All subjects gave their informed permission before beginning the research. They received an explanation of the goals, protocols, and participant rights of the study. As participation in the study was entirely voluntary, participants were free to leave at any moment without incurring any penalties. The research procedure preserved participant anonymity and all acquired data were handled with the utmost secrecy. Participants gave their permission for their data to be used only for study. Furthermore, no personally identifying information ,such as email addresses or phone numbers, was gathered as part of the poll in order to respect confidentiality and ethical norms.

7-6-Conflicts of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the author.

8- References

- Rashid Al-Shamsi, I., & Shannaq, B. (2024). Leveraging clustering techniques to drive sustainable economic innovation in the India–Gulf interchange. Cogent Social Sciences, 10(1), 2341483. doi:10.1080/23311886.2024.2341483.
- [2] Boumedyen, S., Yusupov, R., & V., A. (2010). Student Relationship in Higher Education Using Data Mining Techniques. Global Journal of Computer Science and Technology, 10(10), 54–59.
- [3] MTCIT (2024). Ministry of Transport, Communications and Information Technology. MTCIT, Muscat, Oman.Available online: https://www.mtcit.gov.om/ITAPortal/Pages/Page.aspx?NID=292618&PID=200398 (accessed on December 2024).

- [4] Shannaq, B., Ali, O., Maqbali, S. A., & Al-Zeidi, A. (2024). Advancing user classification models: A comparative analysis of machine learning approaches to enhance faculty password policies at the University of Buraimi. Journal of Infrastructure, Policy and Development, 8(13), 9311. doi:10.24294/jipd9311.
- [5] Latham, A., Crockett, K., & McLean, D. (2014). An adaptation algorithm for an intelligent natural language tutoring system. Computers & Education, 71, 97-110. doi:10.1016/j.compedu.2013.09.014.
- [6] Arai, K., & Kapoor, S. (2022). Advances in Information and Communication: Proceedings of the 2022 Future of Information and Communication Conference (FICC), Volume 2, Springer Nature, Cham, Switzerland. doi:10.1007/978-3-030-17795-9.
- [7] Segumpan, R. G., & McAlaney, J. (2023). Challenges and Reforms in Gulf Higher Education: Confronting the COVID-19 Pandemic and Assessing Future Implications. Taylor & Francis, London, United Kingdom. doi:10.4324/9781003457299.
- [8] Awwad, B. (2024). The AI Revolution: Driving Business Innovation and Research. Studies in Systems, Decision and Control, Springer Nature, Cham, Switzerland. doi:10.1007/978-3-031-54383-8.
- [9] Shannaq, B., & Al-Zeidi, A. (2024). Intelligent Information System: Leveraging AI and Machine Learning for University Course Registration and Academic Performance Enhancement in Educational Systems. Studies in Big Data, 159, 51–65. Springer Nature, Cham, Switzerland. doi:10.1007/978-3-031-71213-5_5.
- [10] Shannaq, B., Muniyanayaka, D. K., Ali, O., Bani-Ismail, B., & Al Maqbali, S. (2024). Exploring the role of machine learning models in risk assessment models for developed organizations' management decision policies. Journal of Infrastructure, Policy and Development, 8(13), 9364. doi:10.24294/jipd9364.
- [11] Sadriwala, K. F., Shannaq, B., & Sadriwala, M. F. (2024). Gcc cross-national comparative study on environmental, social, and governance (Esg) metrics performance and its direct implications for economic development outcomes. Studies in Systems, Decision and Control, 525, 429–441. doi:10.1007/978-3-031-54383-8_33.
- [12] Shannaq, B., Shamsi, I. Al, & Majeed, S. N. A. (2019). Management information system for predicting quantity martials. TEM Journal, 8(4), 1143–1149. doi:10.18421/TEM84-06.
- [13] Daly-Smith, A., Quarmby, T., Archbold, V. S. J., Corrigan, N., Wilson, D., Resaland, G. K., Bartholomew, J. B., Singh, A., Tjomsland, H. E., Sherar, L. B., Chalkley, A., Routen, A. C., Shickle, D., Bingham, D. D., Barber, S. E., Van Sluijs, E., Fairclough, S. J., & McKenna, J. (2020). Using a multi-stakeholder experience-based design process to co-develop the Creating Active Schools Framework. International Journal of Behavioral Nutrition and Physical Activity, 17(1), 13. doi:10.1186/s12966-020-0917-z.
- [14] Errida, A., & Lotfi, B. (2021). The determinants of organizational change management success: Literature review and case study. International Journal of Engineering Business Management, 13, 18479790211016273, doi:10.1177/18479790211016273.
- [15] Falqueto, J. M. Z., Hoffmann, V. E., Gomes, R. C., & Onoyama Mori, S. S. (2020). Strategic planning in higher education institutions: what are the stakeholders' roles in the process? Higher Education, 79(6), 1039–1056. doi:10.1007/s10734-019-00455-8.
- [16] Loureiro, S. M. C., Romero, J., & Bilro, R. G. (2020). Stakeholder engagement in co-creation processes for innovation: A systematic literature review and case study. Journal of Business Research, 119, 388–409. doi:10.1016/j.jbusres.2019.09.038.
- [17] Sellami, A., Arar, K., & Sawalhi, R. (2022). Higher Education and Scientific Research in the Arabian Gulf States: Opportunities, Aspirations, and Challenges. Routledge, London, United Kingdom. doi:10.4324/9781003222750.
- [18] Abdalla, S., Ramadan, E., Al-Belushi, M. A. K., & Al-Hooti, N. (2024). Unveiling the Role of Arab Universities in Advancing Sustainable Development Goals: A Multi-Dimensional Analysis. Sustainability (Switzerland), 16(14), 5829. doi:10.3390/su16145829.
- [19] Almahamid, S. M., Ayoub, A. E. A., & Al Salah, L. F. (2023). New ways of working scale development and psychometric properties: validation in higher education institutions in the GCC countries. Journal of Facilities Management, 21(3), 453–471. doi:10.1108/JFM-05-2021-0051.
- [20] Phadermrod, B., Crowder, R. M., & Wills, G. B. (2019). Importance-performance analysis based SWOT analysis. International Journal of Information Management, 44, 194-203. doi:10.1016/j.ijinfomgt.2016.03.009.
- [21] Shannaq, B., Ibrahim, F. J., & Adebiaye, R. (2012). the Impact of the Green Learning on the Students Performance. Asian Journal Of Computer Science And Information Technology, 2(7), 190–193.
- [22] Vialardi, C., Bravo, J., Shafti, L., & Ortigosa, Ê. (2009). Recommendation in Higher Education Using Data Mining Techniques. Educational Data Mining, 190.
- [23] Cheng, M., Adekola, O., Albia, J., & Cai, S. (2022). Employability in higher education: a review of key stakeholders' perspectives. Higher Education Evaluation and Development, 16(1), 16–31. doi:10.1108/heed-03-2021-0025.
- [24] Waissi, G. R., Demir, M., Humble, J. E., & Lev, B. (2015). Automation of strategy using IDEF0 A proof of concept. Operations Research Perspectives, 2, 106–113. doi:10.1016/j.orp.2015.05.001.

- [25] Abdul Rahman, A. A. (2019). The impact of strategic planning on enhancing the strategic performance of banks: Evidence from Bahrain. Banks and Bank Systems, 14(2), 140–151. doi:10.21511/bbs.14(2).2019.12.
- [26] Humaid Al Abri, Y. B. S. Bin, Mohamed Adnan, M. A. Bin, Amer Alesayi, A. K. S., Humid Al-Qari, H. B. S. Bin, & Ali Al Eisaei, M. S. (2023). The Role of Future Foresight in Achieving Strategic Leadership for Educational Institutions in the Sultanate of Oman. International Journal of Academic Research in Business and Social Sciences, 13(10), 2285–2305,. doi:10.6007/ijarbss/v13-i10/19134.
- [27] Al-Aamri, M. S. H., Soliman, M., & Ponniah, L. S. (2024). Influencers of academic staff performance in higher education: the role of motivation, transformational leadership and involvement in strategic planning. Journal of Applied Research in Higher Education. doi:10.1108/JARHE-08-2023-0339.
- [28] Al-Shamsi, I. R., Shannaq, B., Adebiaye, R., & Owusu, T. (2024). Exploring biometric attendance technology in the Arab academic environment: Insights into faculty loyalty and educational performance in policy initiatives. Journal of Infrastructure, Policy and Development, 8(9), 6991. doi:10.24294/jipd.v8i9.6991.
- [29] Al-Khayari, N. M., Yousefi, M., & Aigbogun, O. (2024). A predictive model for collaborative leadership in digital transformation: Does it make a difference in Oman's e-government performance? Foresight. doi:10.1108/FS-08-2023-0163.
- [30] Shannaq, B., Adebiaye, R., Owusu, T., & Al-Zeidi, A. (2024). An intelligent online human-computer interaction tool for adapting educational content to diverse learning capabilities across Arab cultures: Challenges and strategies. Journal of Infrastructure, Policy and Development, 8(9), 7172. doi:10.24294/jipd.v8i9.7172.
- [31] Shakir, M., Farsi, M. J. Al, Al-Shamsi, I. R., Shannaq, B., & Taufiq-Hail, G. A. M. (2024). The Influence of Mobile Information Systems Implementation on Enhancing Human Resource Performance Skills: An Applied Study in a Small Organization. International Journal of Interactive Mobile Technologies, 18(13), 37–68. doi:10.3991/ijim.v18i13.47027.
- [32] Al-Anbari, Y. K., Khan, N., Nusratullah, K., Keerio, I. K., Shah, A., Khedher, M., Din, A. B. M. S., & Seman, M. S. A. (2024). A Conceptual Framework for Determinants of the Student Advisory System at the University of Nizwa Oman. 2024 IEEE 1st Karachi Section Humanitarian Technology Conference, Khi-HTC 2024, 1–6. doi:10.1109/KHI-HTC60760.2024.10482234.
- [33] Shannaq, B. (2024). Unveiling the Nexus: Exploring TAM Components Influencing Professors' Satisfaction With Smartphone Integration in Lectures: A Case Study From Oman. TEM Journal, 2365–2375. doi:10.18421/tem133-63.
- [34] Parthasarthy, R., & Sethi, S. P. (2018). The Impact of Flexible Automation on Business Strategy and Organizational Structure. Organizational Innovation, 319–344. doi:10.4324/9780429449482-16.
- [35] Makowski, P. T., & Kajikawa, Y. (2021). Automation-driven innovation management? Toward Innovation-Automation-Strategy cycle. Technological Forecasting and Social Change, 168, 120723. doi:10.1016/j.techfore.2021.120723.
- [36] Shannaq, B., Saleem, I., & Shakir, M. (2024). Maximizing Market Impact: An In-Depth Analysis of the Market Penetration Strategy and Its Effective Tools for Sales Growth and Brand Expansion in the E-commerce Markets of Oman and Bahrain. Studies in Systems, Decision and Control, 524, 277–291. doi:10.1007/978-3-031-54379-1_25.
- [37] Shannaq, B. (2024). Enhancing Human-Computer Interaction: An Interactive and Automotive Web Application Digital Associative Tool for Improving Formulating Search Queries. Lecture Notes in Networks and Systems: Vol. 921 LNNS, 511– 523. doi:10.1007/978-3-031-54053-0_35.
- [38] Shannaq, B. (2024). Digital Formative Assessment as a Transformative Educational Technology. Lecture Notes in Networks and Systems: Vol. 921 LNNS, 471–481. doi:10.1007/978-3-031-54053-0_32.
- [39] Amer jid Almahri, F., Salem, I. E., Elbaz, A. M., Aideed, H., & Gulzar, Z. (2024). Digital Transformation in Omani Higher Education: Assessing Student Adoption of Video Communication during the COVID-19 Pandemic. Informatics, 11(2), 1–28,. doi:10.3390/informatics11020021.
- [40] Al-Shamsi, I. R., Shannaq, B., & Devarajanayaka, K. M. (2023). A Comparative Analysis of the Service Quality in Public and Private Company Telecommunication Services. Lecture Notes in Networks and Systems: Vol. 651 LNNS, 167–186. doi:10.1007/978-3-031-28076-4_15.
- [41] Shannaq, B., Devarajanayaka, K. M., Shakir, M., & Abbas, A. D. (2023). Generating an integrated SWOT strategy from the SERVQUAL survey results-the need for a comparative assessment of telecommunication companies in Oman. AIP Conference Proceedings, 3015(1), 20001. doi:10.1063/5.0188360.
- [42] Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). Partial least squares structural equation modeling (PLS-SEM). Journal of Marketing Theory and Practice, 19(2), 139–152. doi:10.1007/978-3-030-80519-7.
- [43] Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2–24. doi:10.1108/EBR-11-2018-0203.
- [44] Hair, J. F., & Brunsveld, N. (2019). Essentials of business research methods. Essentials of Business Research Methods, 1–507. doi:10.4324/9780429203374.

Appendix I: Survey

Variable	Question	Survey Question	Scale			
Automation in Strategic Planning (ASP)	1	To what extent is automation integrated into the strategic planning processe	1 = Stongl	iy Disagree	l to 5 = Stro	ongly agree
	2	How effective is the current automation technology in streamlining strategic	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	3	Does the automation system provide timely and accurate data for decision-	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	4	How user-friendly is the automation system for strategic planning at your in	1 = Stongl	iy Disagree	l to 5 = Stro	ongly agree
	5	How well does automation help in aligning strategic initiatives with institutio	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
Digital Information Utilization (DIU)	1	How effectively do you use digital information in strategic decision-making?	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	2	How proficient are you in analyzing digital data for strategic planning purpos	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	3	To what extent does digital information enhance the accuracy of your strate	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	4	How well do you integrate digital tools into the strategic planning process?	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	5	How effectively do you leverage digital information to monitor strategic plar	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
Strategic Planning Effectiveness (SPE)	1	To what extent does your institution's strategic planning process ensure the	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	2	How effective is your institution in aligning resources with strategic priorities	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	3	To what degree does the strategic planning process enable your institution t	1 = Stongl	iy Disagree	l to 5 = Stro	ongly agree
	4	How well does the strategic planning process engage relevant stakeholders	1= Stongli	y Disagreel	to 5 = Stro	ngly agree
	5	How effective is the strategic planning process in monitoring progress and a	1= Stongli	y Disagreel	to 5 = Stro	ngly agree