IT ALIGNMENT AND PERFORMANCE: A STUDY IN UAE EDUCATION INSTITUTIONS

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ABSTRACT

Purpose- This study investigates the impact of IT alignment on institutional performance in UAE higher education institutions~~, explores the moderating effect of IT flexibility, and examines how IT flexibility strengthens institutional performance~~. Moreover, the study adopts a theoretical framework of IT alignment in education, encompassing ~~IT~~ governance, ~~IT~~ competence, ~~IT~~ communications, ~~IT~~ partnership, ~~IT~~ scope, and architecture, as well as IT skills, to explore their impact on the performance of higher education institutions.

Design/methodology/approach- Using a cross-sectional approach, data are gathered from 310 Zaid University employees through a questionnaire strategy and analyzed using partial least squares under structural equation modeling to explore the relationships among IT alignment components, ~~IT~~ flexibility, and institutional performance.

Findings- The study reveals a significant positive ~~impact~~of IT alignment, with ~~IT alignment~~skills~~having the greatest effect~~, while IT flexibility moderates the relationship between IT alignment components and institutional performance.

Research, Practical & Social implications: This study contributes to ~~the~~ IT literature~~by~~ highlighting the role of IT in enhancing institutional performance, emphasizing the importance of IT governance and competence at the senior management level. It offers practical and social implications for leveraging IT to improve the quality of education.

Originality/value- This study advances the understanding of IT alignment in education, showcasing its positive impact on institutional performance and the interplay between senior management IT competency and IT-business alignment. Furthermore, it enhances the literature on IT governance through real-world investigation.

Keywords:IT alignment components, Institutional performance, IT flexibility, Education institutions, ~~UAE.~~

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1. INTRODUCTION

Since the beginning of the 20th century, higher education has played a significant role in driving economic and social growth in societies [1]. However, the landscape of higher education is not without challenges. Factors such as an unpredictable economy, technological advancements, increasing student demand, and the need for lifelong learning have forced higher education institutions (HEIs) to navigate a steep learning curve [2-3]. Addressing these specific challenges is crucial to meeting the evolving needs of individuals and communities [4]. Consequently, countries worldwide are striving to develop their educational systems by attracting, supporting, and retaining academic employees, as well as offering flexible programmes and opportunities to meet student demands.

In the United Arab Emirates (UAE), the higher education sector comprises 118 institutions, which must be recognized by the Commission for Academic Accreditation (CAA), a part of the Ministry of Education [5]. While some institutions operate under the CAA, others are governed by individual Emirates and their respective free zones. However, the low performance of UAE higher education

institutions has been attributed to the lack of alignment between information technology (IT) practises and management [6]. Bridging ~~this~~gap is crucial to accelerat~~ing~~ the performance of UAE higher education institutions.

IT alignment, although essential, can introduce complexity in university service delivery and requires proper handling. Despite efforts ~~to integrate IT systems and investments~~, challenges remain in effectively linking technology with educational activities[7,4]. Moreover, issues such as the quality of ICT infrastructure, internet connectivity, and inadequate IT skills have hindered IT alignment in higher education institutions, including those in the UAE [7]. Additionally, existing IT systems are often underutilised, even after training, due to a lack of basic IT competence among users.

While various models and frameworks exist for measuring and guiding the deployment of technology in HEIs, there is a lack of clarity, completeness, and emphasis on which techniques should be implemented to build and measure alignments between IT and institutional performance [8]. Furthermore, most existing models and frameworks in literature need to be tailored to specific contexts, such as the higher education industry in the UAE. This research aims to investigate the alignment between information technology and institutional performance in UAE higher education institutions, filling the gaps in the existing literature. By examining IT alignment within the unique context of the UAE higher education sector, this study seeks to develop a contextualized IT model that can effectively guide the IT implementation process in UAE institutions and similar contexts. It also addresses the significant challenge of misalignment between IT and institutional services, highlighting the need for a clear model of alignment to enhance IT integration and ultimately improve institutional performance.

2. LITERATURE REVIEW

IT alignment has been recognised as a contributing factor to institutional performance by enhancing service delivery [9-10]. Evaluating the~~value of IT investments should consider the level of institutional performance~~[11]. Effective IT alignment relies on alignment practises, which vary across corporate organisations and higher education institutions [12]. The nature and environment of an organisation also influence the metrics for institutional performance that lead to effective IT alignment.

Universities worldwide are integrating IT systems to improve the quality and value of teaching, learning, research, and administration, as information and communication technologies (ICTs) play a crucial role in supporting innovation. Aligning IT with university services is essential to ensuring that IT investments contribute value and enhance institutional performance. It is imperative for universities to implement specific IT-institutional alignment practises across all units to improve both academic and administrative performance. This alignment should be maintained at a high level during the IT integration process within university services [4,12,13].

The integration of IT into service delivery requires alignment in social, cultural, intellectual, and structural dimensions, considering ~~an~~ organisation's distinct goals, institutional structure, employee diversity, and socio-cultural viewpoints. By addressing these dimensions, the chosen IT systems can enhance overall university performance when aligned with IT governance procedures [14].

Institutions of higher education achieve their mission and goals by efficiently integrating IT systems to perform both managerial and academic tasks [15]. The performance measurement framework for universities encompasses managerial and academic indicators that are closely related to the institution's mission and objectives [16]. Managerial functions involve resource management, such as staff, institutional data, and ICT infrastructure, while academic functions encompass teaching, learning, and research activities. Therefore, assessing performance in higher education institutions

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requires considering both academic and managerial components, including indicators such as graduate career placement, institutional rankings, and the quality and quantity of ICT infrastructure [17].

Effectiveness and efficiency are the primary elements used to measure institutional performance in universities, with effectiveness gauged by comparing service results to ~~the~~ institution's aims~~,~~ and efficiency reflecting the link between inputs and outcomes [18;19]. Consequently, institutional performance-related IT alignment policies significantly influence what an organisation achieves (effectiveness) and how successfully associated activities are carried out (efficiency) through IT adoption and usage [19]. The alignment between institutional mission, plans, structure, and activities and IT mission, plans, structure, and activities determines the level of IT integration success in higher education institutions.

Establishing efficient IT-institutional procedures fosters a high degree of alignment, leading to enhanced institutional performance. Figure 5 provides a summary of this relationship, where the effectiveness of a university in achieving its vision and goals, along with the efficient utilisation of IT systems and resources, determines the level of performance resulting from IT usage. Based on the arguments presented, the following research hypotheses are proposed:

H1. There is a relationship between IT communications and institutional performance.
H2. There is a relationship between IT competence measurement and institutional performance.
H3. There is a relationship between IT governance and institutional performance.
H4. There is a relationship between IT partnership and institutional performance.
H5. There is a relationship between IT scope & architecture and institutional performance.
H6. There is a relationship between IT skills and institutional performance.
H7. IT flexibility moderates the relationship between IT communications and institutional performance.
H8. IT flexibility moderates the relationship between IT competence and institutional performance.
H9. IT flexibility moderates the relationship between IT governance and institutional performance.
H10. IT flexibility moderates the relationship between IT partnership and institutional performance.
H11. IT flexibility moderates the relationship between IT scope & architecture and institutional performance.
H12. IT flexibility moderates the relationship between IT skills and institutional performance.

These research hypotheses are formulated based on the understanding that IT alignment, encompassing various factors such as communication, competence measurement, governance, partnership, scope and architecture, and skills, plays a critical role in determining institutional performance in higher education institutions (HEIs). The proposed hypotheses aim to investigate the relationships between these IT alignment factors and institutional performance in HEIs. Additionally, the role of IT flexibility as a moderating factor is examined to determine its impact on the relationship between IT alignment factors and institutional performance.

2.1Conceptual Framework

The framework depicted in Figure 1 illustrates the independent variables, the moderator factor, and the dependent variables. The conceptual framework presented below draws inspiration from previous literature on performance in higher education institutions [17,19;20]. This framework provides a clear depiction of how the proposed hypotheses interrelate with each other, serving as the main input for this study.

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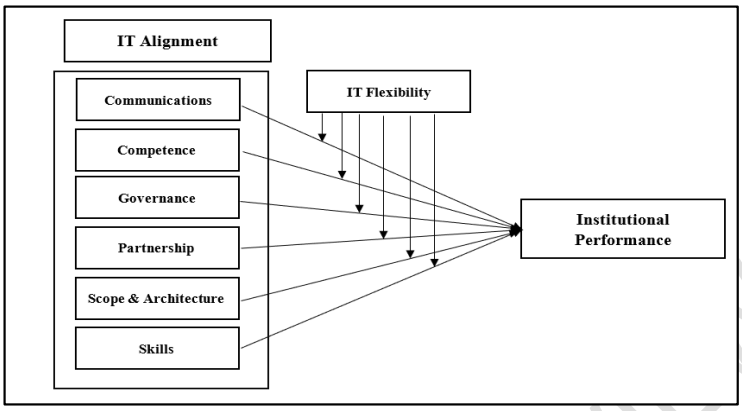

Figure 1. **Conceptual framework**
Source: Prepared by the authors (2023)

3. METHODOLOGY

A questionnaire was created based on prior literature to collect data from Zayed University employees in the United Arab Emirates. The questionnaire used a structured format with listing and rating questions. Statements for independent variables were adopted from strategic alignment maturity criteria, and dependent variables were based on higher education performance. A Likert scale was used for respondents' agreement or disagreement. The sample size of 310 employees was determined through random sampling. The questionnaire was delivered by hand for a higher response rate and data collection efficiency.

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4. RESULTS AND DISCUSSION

The result and discussion section of the quantitative study on Zayed University employees in the United Arab Emirates presented a comprehensive analysis of the collected data, highlighting significant insights into the impact of IT alignment factors on institutional performance and the moderating role of IT flexibility.

4.1 Demographic Analysis

The demographic characteristics of the respondents who participated in the study are presented in Table 1. The gender distribution among the participants indicated that 41.4% (n=128) identified as male, while 58.6% (n=182) identified as female. Regarding age composition, the participants were categorised into four groups. Within the sample, 16.8% (n=52) fell within the 18-25 age range, 23.9% (n=74) were between 26-35 years old, 36.1% (n=112) fell within the 36-45 age range, and 23.2% (n=72) were 46 years of age or older. In terms of educational attainment, the majority of participants held a master's degree, accounting for 31.1% (n=96) of the sample. Participants with a high school degree represented 12.6% (n=39) of the respondents, while 18.3% (n=56) held a diploma degree. Additionally, 29.1% (n=90) of the respondents held a bachelor's degree, and 8.9% (n=29) possessed a PhD degree. Furthermore, the participants' professional experience spanned various time periods, with 12.7% (n=39) having less than 1 to 3 years of experience, 20.8% (n=64) having 3 to 5 years of experience, and the majority, 66.5% (n=207), having more than 5 years of experience. It is noteworthy that a significant proportion of the respondents possessed extensive professional experience.

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Table 1. Profile of respondents (N = 310)

	n	%		n	%
Gender			**Education Level**		
Male	128	41.4	High school	39	12.6
Female	182	58.6	Diploma	56	18.3
Total	**310**	**100.0**	Bachelor	90	29.1
			Master	96	31.1
			PhD	29	8.9
			Other	0	0
			Total	**310**	**100.0**
Age			**Experience**		
18-25	52	16.8	Below 1 year	0	0
26-35	74	23.9	1-3 years	39	12.7
36-45	112	36.1	3- 5 years	64	20.8
46 and above	72	23.2	5 years and above	207	66.5
Total	**310**	**100.0**	**Total**	**310**	**100.0**

Source: SPSS V.25 output prepared by the authors (2023)

4.2 Measurement Model Evaluation

Reliability refers to the extent to which a variable produces consistent and accurate measurements across different measures. It reflects the level of consistency between a variable or set of variables and its intended purpose. In this study, internal consistency reliability was estimated using Cronbach's alpha correlation coefficient. The following thresholds were used to assess the reliability: excellent ($\alpha>0.9$), good ($0.7< \alpha <0.9$), acceptable ($0.6< \alpha <0.7$), poor ($0.5< \alpha <0.6$), and unacceptable ($\alpha <0.5$).

Table 2 illustrates that all variables (communications, competence/value measurement, structure/governance, partnership, technology scope & architecture, skills, IT flexibility, and institutional performance) have values above 0.5, indicating a correlation among the variables. The Cronbach's alpha values ranged from 0.718 to 0.904, while the composite reliability values ranged from 0.800 to 0.946. Moreover, it is evident that the composite reliability, factor loadings, and Cronbach's alpha for each construct surpass the required threshold, indicating the reliability of the measurements. The factor loading test revealed that the second item for the variable "communication" had the lowest loading of 0.524, whereas the fourth item for the variable "competence/value measurement" had the highest loading of 0.934.

Moreover, convergent validity, a subtype of construct validity, was assessed using the average variance extracted (AVE). When the AVE value exceeds 0.5, it indicates good construct validity for the variable. Table 2 demonstrates that the variables (communications, competence/value measurement, structure/governance, partnership, technology scope & architecture, skills, IT flexibility, and institutional performance) obtained acceptable AVE values ranging from 0.539 to 0.676.

Table 2. Measurement model evaluation

Construct	Items	Loading>0.5	CA>0.7	CR>0.7	AVE>0.5
Communications	C1	0.699	0.904	0.891	0.662
	C2	0.524			
	C3	0.594			
	C4	0.812			
Structure / Governance	SG1	0.850	0.785	0.814	0.594
	SG2	0.842			
	SG3	0.758			
	SG4	0.665			
Competence / Value measurement	CVM1	0.701	0.846	0.809	0.628
	CVM2	0.682			
	CVM3	0.780			
	CVM4	0.934			
Technology Scope & Architecture	TSA1	0.768	0.818	0.866	0.622
	TSA2	0.716			
	TSA3	0.806			
	TSA4	0.820			
Skills	S1	0.700	0.718	0.946	0.653
	S2	0.737			
	S3	0.677			
	S4	0.675			
	S5	0.789			
	S6	0.904			
Partnership	P1	0.856	0.793	0.800	0.645
	P2	0.624			
	P3	0.769			
IT Flexibility	ITF1	0.787	0.877	0.825	0.539
	ITF2	0.883			
	ITF3	0.673			
	ITF4	0.684			
	ITF5	0.726			
	ITF6	0.696			
	ITF7	0.729			
Institutional Performance	IP1	0.786	0.844	0.813	0.676
	IP2	0.795			
	IP3	0.733			
	IP4	0.798			

Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: CA= Cronbach's alpha; Reliability;CR= Composite Reliability; AVE= Average Variance Extracted

4.3Discriminant validity

Discriminant validity guarantees that distinct elements within the research do not overlap. It assesses whether constructs that are not supposed to be connected are indeed unrelated. Referring to Table 3, the variables (communications, competence/value measurement, structure/governance, partnership, technology scope & architecture, skills, IT flexibility, and institutional performance) exhibited strong and positive correlations, as all variables achieved r-values greater than 0.4. The recorded values for the variables ranged from 0.714 to 0.879.

Table 3. Results of discriminant validity by Fornell-Larcker criterion

	C	CVM	SG	P	TSA	S	ITF	IP
Communications	**0.871**							
Competence / Value measurement	0.193	**0.879**						
Structure / Governance	0.618	0.023	**0.843**					
Partnership	0.368	0.319	0.009	**0.714**				
Technology Scope & Architecture	0.424	0.674	0.117	0.172	**0.836**			
Skills	0.117	0.372	0.575	0.011	0.063	**0.784**		
IT Flexibility	0.107	0.058	0.653	0.073	0.274	0.133	**0.816**	
Institutional Performance	0.107	0.608	0.563	0.761	0.754	0.193	0.716	**0.859**

Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: C; communications, CVM; competence/value measurement, SG; structure/governance, P; partnership, TSA; technology scope & architecture, S; skills, and IP; institutional performance

The measurement model of the study is depicted in Figure 2 below. Building upon the preceding discussion, it can be affirmed that the measurement is valid for subsequent analysis, in accordance ~~with the~~recommendations of [21].

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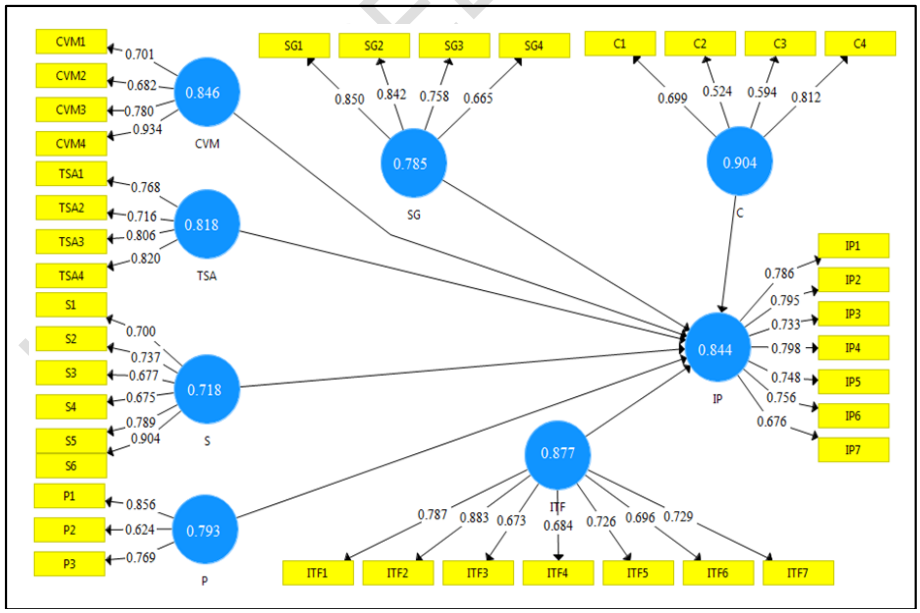

Figure 2. Measurement model of the study
Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: C; communications, CVM; competence/value measurement, SG; structure/governance, P; partnership, TSA; technology scope & architecture, S; skills, and IP; institutional performance

4.4 Hypothesis Testing (Direct Effect and Moderation Effect)

Hypothesis testing is employed to determine whether the null hypothesis, which suggests no difference or no effect, should be accepted or rejected. If the null hypothesis is rejected, it implies that the research hypothesis can be accepted. Conversely, if the null hypothesis is accepted, it indicates that the research hypothesis is rejected.

In this study, the bootstrapping option was employed to assess the significance of structural paths, following the approach suggested by Hair *et al*. [22]. This technique involves generating numerous subsamples, which serve as replacements for the original samples, in order to test the significance of coefficients. Figure 3 illustrates the structural model after bootstrapping, drawing on the works of Hair *et al*. [21], and Sarstedt *et al*. [23]. However, in this particular study, two types of hypothesis testing were employed: direct effect testing and moderation effect testing.

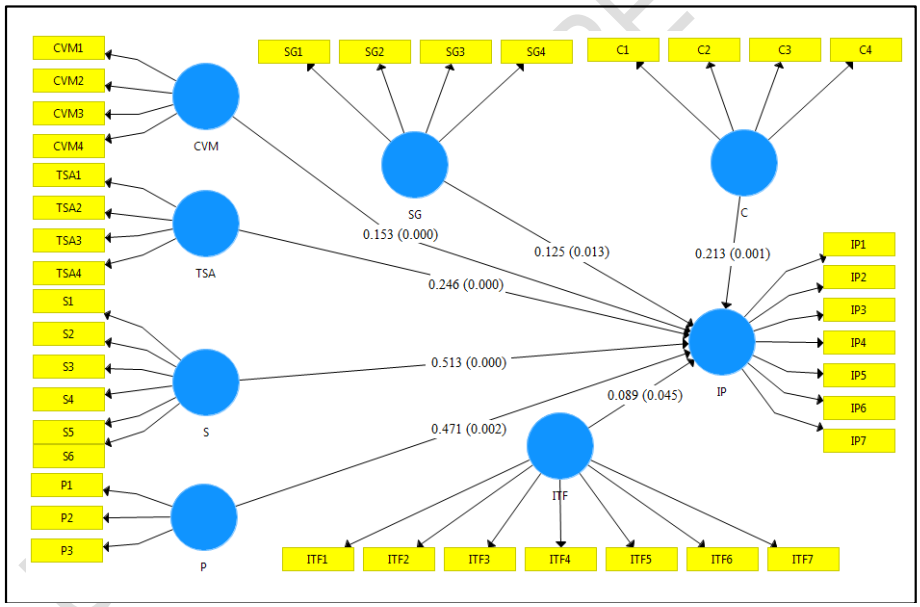

Figure 3. Structural model of the study
Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: C; communications, CVM; competence/value measurement, SG; structure/governance, P; partnership, TSA; technology scope & architecture, S; skills, and IP; institutional performance

4.4.1 Hypothesis Testing (Direct Effect)

The direct effect test was employed in the study to investigate the relationships between the independent variables and the dependent variable. Based on the research hypotheses and the findings presented in Table 4.

Table 4. Summary of the direct effect

Paths	Beta	SD	T Values>1.96	P Values<0.05
C -> IP	0.213	0.046	3.768	0.001
CVM -> IP	0.153	0.086	4.554	0.000
SG -> IP	0.125	0.043	1.995	0.013
P -> IP	0.471	0.137	5.326	0.002
TSA -> IP	0.246	0.107	8.121	0.000
S -> IP	0.513	0.227	11.138	0.000

Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: C; communications, CVM; competence/value measurement, SG; structure/governance, P; partnership, TSA; technology scope & architecture, S; skills, and IP; institutional performance

The findings in Table 4 indicate that all the variables have positive and significant associations with higher education institutional performance in Zayed University; the following conclusions were drawn:

H1. Communications exhibited a positive and significant relationship with institutional performance, with a beta coefficient of 0.213, T-values of 3.768, and a P-value of 0.001.
H2. Competence/value measurement demonstrated a positive and significant relationship with institutional performance, with a beta coefficient of 0.153, T-values of 4.554, and a P-value of 0.000.
H3. Structure/governance showed a positive and significant relationship with institutional performance, with a beta coefficient of 0.125, T-values of 1.995, and a P-value of 0.013.
H4. Partnership displayed a positive and significant relationship with institutional performance, with a beta coefficient of 0.471, T-values of 5.326, and a P-value of 0.002.
H5. Technology scope & architecture indicated a positive and significant relationship with institutional performance, with a beta coefficient of 0.246, T-values of 8.121, and a P-value of 0.000.
H6. Skills exhibited a positive and significant relationship with institutional performance, with a beta coefficient of 0.513, T-values of 11.138, and a P-value of 0.000.

4.4.2 Hypothesis Testing (Moderation Effect)

This section presents the results of the moderation effect test, wherein the moderating effect of IT flexibility on the relationships between communication, competence/value measurement, structure/governance, partnership, technology scope & architecture, and skills, and higher education institutional performance at Zayed University was examined using the PLS-SEM methodology. Table 5 displays the outcomes of the moderation effects (indirect effects).

Table 5. Moderation Testing (Indirect Effect)

Moderation paths	Beta	SD	T-value	P Values
C * ITF -> IP	0.428	0.117	5.706	0.000
CVM * ITF -> IP	0.319	0.309	2.198	0.004

SG * ITF -> IP	0.309	0.122	2.523	0.003
P * ITF -> IP	0.129	0.043	3.156	0.000
TSA * ITF -> IP	0.235	0.057	4.728	0.009
S * ITF -> IP	0.246	0.094	3.142	0.000

Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: C; communications, CVM; competence/value measurement, SG; structure/governance, P; partnership, TSA; technology scope & architecture, S; skills, and IP; institutional performance

Furthermore, the following findings were derived from the results obtained in Table 5 and Figure 4 on the relationship between IT flexibility higher education institutional performance at Zayed University:

H7. IT flexibility has a low moderation effect on the relationship between communications and institutional performance (Beta = 0.428, T-value = 5.706, and P-value = 0.000).
H8. IT flexibility has a low moderation effect on the relationship between competence/value measurement and institutional performance (Beta = 0.319, T-value = 2.198, and P-value = 0.004).
H9. IT flexibility has a low moderation effect on the relationship between structure/governance and institutional performance (Beta = 0.309, T-value = 2.523, and P-value = 0.003).
H10. IT flexibility has a low moderation effect on the relationship between partnership and institutional performance (Beta = 0.129, T-value = 3.156, and P-value = 0.000).
H11. IT flexibility has a low moderation effect on the relationship between technology scope & architecture and institutional performance (Beta = 0.235, T-value = 4.728, and P-value = 0.009).
H12. IT flexibility has a low moderation effect on the relationship between skills and institutional performance (Beta = 0.246, T-value = 3.142, and P-value = 0.000).

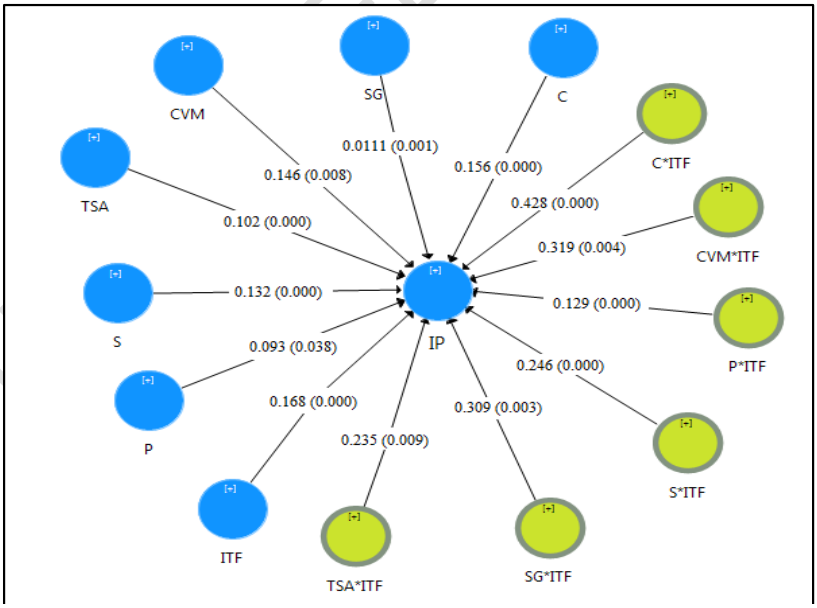

Figure 4. **Moderation testing**
Source: SmartPLS V.3.9 output prepared by the authors (2023)
Note: C; communications, CVM; competence/value measurement, SG; structure/governance, P; partnership, TSA; technology scope & architecture, S; skills, and IP; institutional performance

Several tests and analyses were conducted to analyse the reliability, validity, and demographic backgrounds of the participants in this study, as well as to examine the research hypotheses and compare them with previous studies. The direct effect test revealed positive and significant relationships between various factors and higher education institutional performance at Zayed University. For example, there was a positive and significant relationship between communications (beta = 0.213, T-values = 3.768, P-values = 0.001), competence/value measurement (beta = 0.153, T-values = 4.554, P-values = 0.000), structure/governance (beta = 0.125, T-values = 1.995, P-values = 0.013), partnership (beta = 0.471, T-values = 5.326, P-values = 0.002), technology scope & architecture (beta = 0.246, T-values = 8.121, P-values = 0.000), and skills (beta = 0.513, T-values = 11.138, P-values = 0.000).

The moderation test showed that IT flexibility had a low moderation effect on the relationship between the aforementioned factors and higher education institutional performance in Zayed University. IT flexibility exhibited moderation effects for communications (beta = 0.428, T-value = 5.706, P-value = 0.000), competence/value measurement (beta = 0.319, T-value = 2.198, P-value = 0.004), structure/governance (beta = 0.309, T-value = 2.523, P-value = 0.003), partnership (beta = 0.129, T-value = 3.156, P-value = 0.000), technology scope & architecture (beta = 0.235, T-value = 4.728, P-value = 0.009), and skills (beta = 0.246, T-value = 3.142, P-value = 0.000).

This result aligns with previous studies that consider IT alignment as a contributing factor to institutional performance [4,9,10]. Antecedents or "alignment" that contribute to effective IT alignment have been identified [12;24]. IT alignment differs between general business companies and HEIs, and the indicators for effective IT alignment also vary based on the organisation's type and context. When measuring performance in HEIs, both academic and managerial dimensions should be considered, including ICT infrastructure, academic publications, efficiency, and effectiveness [15;17,18,24;25].

IT alignment significantly contributes to organisational effectiveness and efficiency through the adoption and use of IT [19]. Effective idea sharing and understanding of successful initiatives are important alignment enablers, while a lack of business technology and respect for IT can be inhibitors [26]. Communication, service levels, post-project reviews, and collaboration between IT and business divisions also play key roles in IT alignment [24]. Metrics and dashboards are used to measure business functions, including end-user satisfaction and application development efficacy [24]. IT governance, including ethics, risk management, compliance, and administration, is essential for alignment [27]. Interaction and collaboration between business and IT groups, with a shared vision, are crucial for mature alignment [26]. IT skills and flexibility are important for competitive advantage, and the resource approach and IT flexibility perspective are relevant in explaining the implications of IT flexibility [28, 29; 30].

5. CONCLUSION

This study has achieved its objectives by examining the impact of IT alignment components on the institutional performance of higher education institutions (HEIs) in the UAE. The research focused on the UAE's educational landscape, considering the country's evolving technological background in HEIs. The findings revealed positive and significant relationships between various IT alignment factors and institutional performance at Zayed University. While IT alignment has been extensively studied in ~~other industries~~, there is a lack of research in the context of higher education, especially in developing countries like the UAE. The study highlights the importance of IT alignment skills and the

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role of IT flexibility in moderating the relationship between IT alignment factors and institutional performance. Furthermore, the study contributes to the IT literature by demonstrating the interplay between senior management's IT competency, IT-business alignment, and performance. The findings have practical implications for universities, emphasising the need for effective IT alignment mechanisms and executive IT expertise to drive IT business synergy and enhance performance. However, it is important to acknowledge the limitations of the study, such as potential biases and the need to consider other situational factors influencing institution performance. Future research should explore these aspects and further develop IT-business alignment theories and practises. Based on the research findings, recommendations include improving the quality of higher education, enhancing communication systems, ensuring accountability through objective assessments, and strengthening IT alignment in higher education institutions through capacity development and collaboration with relevant stakeholders. Overall, this study contributes to the understanding of IT alignment and its implications for institutional performance in the UAE's higher education sector.

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