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Bridging the Skills Gap: Identifying the Business Computing Graduate Competencies Needed to Enhance Organisational Performance through an IT Managers' Lens

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Abstract. This study develops and validates a model elucidating the connection between the critical skills demanded of business computing graduates and organisational performance, considering the perspectives of IT managers as a key stakeholder group. Data collected from 232 managers were analysed using partial least squares structural equation modelling (PLS-PM). The results indicate that project management skills strongly predict achievement of organisational objectives. Team effectiveness competencies also enhance project outcomes. However, and surprisingly, Arabic language ability does not relate significantly. Both design communication skills and IT operation skills are found to directly affect the achievement of organisational objectives and performance. In contrast, insufficient evidence was found to suggest that work sector-specific product management skills are a mediator. The findings imply that project-based methodologies should be integrated into computing curricula to equip graduates with the adaptable skillsets valued by employers, namely, efficient coordination, stakeholder engagement, and communication acumen, thereby benefiting workforce performance.

Keywords: stakeholder perspective, business computing graduates' skills, organisational objectives and performance (OOP), partial least square path modelling (PLS-PM), project management skills

1. Introduction

The job market for IT professionals is constantly changing because of the fast pace of technology evolution. More demand is emerging for cloud engineers, developers, security professionals, data analysts and scientists, artificial intelligence and machine learning specialists, robotics engineers, software and application developers, and digital transformation specialists (Whiting, 2020; White, 2023). These professionals, however, need skills that meet the requirements of multiple stakeholders to remain employable in terms of promoting organisational objectives and performance (OOP) when the work is approached as a contemporary project and must therefore keep their skills updated (Prabhakar et al., 2005).

Employability in higher education is considered from a multiple stakeholder perspective (Smith et al., 2018) and refers to the achievements and skills that make a graduate more likely to be fully employed rather than merely able to obtain any sort of work. Employment is associated with the quality of university delivery, but employability is more complex than just the ability to obtain a job (Cheng et al., 2022). Rather, it is focused on how graduates solve problems as projects and thus achieve OOP in IT-enabled environments (Hamid et al., 2022). Evidence suggests that the perspectives of key stakeholders (higher education institutions (HEIs), students, government, employers, etc.) are essential and need to be taken into consideration in developing IT-based project management skills. Since these stakeholders have different expectations, there may be skills gaps in the learning delivered (Kim et al., 2006).

Recent studies highlight the ongoing debate about the balance between technical and soft skills in IT curricula and the need to align such curricula with the skills demanded by employers. The limitations and challenges of integrating soft skills, such as project management skills, into academic IT systems curricula are discussed by multiple authors (Al-Hashimi et al., 2020; Al-Sartawi & Reyad, 2020; Dubey & Tiwari, 2020), who all identify a trend that employers hiring entry-level management information systems (MIS) graduates are looking for IT graduates with soft skills that involve project management characteristics rather than highly technical skills. Burns et al. (2018) investigated whether the knowledge and skills of information systems (IS) graduates meet ACM/AIS Information Systems Curriculum Guidelines and employer requirements, and their findings indicate that balancing business and technical skills remains a primary challenge for educators.

This paper focuses on the perspective of key stakeholders to explain factors in project management graduates' skills and how such skills promote OOP. The paper explains the impact of IT operation skills, design communication skills, Arabic language skills, and employee characteristics on promoting employees' holistic project management skills. Imparting such skills is necessary for academic curricula to meet the needs of today's society (Bucea-Manea-ţoniş et al., 2022). Project management skills, in turn, promote OOP. Empirical studies suggest that IT skills needed to be clipped with the other strategic skills of organization to achieve collective success in terms of performance (Croteau & Raymond, 2004). Few studies have discussed computing graduates' skills and organisational performance, specifically with a business background. Hence, further studies are needed to better understand this association.

This study aims to examine the perspectives of managers, as dominant key stakeholders, and their associations with the desired business and computing skills of graduates, which are dynamic in nature. We collected data from 232 IT managers of organisations in the public and private sectors using a generic survey and then analysed the data using partial least squares structural equation modelling (PLS-SEM). Our results led to the construction of a model that can enable computing curricula, in collaboration with marketplace representatives, to highlight those traits and characteristics of IT graduates that are desired by headhunters, thus ensuring that employed graduates can help meet OOP. The significance of this study lies in its potential to improve the employability of IT graduates with a business background and help address the lack of IT-qualified graduates in the marketplace. However, the study has limitations as it is based on a single country and a limited number of IT managers.

By examining the viewpoint of a dominant key stakeholder group that has high salience in IT employability, this study provides valuable insights into how educational institutions can collaborate with marketplace representatives to better place their students in the market. The study draws on stakeholder theory and project management to provide a theoretical model for understanding how managers view the role of IT graduates in organisations. Our research provides valuable insights for computing departments looking to enrich their programmes with the specific skills and competencies required by the marketplace and increase the employability of their graduates. It also highlights the importance of effective collaboration between key stakeholders in ensuring that graduates are well-prepared for the job market. The remainder of this manuscript is organised as follows: Section 2 describes the background from which the hypotheses are drawn and the research approach. Section 3 presents the research methodology and data collection process. Section 4 presents the results and discusses their implications. Section 5 concludes with a summary of our findings and suggestions for future research.

2. Background and Approach

2.1. Stakeholder Theory, Collaboration, and Project Management

The world is characterised by complexity and constant change. As such, future developments will render the world increasingly difficult to comprehend and analyse. A holistic approach is required to mitigate the factors that influence it and to emphasise those elements that are truly significant to better understand it. Systems thinking provides a means of addressing complexity in a manageable manner. Any entity in the world, be it an object, process, individual, or department, can be viewed as a system and analysed accordingly. This approach aligns with stakeholder theory (Freeman, 1984), a theory of organisational management and business ethics that accounts for the perspectives of all stakeholder representatives that affect or will affect business entities and considers their needs and interests in the hope of making more informed decisions and creating value for everyone involved (Arnold & Wade, 2015; Ramírez-Montoya et al., 2022).

Stakeholder theory has been applied to HEIs to help them better understand and manage their relationships with their stakeholders, which can be students, staff, local businesses, academic and research bodies, local governments, and professionals (Chapleo & Sims, 2010). Another example of using stakeholder theory in higher education is presented in a study conducted by Langrafe and colleagues in 2020. The authors surveyed 88 heads of HEIs in Brazil to investigate whether better relationships between them and their stakeholders is favourable. Their findings show that more value is created for organisations from relationships with stakeholders based on information sharing and involvement in decision-making that aligns with stakeholders' interests. A more recent application of stakeholder theory in HEIs is a study by McCann et al. (2022), who conducted a survey of secretaries in 22 UK university to investigate the influence of salient stakeholders in UK higher education. Their findings suggest that academic staff and students are dominant internal stakeholders, and undergraduate domestic students are the dominant student group. Another recent example is an article by Ansell (2021), which discusses the role of boards in understanding and engaging stakeholders in higher education. The article explores the role of stakeholders in governance codes as reported by the Chair of the Board at Deakin University in Australia.

Stakeholder theory and collaboration are essential for project management success (Freeman, 1984), as both emphasise working with others to achieve common goals. Managers possess high salience, and their perspectives are crucial to understanding IT project needs, as project managers assemble skilled IT teams that collaborate effectively. However, IT skills alone are insufficient for project success; team members with soft project management skills are more likely to succeed (Pinto & Slevin, 1988; Turner & Cochrane, 1993; Morris & Hough, 1991; Project Management Institute [PMI], 2021). Project management skills are crucial in ensuring successful projects across various industries. One prominent

theory that underscores the significance of project management skills is the PMI's Talent Triangle® framework. This framework emphasises that project managers need a balanced blend of technical project management, leadership, and strategic and business management skills to excel in their roles. Technical project management skills ensure that project managers can effectively plan, execute, and control projects. Leadership skills enable them to inspire and guide their teams, fostering collaboration and productivity. Finally, strategic and business management skills help project managers align projects with organisational objectives and make informed decisions. This theory underscores the multifaceted nature of project management, highlighting the need for a well-rounded skill set to achieve project success (PMI, 2021). Moreover, studies have suggested that both IT and non-technical project management skills are essential to transform competencies into performances (Gallagher et al., 2010).

Therefore, the current study proposes, based on the literature, the set of hypotheses presented in the next section.

2.2. Organisational Objectives and Elevating Performance

Research indicates that an individual's project management skills are pivotal to, and have a significantly positive influence on, the attainment of OOP. According to Belout and Gauvreau (2004), project management expertise improves coordination, communication, and stakeholder participation, which assists the organisation to achieve its desired objectives. Moreover, the development of efficient project management skills can enhance an organisation's performance. A study by Turner and Müller (2005) emphasised that effective project management practices facilitate goal alignment and time management and optimise resources, all of which can improve an organisation's performance overall. As a result, the findings emphasise the importance of equipping IT students with sufficient project management skills to meet the demands of the current job market. Therefore, the following hypothesis has been formulated:

H1: Project management skills will positively influence meeting the organisation's objectives and performance.

2.3. Sector-Specific Project Management Skills

It should be noted that workplace sectors can require specific project management skills to help reach their OOP. According to Zwikael and Ahn (2011), developing effective sector-specific project management skills can enhance project planning, resource allocation, and risk management, all of which can help a business achieve its objectives and perform better. Furthermore, Turner and Keegan (2001) indicate that an extensive understanding of sector-specific nuances assists project managers in navigating complexities, optimising organisational processes, and delivering outcomes that align with organisational objectives. These findings support the development of workplace sector-specific project management skills, as such skills impact an organisation's ability to meet its objectives and increase its overall performance. As such, the following hypothesis is formulated:

H2: Workplace sector-specific project management skills will positively influence meeting the organizations objectives and performance.

2.4. IT Operation & Project Management Skills

The development of IT operation skills can enhance project management skills, which highlights the importance of these skills. According to Svejvig and Andersen (2015), IT professionals with effective operation skills can encourage better decision-making and enhance the alignment between project outcomes and organisational objectives. This finding sheds light on how the development of IT operation skills can positively affect project management skills. Additionally, research has shown how IT operations expertise helps with effective project planning, resource allocation, and risk management, which ultimately results in increased project performance (Lee & Lee, 2018). IT operations skills are important as they translate into the variety of skills that shape the overall project

performance (Gallivan et al., 2004). Thus, there is a positive correlation between IT operation skilfulness and project management skilfulness, and the latter are transformed into organisational performance (Pan & Seow, 2016) because both IT and project management skills are essential to such performance (Lee & Mirchandani, 2010). Therefore, the findings emphasise the need to foster adequate IT operation skills to improve project management skills and attain the desired project outcomes. Hence, we formulated the following hypothesis:

H3: IT operation skills have a positive effect on project management skills.

2.5. Design Communication & Project Management Skills

Design communication skills can play a pivotal role in enhancing project management skills. According to Brown and Jones (2017), the attainment of strong design communication skills can assist project managers to communicate their vision, which unites the project team around a common objective. Thus, effective design communication can guide project managers to reach project goals through the enhancement of project management skills. The findings of Johnson and Lee (2020) similarly indicate that efficient communication during the design stage of a project results in improved stakeholder engagement and informed decision-making, which reveals that project management skills have a positive influence. As a result, research suggests that effective design communication can positively impact project management skills and therefore contribute to overall project success. We therefore conceived the following hypothesis:

H4: Design communication skills have a positive effect on project management skills.

2.6. Arabic Language Skills & Project Management Skills

IT companies in the Middle East would benefit from their workers having effective Arabic language skills because they can enhance the development of project management skills. Al-Mansoori and Al-Mahmoud (2018) indicate that reaching a proficient level in Arabic can help improve communication with stakeholders in the Middle East, which can lead to improved collaborative work, rapport building, and project outcome achievement. This finding emphasises the crucial role played by fluency in Arabic in improving project management skills with Middle Eastern stakeholders. Proficiency in Arabic can assist project managers to further understand regional cultural nuances, which can lead to enhanced communication and better ability to navigate the complex socio-cultural dynamics that are unique to the area, aiding in the improvement of project management capabilities in the local marketplace. According to these findings, we have drawn the following hypothesis:

H5: Arabic language skills have a positive effect on project management skills.

2.7. Employee Characteristics & Project Management Skills

Employee characteristics can enhance project management skills. Johnson and Smith (2016) indicated that employees with efficient organisational and time-management skills excelled in project management roles compared to employees that lacked such skills, leading to improved planning, allocation of resources, and achieving goals prior to deadlines. Additionally, Smith and Jones (2019) indicated that employees who were proactive and demonstrated problem-solving skills were better equipped to navigate complications during project implementation, resulting in improved project outcomes. Clearly, both findings indicate how certain professional traits can improve project management proficiency. Thus, we have formed the following hypothesis:

H6: Employee characteristics have a positive effect on project management skills.

The literature lacks the interconnection of all aforementioned hypotheses in IS context, therefore this study tries to better understand these relationships by testing these assumptions.

2.8. The PLS-PM Model Diagram

This study uses partial least squares structural path modeling (PLS-PM) which is called (PLS-SEM)

interchangeably. In a multiple relationship situation PLS-PM can test effectively a single structural relationship at a time versus standard moderation; and thus, encapsulating significant differences. PLS-PM significantly improves statistical analysis and reduces the number of highly correlated variables in a network. This reduction improves the performance of the statistical analysis. Whereby the proposed theoretical model has multiple relationships and indicates how statement items are grouped and clustered according to their loadings. The node diagram shown in Figure 1 represents stakeholders' perspective encapsulation of IT marketplace demands (SPE-IT-MD), based on the literature. These perspectives are multiple relationships with scares theory and no clear pattern in the data. PLS-PM can provide insight to improve an organizations objectives and performance by understanding the complex relationship between latent variables.

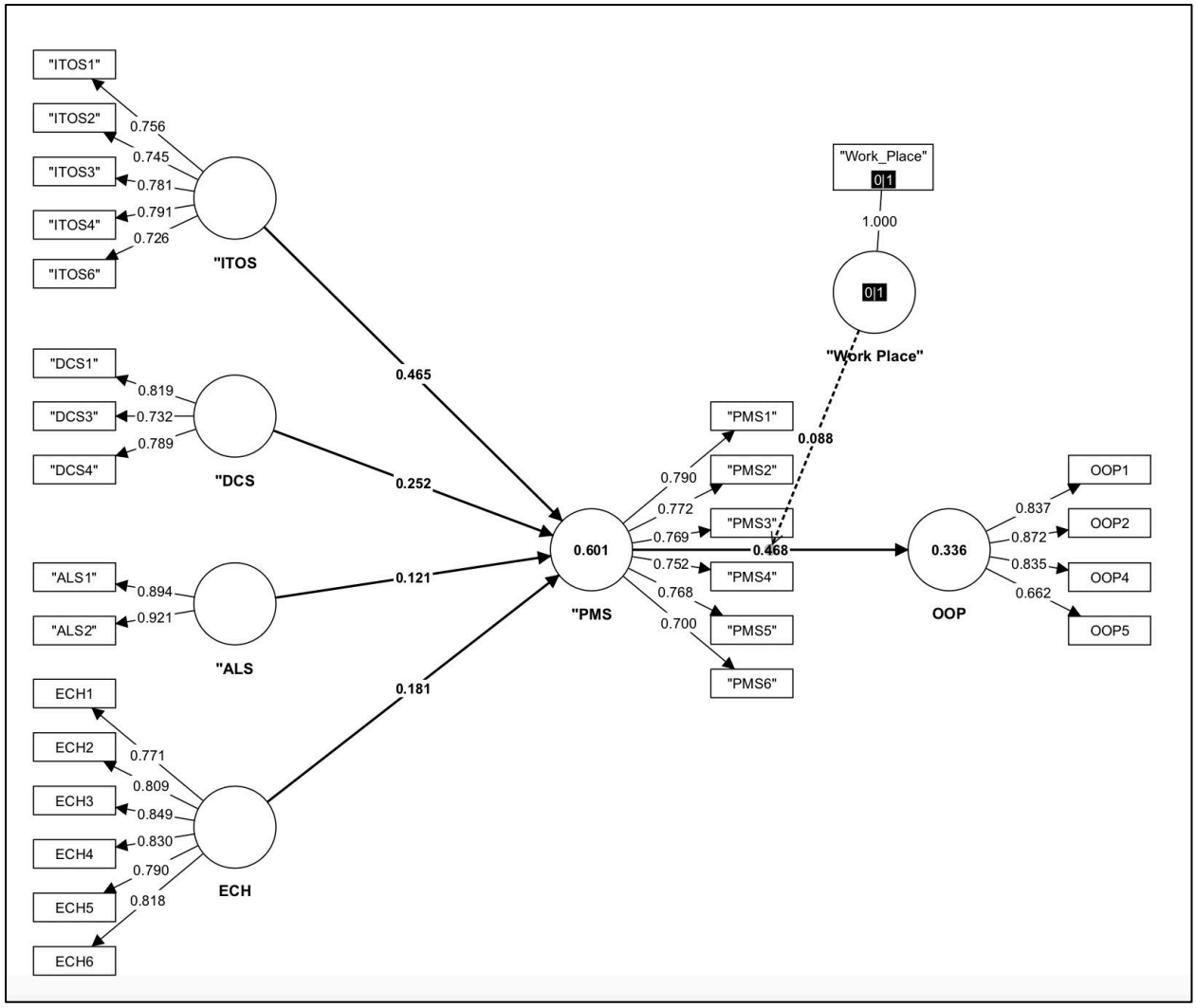

Fig. 1: Stakeholders' Perspective Encapsulation of IT Marketplace Demands (SPE-IT-MD) Model.

The following acronyms are used to identify each cluster:

PMS = Project Management Skills

ITOS = IT Operation Skills

DCS = Design Communication Skills

ALS = Arabic Language Skills

ECH = Employee Characteristics

OOP = Organisational Objectives and Performance

The above set of category skills, derived from the literature, is represented by the six hypotheses (H1 to H6) and fits into the One*NET content model and projections of future marketplace job needs (Future of Jobs Report, 2018). An integration of the three sources encapsulates the roles, skills, and tasks of future computing job trends. A set of phases, described in the research method section, below, shows how a survey tool can be developed to test the hypotheses and encapsulate the context-specific desired traits of computing graduates with a business background.

3. Research Method

The initial framework presented in the previous section is based on a review of the literature and the construction of a theoretical model grounded in management and stakeholder theory. The study examines employability factors, namely, ITOS (5 items), DCS (3 items), ALS (2 items), ECH, and PMS (6 items). PMS' impact on OOP is also explained with four items.

The study purposely targets IT managers as key stakeholders to showcase what skills this group found relevant. The IT managers were approached randomly, and 232 complete responses were considered for this study. The survey developed uses a 5 Likert scale, administered online, and data were collected from both public and private sectors (155 and 77 surveys, respectively). The sample size aligns with other studies using PLS-SEM (Onaolapo & Oyewole, 2018) and the 10-times rule, as the 26 items are included in the instrument for which the minimum sample size is 260 (Kock & Hadaya, 2018).

Demographic data included titles, descriptions of occupations (role, skills, and task), management levels, affiliation types and salary ranges, and job categories. A five-point Likert scale was used, where 1 = least agreeable and 5 = most agreeable. The resulting statements were fed into an electronic form, and a link was initiated and sent electronically for validation.

Both the content and face validity of the research instrument were ensured. Content validity checks that statements are relevant to the field, and face validity checks that statements are clear to the users (Al-Tahat, 2020). In a pre-validation phase, an expert in curriculum development helped shape the statements to be more focused and content-specific. The content validity was evaluated by three curriculum development field expert opinions via online links and analysed using a content validity index (CVI). Furthermore, the face validity was assessed by 10 users using a face validity index (FVI) (AlGhannam et al., 2023).

The study also ranked the skills named in the Future of Jobs Report of 2018, which called for collaboration between government, educational institutions, training, workers, and employers to satisfy future job trends. Its classification is based on the One*NET content model, which focuses on roles, skills, and tasks with projections of future marketplace labour needs. The findings of the adapted survey within the Middle East region were used as the starting point of the new survey developed for this study. In addition, the generic survey at O*NET Resource Center was used, which focuses on the following: 'Abilities, Background, Education and Training, Generalized Work Activities, Knowledge, Skills, Work Context and Work Styles'.

Selected statements that serve the objectives of this study were taken from the sources mentioned above to form the new survey used in the study. Furthermore, the top ten trending skills of 2022 and projected technology adaptations from the Future of Jobs Report in 2018 (p.12, Table 4) include 'Analytical thinking and innovation, Active learning and learning strategies, Creativity, originality, and initiative, Technology design and programming, Critical thinking and analysis, Complex problem-solving, Leadership and social influence, Emotional intelligence, Reasoning, problem-solving and

ideation and Systems analysis and evaluation', which were added to determine their order of importance in the region of our study, namely, Kuwait.

Kuwait is part of the Middle East and North Africa (MENA) region (Future of Jobs Report, 2018, p.32, Table B2), and its projected technology adaptations, from highest to lowest, are as follows:

User and entity big data analytics, Machine learning, Internet of things, App- and web-enabled markets, Cloud computing, Augmented and virtual reality, Encryption, New materials, Digital trade, Wearable electronics, Autonomous transport, 3D printing, Distributed ledger (blockchain), Stationary robots, Non-humanoid land robots, Quantum computing, Biotechnology, Humanoid robots and Aerial and underwater robots. (Future of Jobs Report, 2018, p.116)

The blueprint for the developed tool consists of 3 processes with diverse phases to ensure a context specific tool that is valid and easy to interpret results. The phases of the first process which is called the Survey Development Process is described below.

Phase 1_Survey Stakeholder Identification: stakeholder representatives from both the government and educational institutions were identified (Future of Jobs Report, 2018).

Phase 2_Survey Demographics: attributes were added to enrich the survey, such as titles, descriptions of occupations (role, skills, and tasks), management levels, affiliation types and salary ranges.

Phase 3_Survey Skeleton: classification based on the One*NET content model (www.onetcenter.org), which focuses on roles, skills, and tasks, was used as a skeleton to develop the new survey. Statements from the One*NET content model and findings from the literature were mapped into generic statements and categorised to serve the objectives of the study.

Phase 4_Survey Context-Specific:

1. IT Job Projections: projections of future marketplace labour needs were identified focusing on the environment under investigation. In our study, the environment is in the Middle East (Future of Jobs Report, 2018).

2. IT Skills Projections: the current top ten trending skills and projected technology adaptations were added to the survey statements (The Future of Jobs Report, 2018, p.12, Table 4) to determine their order of importance in the region.

3. Technology Adaptation Projections: Kuwait falls within the MENA region (Future of Jobs Report, 2018, p.32, Table B2), and its projected technology adaptations, from highest to lowest, are included in the survey statements (Future of Jobs Report, 2018, p.116).

Phase 5_Survey Identity Alignment: the academic institution's under Study's identity aligned with the nation's mission & vision. In addition, current and future partnerships with marketplace organisations were taken into consideration.

Phases 3 through 5 were rigorously cycled and involved members of IT academia via face-to-face interviews, remote meetings and focus group meetings to extrapolate the survey statements until the stakeholder representatives involved in the survey development were content.

The phases of the second process which is called the Survey Validation Process is described below.

Survey Pre-validation Phase: confirmation from a curriculum development expert was given that the survey statements were focused and content-specific. This phase was conducted internally during the development phases 3 through 5.

Survey Content Validity Phase: content validity checks were carried out to ensure the statements were relevant to the field. Evaluations from field experts were requested and analysed using a CVI.

Survey Face Validity Phase: face validity checks were carried out to ensure the statements were clear to the users. These checks were conducted on ten users using an FVI.

The phases of the third process which is called the Survey Analysis Process is described below.

Initially descriptive testing is performed as a form of normality analysis followed by reliability evaluation, CVI and FVI. PLS-PM data analysis is conducted as it fits the study's objective, which requires a precise understanding of how the variables and constructs are interrelated in a network of

multiple relationships with scares theory to support it, as seen in Figure 1. The PLS-PM model was evaluated through an investigation of the validity of the measurement model and the structural model.

4. Results

Descriptive analysis is conducted as shown if Figures 2 and Figure 3. The reliability of the survey Cronbach alpha is acceptable with a value of 0. 836. In addition the validity of the survey was acceptable with a value of CVI of 0.81 and values of FVI of 3 and 4 from a scale of 4. Data were then analysed through PLS-PM, PLS-PM is preferred over EFA and CFA in handling complex cause-effect relationships, especially with small sample sizes, formative measurement models, unknown data nature, and when evaluating new constructs. SmartPLS V.4.07 and JAMOVI software packages were used for data analysis. The survey results show that the workplace generating the highest number of responses was the government (n = 155, 63.27%), and, in terms of experience, the highest number came from those with less than 5 years (n = 105, 42.86%). Table 1 shows the frequencies and percentages.

Table 1. Frequency Table for Nominal Variables

Variable	*n*	*%*	Cumulative *%*
Workplace			
Government	155	63.27	63.27
Private	77	31.43	94.69
Experience			
Less than 5 years	105	42.86	42.86
From 5 to 10 years	68	27.76	70.61
From 11 to 15 years	25	10.20	80.82
More than 15 years	42	17.14	97.96

Note. Due to rounding errors, percentages may not equal 100%.

The survey also shows that the most frequently observed category of accounting was no (*n* = 190, 77.55%). The most frequently observed category of programming was no (*n* = 200, 81.63%). The most frequently observed category of IT was no (*n* = 207, 84.49%). The most frequently observed category of MIS was no (*n* = 203, 82.86%). The highest category of e-commerce was no (*n* = 219, 89.39%). The highest category of computer network design was no (*n* = 222, 90.61%). The highest observed category of marketing was no (*n* = 217, 88.57%). The highest category of data science was no (*n* = 221, 90.20%). The highest category of another major was no (*n* = 238, 97.14%). Frequencies and percentages are presented in Figure 2.

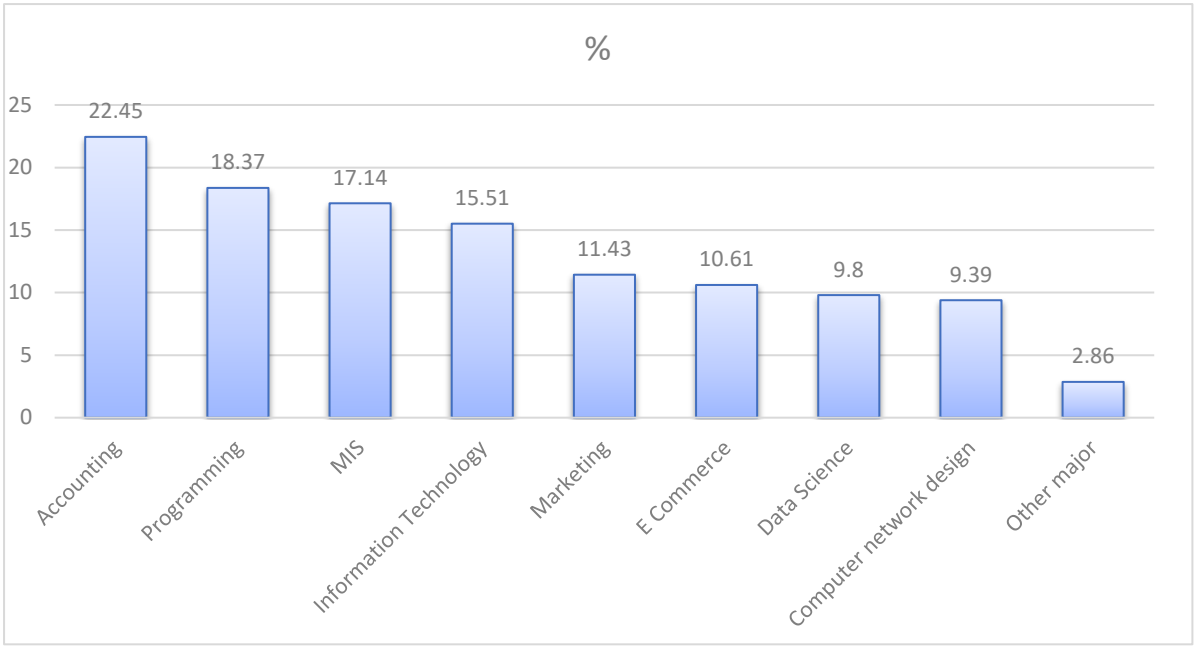

Fig.2: Frequency Diagram for Nominal Variables

Further results for programming languages include the most frequently observed category of Java was no (n = 198, 80.82%). The most frequently observed category of Python was no (n = 229, 93.47%). The highest category of C Sharp was no (n = 229, 93.47%). The highest category of C or C Plus was no (n = 227, 92.65%). The highest category of R was no (n = 235, 95.92%). The highest category of Dot NET was no (n = 220, 89.80%). The highest category of Ruby was no (n = 236, 96.33%). The highest category of SQL was no (n = 220, 89.80%). The highest category of none was no (n = 209, 85.31%). The highest category of other languages was no (n = 239, 97.55%). Frequencies and percentages are presented in Figure 3.

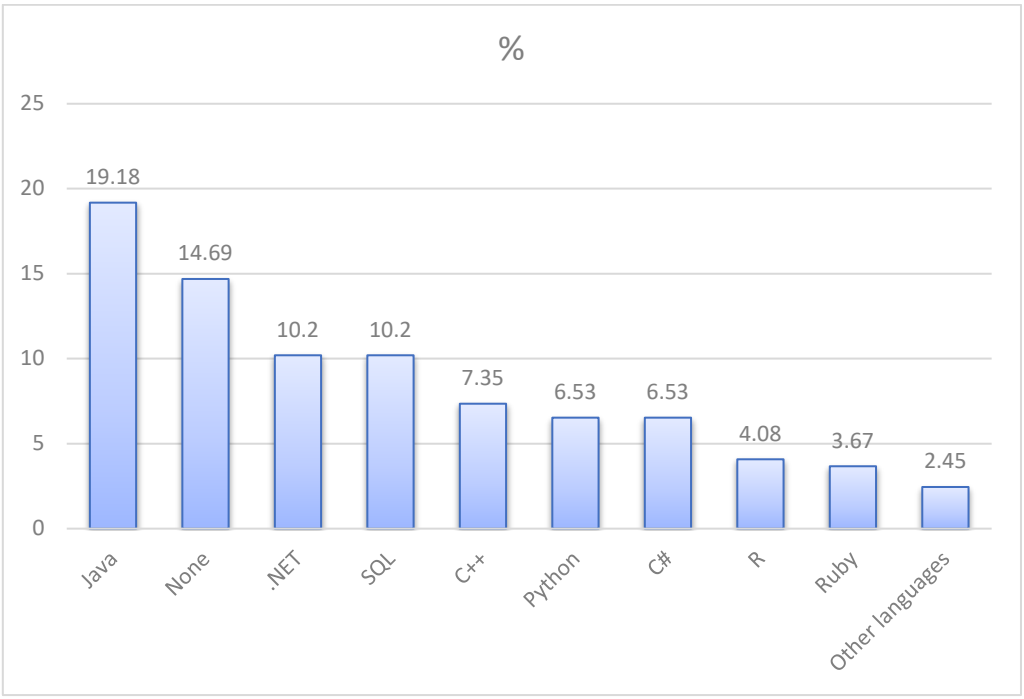

Fig.3: Frequencies and percentages were calculated for Java, Python, C Sharp, C or C Plus, R, Dot NET, Ruby, SQL, none, and other languages.

4.1. Validation: Partial Least Squares Path Modelling

Analysis was conducted using partial least squares path modelling (PLS-PM) to determine the appropriateness of the latent variables, ITOSc, DCSc, ALSc, ECHc, PMSc, WS, and OOPc, and describe the data. The study used PLS-PM because it is the best tool to precisely understand how variables and constructs are interrelated in a network of multi relationship with no common patterns is visible in a small data set, as seen in Figure 1. The PLS-PM aligns with the nature of the research and the model answers the research question. It was evaluated through an investigation of the validity of the measurement and structural models. In addition, the regressions of the PLS-PM were analysed. The measurement model was assessed by evaluating the unidimensionality, loadings, communalities, and crossloadings of the indicator variables and the significance of each loading by bootstrapping.

Sanchez (2013) defines the positive correlation between reflective indicators as the unidimensionality of indicators, which can be evaluated using Cronbach's alpha (α) and Dillon–Goldstein's rho (ρ); acceptable values are an α equal to or greater than 7 and a ρ equal to or greater than 0.7. DCS did not exhibit unidimensionality; thus, this latent variable had to be negated or removed from the model (Sanchez, 2013), as presented in Table 4.

Table 4. Unidimensionality of Indicators for each Latent Construct.

Item	Mean	SD	Outer loadings	Cronbach's α	Composite reliability (rho a)	Composite reliability (rho c)	Average variance extracted (AVE)
ALS1	4.347	1.059	0.894	0.786	0.796	0.903	0.823
ALS2	4.196	1.192	0.921				
DCS1	4.230	1.132	0.819	0.678	0.677	0.824	0.609
DCS3	3.743	1.202	0.732				
DCS4	4.124	1.174	0.789				
ITOS1	4.033	1.170	0.756	0.818	0.822	0.873	0.578
ITOS2	3.871	1.269	0.745				
ITOS3	4.189	1.090	0.781				
ITOS4	4.108	1.184	0.791				
ITOS6	3.996	1.142	0.726				

	P	4	1	0.790	0.8	0.8	0.8	0.
MS1	.232	.112			52	53	91	576
	P	4	1	0.772				
MS2	.012	.165						
	P	4	1	0.769				
MS3	.332	.110						
	P	4	1	0.752				
MS4	.395	.033						
	P	4	1	0.768				
MS5	.326	.076						
	P	4	1	0.700				
MS6	.139	.147						
	E	3	1	0.771	0.8	0.8	0.9	0.
CH1	.919	.383			96	98	20	659
	E	4	1	0.809				
CH2	.201	.235						
	E	4	1	0.849				
CH3	.352	.081						
	E	4	1	0.830				
CH4	.380	.189						
	E	4	1	0.790				
CH5	.424	.087						
	E	4	1	0.818				
CH6	.466	.168						
	O	3	1	0.837	0.8	0.8	0.8	0.
OP1	.971	.273			21	54	80	649
	O	4	1	0.872				
OP2	.075	.120						
	O	4	1	0.835				
OP4	.021	.137						
	O	3	1	0.662				
OP5	.903	.316						

The validity of the model was also evaluated by looking into crossloadings for the reflective indicators by checking if an indicator's absolute loading was higher than a latent variable to which it was not designated (Henseler et al., 2015; Henseler et al., 2009; Sanchez, 2013). The reflective indicators in the model showed no crossloadings, which implies that the specified latent variable structure was adequate for the data, as presented in Table 5.

Table 5. Loadings and Crossloadings in the Outer Model.

Indicator	ITOSc	DCSc	ALSc	ECHc	PMSc	OOPc
ITOS1	**0.75**	0.34	0.24	0.34	0.48	0.36
ITOS2	**0.76**	0.41	0.32	0.29	0.46	0.44
ITOS3	**0.78**	0.39	0.38	0.29	0.58	0.48
ITOS4	**0.78**	0.45	0.27	0.27	0.60	0.50
ITOS6	**0.73**	0.36	0.21	0.25	0.55	0.33
DCS1	0.43	**0.83**	0.19	0.26	0.44	0.34
DCS3	0.37	**0.69**	0.14	0.26	0.40	0.31
DCS4	0.42	**0.84**	0.17	0.21	0.49	0.39
ALS1	0.28	0.18	**0.89**	0.21	0.30	0.30
ALS2	0.40	0.20	**0.94**	0.29	0.38	0.32
Q4R1	0.33	0.37	0.28	**0.76**	0.43	0.37
Q4R2	0.36	0.24	0.23	**0.81**	0.41	0.22
Q4R3	0.18	0.17	0.18	**0.86**	0.34	0.23
Q4R4	0.31	0.17	0.21	**0.85**	0.41	0.26
Q4R5	0.29	0.23	0.22	**0.81**	0.41	0.23

Q4R6	0.35	0.30	0.24	**0.83**	0.48	0.35
PMS1	0.56	0.43	0.29	0.39	**0.80**	0.43
PMS2	0.52	0.53	0.20	0.31	**0.75**	0.45
PMS3	0.57	0.36	0.29	0.44	**0.79**	0.45
PMS4	0.51	0.43	0.36	0.46	**0.80**	0.43
PMS5	0.58	0.47	0.26	0.38	**0.82**	0.49
PMS6	0.56	0.39	0.35	0.39	**0.69**	0.45
Q3R1	0.47	0.41	0.29	0.26	0.48	**0.84**
Q3R2	0.45	0.34	0.25	0.34	0.50	**0.86**
Q3R4	0.50	0.36	0.30	0.32	0.53	**0.82**
Q3R5	0.35	0.29	0.30	0.12	0.30	**0.66**

The study used average variance, which was drawn out for each construct to determine that each latent variable had a strong correlation with its reflective indicators with an average variance extracted (AVE) ≥ .50. This result indicates that the latent variable in question can be learned from more than 50% of the variance for the indicators (Henseler et al., 2009; Sanchez, 2013; Chinn, 2010). The results indicate no latent variables with low AVE scores, which means that each latent variable accounted for a significant portion of the indicator's variance. The AVE values can be found in Table 4.

Five hundred resamples for the bootstrapping and 95.00% confidence intervals were used to evaluate the regression coefficients to find the significance of the regression paths with α =.05- (Henseler et al., 2009; Sanchez, 2013; Chinn, 2010). PMSc significantly predicted OOPc, *B* = 0.58, 95.00% CI [0.42, 0.71], indicating that a one-unit rise in PMSc will increase the expected value of OOPc by 0.58 units. Thus, H1 is supported. PMSc:WS did not significantly predict OOPc, *B* = 0.02, 95.00% CI [-0.13, 0.16], suggesting that there is no association between PMSc:WS and OOPc. WS did not significantly predict OOPc, *B* = 0.03, 95.00% CI [-0.08, 0.15], suggesting that there is no relationship between WS and OOPc. Thus, H2 is not supported. ITOSc significantly predicted PMSc, *B* = 0.47, 95.00% CI [0.33, 0.59], indicating that a one-unit rise in ITOSc will raise the expected value of PMSc by 0.47 units. Thus, H3 is supported. DCSc was significant in predicting PMSc, *B* = 0.23,

95.00% CI [0.11, 0.33]; DCSc will raise the expected value of PMSc by 0.23 units since it is raised by one unit. Thus, H4 is supported. ALSc did not significantly predict PMSc, *B* = 0.09, 95.00% CI [-0.02, 0.18], suggesting there is no association between ALSc and PMSc. Thus, H5 is not supported. ECHc significantly predicted PMSc, *B* = 0.24, 95.00% CI [0.12, 0.38], indicating that a one-unit rise in ECHc will increase the expected value of PMSc by 0.24 units. Thus, H6 is supported. The regression results are shown in Table 6 for the inner model with bootstrapping.

Table 6. Bootstrap Results for the Inner Model Regression Paths.

Effects	Hypothesis	Original sample (O)	T statistics	P values	Remark
Direct Effects	"ALS -> OOP	0.056	1.722	0.085	Not Supported
	"DCS -> OOP	0.118	2.171	0.030	Supported
	"ITOS -> OOP	0.217	2.140	0.032	Supported
	ECH -> OOP	0.085	1.804	0.071	Not Supported
Indirect Effects	ECH -> "PMS -> OOP	0.085	0.010	0.195	Not Supported
	"ITOS -> "PMS -> OOP	0.217	0.028	0.425	Not Supported
	"ALS -> "PMS -> OOP	0.056	0.009	0.143	Not Supported
	"DCS -> "PMS -> OOP	0.118	0.020	0.240	Not Supported

The two-stage approach was used to apply moderation where each interaction term from the latent variable scores was created (Sanchez, 2013). The moderating effects were evaluated by looking at the significance of each interaction term with 95.00% confidence intervals. WS had no significance in moderating the effect of PMSc on OOPc, *B* = 0.02, 95.00% CI [-0.13, 0.16]. Based on this sample, a one-unit rise in WS had no significance in affecting the slope of OOPc on PMSc. Table 6 shows the inner model results, which include any moderating effects.

4.2. Practical Implications

This study has several implications for practice.

Firstly, the study suggests that design communication and IT operation skills have direct effects on OOP. Therefore, IT graduates should be equipped with these two skills on a priority basis, and the curricula must give these skills sufficient weight.

Second, the study found no evidence that employee characteristics and Arabic language skills affect OOP. This finding suggests that IT graduates, irrespective of their individual characteristics and language skills, can be effective provided they have both design communication and IT operation skills.

However, during the rigorous cycle of phases 3 through 5 it was revealed that the Arabic language is favoured when IT employees need to interact with native Arabic language speakers, as in the system requirements collection phase.

Thirdly, insufficient evidence was found in this study to support the hypotheses related to the mediating role of project management. This finding may indicate that IT operation skills and design communication skills work in a standalone manner and do not need to be packaged as project management skills. Hence, there is a need for more specialised courses for IT graduates to enhance their employability.

More generally, the process followed in the study, that is, the construction of a marketplace survey for the skills needed by IT graduates', seems promising. The psychometric analysis of the survey indicates that it is both valid and reliable and encourages future implementation.

As regards content-specific implications, the current marketplace requires organisations to ensure that their IT graduate employees have the skills and qualities that are currently most valued by managers. HEIs should incorporate these skills into their curricula to help IT graduates develop the skills and qualities needed.

The theoretical model provides a way of understanding how these skills and qualities contribute to the success of organisations. Improved collaboration between academia and industry is called for in the hope of better preparing IT graduates for the demands of the marketplace.

5. Conclusion, Limitations, and Future Studies

By applying a stakeholder theory lens to IT manager expectations, this study indicates which skills computing graduates must have to improve organisational performance. The multi-dimensional model offers a blueprint for realigning computing education programmes to address the widening gap between industry demands and graduate competencies, especially related to dynamic project environments. The development and validation of the survey tool are presented in phases that are generic and lead to context-specific statements.

While shedding light on priorities in the Kuwaiti context, larger validation studies across diverse sectors and geographies combined with longitudinal tracking of graduate onboarding success could uncover more generalisable patterns. Given the rapidity of digital transformations, if relevance is to be sustained, institutions and employers must jointly engage in initiatives to continuously co-create adaptive curricula and inculcate essential professional capabilities beyond mere technical prowess.

The study provides significant insights into identifying key skills in business computing graduates and their impact on organisational performance. Implementing the suggested revisions in business computing curricula will enhance their academic rigour and practical relevance. The study, however, has limitations because it is self-reported and based on a single country and a limited number of IT managers. There is a need to replicate this study over time and space to better understand how diverse managers in different regions view market needs according to the context-specific nature of their environments. In addition, small to medium enterprises and nonprofit organisations need to be involved in future studies. Future studies should also investigate which IT jobs would benefit from having the Arabic language skill in an employee.

Research indicates that the cultivation of critical thinking skills can help enhance project management skill proficiency. Smith and Johnson (2017) indicate that project managers with effective critical thinking skills have increased decision-making capabilities and are proficient at assessing project risks, resulting in improved overall project outcomes. Therefore, critical thinking can help guide project managers in project management through skills improvement. Similarly, research indicates that project managers with high critical thinking abilities are equipped to identify possible setbacks in project workflows, allowing them to make improvements and maximise resource allocation (Brown et al., 2019). With more automation, employees are required to show more critical thinking and

management skills to control the overall processes (Adler, 1986). Undoubtedly, future studies should investigate whether critical thinking skills can have a positive influence on project management skills.

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