Factors Affecting Employability of Management Information Systems Graduates in Sudan

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Abstract

This study aims to study the factors that affect the graduate employability of the information systems in Sudan, the author carefully from the literature review selected five factors as dependent variables which are Analysis Skills (AS), Business Skills (BS), Computer Skills (CS), Programming Skills (PS), and Qualification Education and Training Skills (QETS), and one single variable as dependent which is the Graduate Employability (GE). The methodology used by the author followed a quantitative method to conduct the study quantitative data was collected from 161 respondents purposively, and PLS was used for the sake of analysis, which is done in two stages, the first stage was to validate the variables as a construct using HTMT technique, and the second stage is the process of evaluating the model itself using SEM approach to test the hypothesis of the dependents variables against the independent variable.The findings analysis has shown that the selected factors (AS, BS, PS, QETS) have a positive significant effect on the GE, while the factor CS, is having no significant impact.This study threw a stone on graduate employability, which will help other researchers to conduct more research to reveal other factors affecting graduate employability in Sudan.The study will help graduates to have the required skills that are needed by the industry which will let them practically get employed shortly. after rigorous investigation, the author can confirm that this is one of the few pieces of research that tackle the issue of the Management Information System's graduate employability in Sudan. Hence, the door now is open to other research tackling other sub-

jects and other fields of study that in the end will lead to better production and better economic situation.

Keywords: Graduate Employability, Information Systems, Skills Development, PLS-SEM Analysis, Sudanese Labor Market.

العوامل المؤثرة على قابلية توظيف خريجي نظم المعلومات الإدارية في السودان

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المستخلص:

تهـدف هـذه الدراسـة إلى دراسـة العوامـل التـي تؤثـر عـلى قابليـة توظيـف خريجـي نظـم المعلومـات في السـودان، وقـد اختـار المؤلـف بعنايـة مـن مراجعـة الأدبيـات خمسـة عوامـل كمتغـيرات تابعـة وهـي مهـارات التحليـل (AS)، ومهـارات الأعـمال (BS)، ومهـارات الكمبيوتـر (CS)، ومهـارات البرمجـة (PS)، ومهـارات التعليـم والتدريـب المؤهـل (QETS)، ومتغـير واحـد تابـع وهـو قابليـة توظيـف الخريجـين (GE).المنهجيـة التـي اتبعهـا المؤلـف هـي المنهـج الكمـي لإجـراء الدراسـة، حيـث تـم جمـع البيانـات الكميـة مـن ١٦١ مسـتجيبًا بشـكل مقصـود، وتـم اسـتخدام PLS مـن أجـل التحليـل، والـذي يتـم عـلى مرحلتـين، كانـت المرحلـة الأولى هـي التحقـق مـن صحـة المتغـيرات كبنيـة باسـتخدام تقنيـة HTMT، والمرحلـة الثانيـة هـي عمليـة تقييـم النمـوذج نفسـه باسـتخدام نهـج SEM لاختبـار فرضيـة المتغـيرات التابعـة مقابـل المتغـير المسـتقل.أظهر التحليـل أن العوامـل المختـارة (AS، BS، PS، QETS) لهـا تأثـير إيجـابي كبـير عـلى GE، في حـين أن عامـل CS ليـس لـه تأثـير كبير.ألقـت هـذه الدراسـة حجـرًا عـلى قابليـة توظيـف الخريجـين، مـما سيسـاعد الباحثـين الآخريـن عـلى إجـراء المزيـد مـن الأبحـاث للكشـف عـن العوامـل الأخـرى التـي تؤثـر عـلى قابليـة توظيـف الخريجـين في السـودان.ستسـاعد الدراسـة الخريجـين عـلى الحصـول عـلى المهـارات المطلوبـة التـي يحتاجهـا سـوق العمـل والتـي ستسـمح لهـم عمليًـا بالتوظيـف قريبًـا. بعـد تحقيـق دقيـق، يمكـن للمؤلـف أن يؤكـد أن هـذا هـو أحـد الأبحـاث القليلـة التـي تعالـج قضيـة قابليـة توظيـف خريجـي نظـام المعلومـات الإداريـة في السـودان. وبالتـالي، فـإن البـاب مفتـوح الآن لأبحـاث أخـرى تتنـاول مواضيـع أخـرى ومجـالات دراسـية أخـرى مـن شـأنها أن تـؤدي في النهايـة إلى إنتـاج أفضـل ووضـع اقتصـادي أفضـل.

الكلـمات المفتاحيـة: قابليـة توظيـف الخريجـين، نظـم المعلومـات، تطويـر المهـارات، تحليـل PLS-SEM، سـوق العمـل السـوداني.

1. Introduction:

the rapid technological change and COVID 19 changed the way work is done, and they become a driving force that enforce institute to look again to what are the most important and relevant employability factors that should be considered (Djankov et al., 2019).

Data science, Artificial Intelligence, and so the process of the management of these information systems will take a vital role in today world.(Zhu et al., 2021)

Competency life cycle is not living longer as used to be previously due to the rapid change of technology (Zhu et al., 2021).

So changing to online work and due to emergent of Artificial Intelligence, many employees will feel unsecure and many students will be in need to have new skills to adapt and finding an employability chance.

Unemployment and underemployment become an issue affecting not only developing countries but also its an issue strategically for developed country and that is why need to be addressed and raised through a high policy making level (Ayala Calvo & Manzano García, 2021).

Some universities strategically start to recognize themselves as graduate employment maker beside their roles of teaching, researching and providing services to their communities. (Pereira et al., 2020).

One of the university obligation towards their students is to prepare them with the knowledge skills and competencies that qualify them to produce an innovative solution to their communities and their potential customers, that is why those universities should prepare those students to become an entrepreneurs having the required practical capabilities, but in the same time its not expected for all those students to become an entrepreneur, so that is why those students at least should have the skills that allow them to get an entry job level (Mainga et al., 2022).

Universities looking for recognitions through publishing scientific research paper, but also they can get this recognition through their ability to provide employable graduates that have the enough skills and competencies to get enrolled in job (Teichler, 2019). Universities to stay competitive need to make more investigation

regard graduates employability to get adapt to new economic crisis and COVID 19 pandemic.

Universities should realize that, it's not enough only to focus on student's marks and degrees to provide them a better opportunity for their life future career, they should focus on the skills and competencies that make them able to be employed (Scott & Willison, 2021).

Tackling and solving graduate's employability it's not just an issue should be solved from the perspective of the employers or the only from the perspective of the academician in their laps inside their universities but the they should be considered by the student themselves as a main stakeholder (Clarke, 2018).

Despite the fact that the responsibility of the student's employability is distributed between the university and the students, but recently the majority of research tend to rely more on the students to find ways to get employed in the first instant (Cheng et al., 2022).

So this research focus on the student's perspective, because there's many studies showed evident that students are aware enough about their employability chances and what is required for them to get enrolled in an entry level job (Dolce et al., 2020).

So despite the necessity to include the perception of the students on their main issue of their employability by themselves, but there's a few research take to their consideration and their (Higdon, 2016).

Students perception to be included and consider is become very crucial, because the university is not the only opportunity for those students to get employed, and the student can work independently toward finding employability opportunities to themselves (Ergün & Şeşen, 2021).

Significance of the study:

There's many reasons for tackling the subject of students

graduate employability, but one of the most important reason is: the growing and leveraging up the economics of developing countries through providing skilled labor according to the need of the market, and specially now the economic is shifted from traditional economic to the economics of knowledge (States, 2020).

Second, emerging of technology, internet, and the globalization, make the world as small village where the skills of the labor should be up to the international standards as possible, where there should be an standard framework of a scientific model to determine what skills those students graduates should study and possess when they get graduated to get a higher chance to get employed in the local or the international market (Abdurakhmanova et al., 2020).

Third, university need to be sure whether they are up to date or not regard competencies and skills that they are giving to graduates students through the curriculum to match the desire and the need of the employers in the labor market (Uddin, 2021).

Fourth, yes competencies and skills of graduates should match the international standards, but it should be contextualized to the local need of the country, and those graduates are graduated on first place to serve the local community and to enhance the economy of their country and that is why is very important to localize the employability standard for each country separately (Lam & Tang, 2021).

So despite of the reality that the employer play the main role on the process of hiring those graduates students, but also the individual actions rely too much on their perceptions and their choice (Soares & Mosquera, 2020), that is why this study is going to examine the factors that affect the employability of management information systems graduates in Sudan. The study also contributes to the literature by showing the readiness of the Information Systems graduates in Sudan, and their perception toward being em-

ployed after the graduation through determine the factors that affecting their employability.

So, the aim of this study was determining factors that affect students graduate to get employed.

2. Literature Review :

2.1 *Graduate Employability*

Graduate employability refer to the graduate ability to show and possess his/her acquired knowledge and skills to get an entry level job after the finishing the university (Chen, 2017). If these skills are relevant and practical then the employer will be more happier and have a bigger desire to provide a job that can satisfy the both side. The process of employment can be affected by two main factors, external factors which represent the market demand the economic situation of the country, while the internal factors represented on the form of skills that possessed by the graduates themselves like their interpersonal skills, technical skills and team working skills (Guilbert et al., 2016). Some researchers define the employability skills by the following skills and traits that can make the graduate more competitive and more attractive to the employers on the market, and these attributes and skills are include your ability to be social and having good personal attitude, as well as being able to demonstrate your leadership style, your communication skills and to which extend you are able to work in harmony with the team and being able to collaborate (McQuaid & Lindsay, 2005).

Factors that affect the employability of graduates are different and are tackled by many authors and still some new factors are evolving, one of those authors who identify the factors that affect the graduate employability is Weligamage, which he determines seven factors that employers giving them a very high priority and classified as vital, the first factor is the communication skills (CS), and respectively the second one is general knowledge, personality

(PE), computer and IT skills (CIS), verbal communication skills (VCS), realistic experience and educational background (Weligamage & Siengthai, 2003). But when it comes to Paddi, another factors and skills have been added, like analytical skills (AS), critical thinking and IT skills (Paadi, 2014). And also more employability factors have been added by Liyanage, which are logical thinking (LT), dedication to work, communication and IT skills, management skills, positive attitude (PTD et al., 2016). While the academic performance of the students is important, but it's not the only factor that help students to build their future career, and other skills like soft skills and the practical experience also need to be exist to give the graduate a higher opportunity to get hired by the employer (D.G.M.S. JAYASINGHA, 2020). Many factors have been mentioned by previous studies; however, this study focus on six important factors that help information systems graduates in Sudan to get employed which are graduate employability (GE) as dependent variable, programming skills (PS), analysis skills (AS), business skills (BS), computer skills (CS), and leaning, education and training skills (LETS) as independent variables.

2.2 *Analysis skills (AS) and graduate employability (GE)*

Your analysis skills are a personal trait that reflect your ability to analyze and understanding problems to suggest suitable solution, as it mentioned by Potgieter and Coetzee, it's a personal characteristic that distinguish one person from another depending on his/her ability to analyze, think, and interact with others providing good and logical thinking and good attitude or behavior (Potgieter & Coetzee, 2013). Being able to have the enough personal and analytical thinking trait is one step ahead toward being able to get employed in the market according to an empirical studies have done among students asking them about their perspective one what factors that consider important to them to qualify them and make them employable (Qureshi et al., 2016). so according to all these

previous studies, the research makes the analysis skill factor as one of the employability factors that help management information systems graduates in Sudan to get an entry level job, so the following hypothesis is supportive:

H1. AS can positively and significantly affect GE for Sudanese graduates of management information systems.

2.3 *Business skills (BS) and graduate employability (GE)*

Business skills refer to modules that normally taught in business schools like Marketing, Accounting, Supply chain management, etc. (Andrews & Higson, 2008). but also refer to how the graduates are going to deal and perform in the industry and to which extend they are able to perform a business-oriented tasks like preparing contracts, developing proposals and dealing with customers. So, however and according to justification mentioned above, this study considers the business skills as one skill that qualify the graduates to get an entry level job.

H2. BS can positively and significantly affect GE for Sudanese graduates of management information systems.

2.4 *Computer Skills (CS) and Graduate Employability (GE)*

Computer skills is very crucial factor that help graduates to secure a job, at least most of the interviews and job tests are done online which is require the potential employee to have the minimum knowledge of computer to deal with the basic entry level job skills, but an study done by Weligamage found that the computer skills are very important and the respondents gave it a high rank on their assessment (Weligamage & Siengthai, 2003). But now a days and specially after COVID 19 and with the emergent of the artificial intelligence and the necessity to analyze data, the need for the computer skills is definitely got higher, and here in this study the author refers to computer skills to skills that are related to computer that can offer the graduates a job, like designing, development, or data analysis skills. So, according to what mentioned, this study

considers the computer skill are one of the important factors that help graduate students to get an entry level job in the information system industry.

H3. CS can positively and significantly affect GE for Sudanese graduates of management information systems.

2.5*Programing Skills (PS) and Graduate Employability (GE)*

Programing skills is an skills that demonstrate student's technical skill to act and deal with computers and software, as it mentioned by Mansour and Dean it's about student ability to gain and acquire new tools, techniques and approach that help them to demonstrate their ability in practical manner (Mansour & Dean, 2016). so technical skills or programming skills as a form of technical skills is very vital in the process of handling business problems and that is why it consider as one of the factors that attract employer towards the potential employees to get hired by them and providing them good offer and good opportunities.

H4. PS can positively and significantly affect GE for Sudanese graduates of management information systems.

2.6*Qualification, Education and Training (QET) and Graduate Employability (GE)*

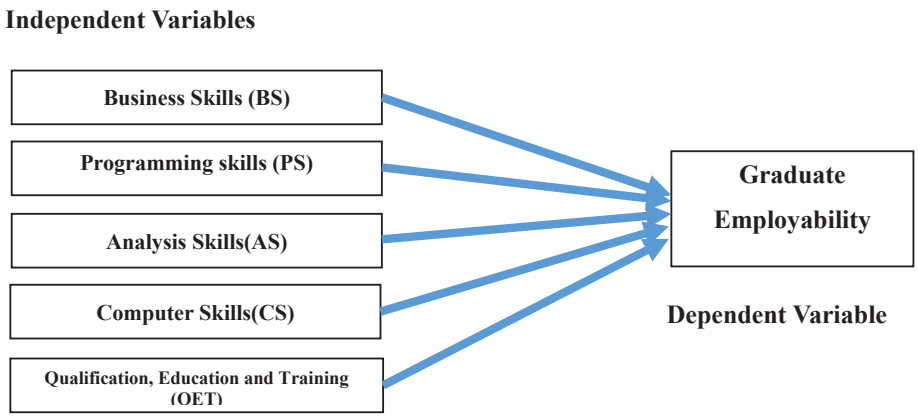
Qualification, education and training is important factor that help student graduates to get hired and employed if they are qualified enough and get their education in proper way that match the expectation of the employers and the real need of the market. But unfortunately some research criticized the way most of business schools are teaching their students, saying that: those schools mostly focus on the content and the discipline rather than focusing on the real need of the market and instead of giving students small problems from their life, they are only focusing on giving them concepts and theories, which is after a while make a separation between the students and the reality, make them more conceptual than being more practical to satisfy the expectation of the employ-

ers as well as the expectation of the students themselves (Longmore & Grant, 2018). According to previous statements, the process of education, if it's delivered in a way that put the students on the center of the learning process and make it the learning more practical, taking the flavor of training, then the student will be qualified enough to get an entry level job. And that is why in this research the factor of qualification, education, and training consider an important factor to be investigated in this study.

H5. QET can positively and significantly affect GE for Sudanese graduates of management information systems.

2.7 *Theoretical Model*

This exploratory study involves five independent variables (IV) and one dependent variable (DV) showed in the following diagram.



3. Research Method:

The study adopted exploratory quantitative approach, and the literatures about employability and graduates has been reviewed thoroughly for the sake of developing and formulating hypothesis to predict factors that affecting graduate employability in Sudan as a developing country, variables and its measures has been stablished also, then a conceptual model has been designed to test the relations between these factors and the employability as a dependent variable.

3.1 *Data collection and sample*

This study has been conducted through distributing self-administered questionnaire to final year graduate students of management information systems at Sudan University for Science and Technology which is a public university, as well as final year graduate students of Ahfad University for Women, which is a private university, both of these universities have relatively similar curriculum, similar teaching approach, and almost most of the staff of AUW are teaching in both universities using same references. The questionnaire has been designed electronically using donkey website, so during the design process the researcher put some rules and criterial that enforce each respondents to answer all questions to avoid missing data or incomplete responses, then the link has been shared with all the students in their personal and academic WhatsApp and Facebook groups, for all the final year students which their numbers are 120 from SUST and 51 from AUW, from the first time the researcher received only 90 responding, but after a close follow up with the students directly and through their groups, the researcher got 110 respondents from SUST and 51 from AUW. To avoid any potential bias due to data collection, the researcher was very careful and followed all possible criteria and guide line given by Podsakaoff (Podsakoff et al., 2003). To ensure that all data are have a high degree of quality, for example the researcher inform all the respondents that: their name and their identity will remain confident and even they are free to mention or hide their names, also they have been told to be frank as much as possible because these data it will be used to enhance the employability process in the future for the coming students.

3.2 *Measures and variables*

The study took the employability as the dependent variable and then the literature has been examined to come up with the five independents variables with their measures, which those depen-

dents variables are Business Skills (BS), Analysis Skills (AS), Programming Skills (PS), Computer Skills (CS), and Qualification, Education and Training (QET). Then the questionnaire has been designed to measure each variable separately, five Likert scale has been used in the questionnaire with the value 1 given as strongly disagree and 5 as strongly agree.

The first three measures of this study, BS, AS, and PS, has been identified from the Australian report containing framework that used specifically to measure the skills that information system users should have, this framework called Skills Framework for the Information Age (SFIA), the first variable (BS) has been measured through questions regard your ability to develop a contract, prepare a proposal, and documenting customers data, while the second variable (AS) has been measured through questions regard project management, suggesting solutions, and project management skills. While the third variable (PS) concern by skills like student ability to develop data bases, and writing codes (Shankaraman & Gottipati, 2016), while the variable CS which containing the skills that information system graduate should possess as a career in the industry has been measured through set of skills determined by the contribution of group of six experts from the industry through an interview, Those skills are your ability to develop a web application, android application, analyzing and managing data, and developing Enterprise Resource Planning (ERP) systems. The fifth variable QET has been measured using literature found on the frame work issued in The Journey to Employment report, with the specific questions regards your experience, training, and learning style like, have you been involved in a real project, or have you been in a training in a related company (Copps &

Plimmer, 2014). Last variable is the employability; the dependent variable has been measured through questions regard your ability to work with the team, your ability to communicate efficiently, and your ability to solve problems. All the employability measures have extracted also from the literature (Hossain et al., 2019).

3.3 Data analysis technique

Partial Least Square (PLS) as a technique has been used for this study and the Structural Equation Modelling (SEM) has been used as a methodology to test the hypothetical model and to test the relation between the variables for the sake of predicting the dependent variable which is the employability. PLS is a very appropriate for this study because the sample size is relatively small (161), but this size is suitable to predict the dependent variable (Information & Chin, 2013). So to fulfill the objective of the study and according to methodology has been adopted in this study according to the data and information mentioned previously, the SEM is the most appropriate method to be used for the sake of analyzing the collected data to give most accurate results (Ringle et al., 2014).

4. Analysis and Interpretation:

4.1 *Demographic Characteristics*

Table 3 shows the demographic of the participants which is consist of 161 participants, 47.2% of them are male and 52.8% of them are female. While 34% of them got excellent, 44.7% got V. Good, 26.7% got Good and 7.5 of them got pass. And when we come to their universities, we will find 29.2% of them from AUW and 70.8 of them from SUST. Finally, all the participants from one special

ization which is Information Systems.

Demographic Variables	Category	Arithmetic Number	%
Gender	Male	76	47.2
	Female	85	52.8
	Total	161	
Degree	Excellent	34	21.1
	V.Good	72	44.7
	Good	43	26.7
	Pass	12	7.5
	Fail	0	0
Universities	Ahfad	47	29.2
	SUST	114	70.8
Specialization	Information Systems	161	100%

Table 1 *Demographic characteristics of the participants:* ***Source****: Demographic component of the Questionnaire (Author 2023)*

4.2 Normality of Data

Data in Table 4 has no any skew more than 1.0 which is indicate its normally distributed and can be subjected to further analysis to be conducted for the structure model and the measurement model and this fact is stated by sposito (Skarpness, 1983)

Name	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness
Gender	1.528	2	1	2	1	2	0.499	-2.012	-0.113
University	1.292	1	1	2	1	2	0.455	-1.161	0.924
Specialization	1	1	1	1	1	1	0	NaN	NaN
GradYear	2018.037	2020	2002	2023	2002	2023	4.446	0.637	-1.165
Degree	2.205	2	1	4	1	4	0.857	-0.519	0.308
G_WebApplicationDevelopm	3.491	4	1	5	1	5	1.201	-0.388	-0.716

Name	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness
G_IOSandAndroidDevelopment	2.255	2	1	5	1	5	1.197	-0.759	0.615
G_UIUXDesign	2.776	3	1	5	1	5	1.365	-1.352	0.027
G_BusinessAnalysisandDesign	3.472	4	1	5	1	5	1.246	-0.796	-0.528
G_ApplicationDevelopment	2.385	2	1	5	1	5	1.231	-0.937	0.459
G_DataAnalysisandDataMining	2.733	3	1	5	1	5	1.25	-1.196	0.114
A_UsingAppforProjFollowUp	2.764	3	1	5	1	5	1.156	-1.023	0.132
A_UserRequirment	3.255	4	1	5	1	5	1.197	-0.779	-0.482
A_AppModdeling	3.118	3	1	5	1	5	1.228	-1.097	-0.106
A_SoftwareDesign	3.273	4	1	5	1	5	1.226	-0.87	-0.455
P_Programming	3.311	4	1	5	1	5	1.196	-0.765	-0.489
P_AnimationDevelopment	2.137	2	1	5	1	5	1.06	0.075	0.828
P_DatabaseDesign	2.646	2	1	5	1	5	1.233	-1.07	0.261
P_Testing	2.665	2	1	5	1	5	1.195	-0.907	0.343
B_SafetyEngineering	2.658	2	1	5	1	5	1.242	-0.984	0.36
B_InformationContentAuthoring	2.602	2	1	5	1	5	1.176	-0.785	0.399
B_UserExperinceDesign	2.87	3	1	5	1	5	1.305	-1.185	0.058
B_MarketingResearch	2.764	3	1	5	1	5	1.229	-1.026	0.258
B_SalesSupport	2.938	3	1	5	1	5	1.359	-1.314	0.009
E_SelfManagement	3.236	4	1	5	1	5	1.259	-1.024	-0.38
E_Communication	3.161	3	1	5	1	5	1.26	-1.178	-0.196
E_TeamWork	2.491	2	1	5	1	5	1.132	-0.631	0.503
E_ProblemSolving	2.354	2	1	5	1	5	1.024	-0.166	0.575

Name	Mean	Median	Scale min	Scale max	Observed min	Observed max	Standard deviation	Excess kurtosis	Skewness
T_ProjectBasedLearning	3.087	3	1	5	1	5	1.306	-1.135	-0.179
T_TrendingTools	2.652	2	1	5	1	5	1.227	-0.906	0.366
T_TechnicalTeachersToSelfLearner	2.957	3	1	5	1	5	1.238	-0.99	-0.056
T_TrainingAtReleventOrganization	2.702	2	1	5	1	5	1.351	-1.173	0.359
T_GraduatesAreReady	2.168	2	1	5	1	5	1.222	-0.315	0.829
S_UniversityEnterpriseCollaboration	4.571	5	1	5	1	5	0.809	7.243	-2.541
S_SubjectRelatedToMarket	2.689	2	1	5	1	5	1.242	-1.055	0.256
S_GoodLaps	2.888	3	1	5	1	5	1.323	-1.192	-0.036
S_InternshipInRelated	4.565	5	1	5	1	5	0.847	8.318	-2.743
S_ParticipatingInCurriculumDesign	4.205	5	1	5	1	5	1.058	0.738	-1.245
S_EncourgingEnterpreneurship	4.478	5	1	5	1	5	0.926	4.587	-2.183
S_QulifyingTecherPractically	4.547	5	1	5	1	5	0.877	6.067	-2.428
S_AppNewToolsInCurriculum	4.683	5	1	5	1	5	0.726	9.926	-2.971

Table 2 *Normality of the data* ***Source****: Structural Equation Modelling (Author 2023)*

1.1 *Validity and reliability of the items included on the survey instrument*

When we have many items combined together to build a construct, then we should examine those items, and one approach to check the validity of this construct we apply convergent validity, and the researcher **concern will be about measuring the extent**

those items are really representing the construct The question is how we can assess this convergent validity for this construct and according to Hair too, it will be through Composite Reliability (CR) (Hair, 2009).

Variables	No of Items
Analysis Skills (Independent)	4
Business Skills (Independent)	5
Programming Skills (Independent)	4
Computer Skills (Independent)	6
Qualification, Education, and Training (Independent)	5
Graduate Employability (Dependent)	4

***Table 3**: Number of items under each variable on the survey questionnaire:*

***Source**: Survey instrument by the author 2023*

The result shown on (Table 4) of factors loading for all items passed the minimum value which is 0.7, which is referring to the quality of the measurement model and its items that reform all the constructs (MacKinnon et al., 2008). The values showed by the study reveal that the minimum value is 0.716 and maximum value is 0.882, so all the values already exceed the minimum value which is 0.7.

From another side when we come to analyze the concept of reliability (internal consistency), Cronbach alpha consider one of the known methods, and here the value of alpha should exceed 0.6, and its ranging form 0.702 as a minimum value to 0.881 as a maximum value, and here we consider the data and the questionnaire is reliable, and this criterion is suggested by Nunnally. And according to the result shown on the Table 2, then we can say the data are reliable, and each item is internally consistence and have enough degree of reliability (Nunnel et al., 1994). Convergent validity was acceptable because the average variance extracted (AVE) was over 0.5. The results for reliability and validity along with the

factor loadings for the items ae presented in table 1. Discriminant validity was assessed by heterotratit-monotrait ratio of correlations(Henseler et al., 2015), with values below the threshold of 0.90. Hence , discriminant validity is established (see Table 5).

	Loadings	Cron-bach's Alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Analysis Skills (AS)		0.774	0.855	0.595
A1	0.792			
A2	0.804			
A3	0.729			
A4	0.761			
Business Skills (BS)		0.881	0.913	0.678
B1	0.771			
B2	0.807			
B3	0.839			
B4	0.831			
B5	0.869			
Employability Skills (ES)		0.817	0.53	0.716
E1	0.67			
E2	0.846			
E3	0.822			
Computer Skills (CS)		0.852	0.491	0.796
C1	0.673			
C2	0.712			
C3	0.763			
C4	0.754			

	Loadings	Cron-bach's Alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
C5	0.752			
Programming Skills (PS)		0.82	0.536	0.744
P1	0.812			
P2	0.694			
P3	0.861			
Qualifications, Education, and Training (QET)		0.851	0.538	0.803
QET1	0.795			
QET2	0.824			
QET3	0.816			

Table 4 *Loading, Reliability, and Validity (Author 2023)*

	Analysis Skills	Business Skills	Com-puter Skills	Em-ploy-ability	Pro-gram-ming Skills	Qualifi-cation, Educa-tion and Training
Analysis Skills						
Business Skills	0.667					
Computer Skills	0.790	0.666				
Employability	0.866	1.030	0.761			
Programming Skills	0.856	0.737	0.860	0.921		
Qualification, Education and Training	0.631	0.541	0.731	0.499	0.702	

Table 5 *HTMT Ratio (Author 2023)*

4.3*Structural Model Assessment*

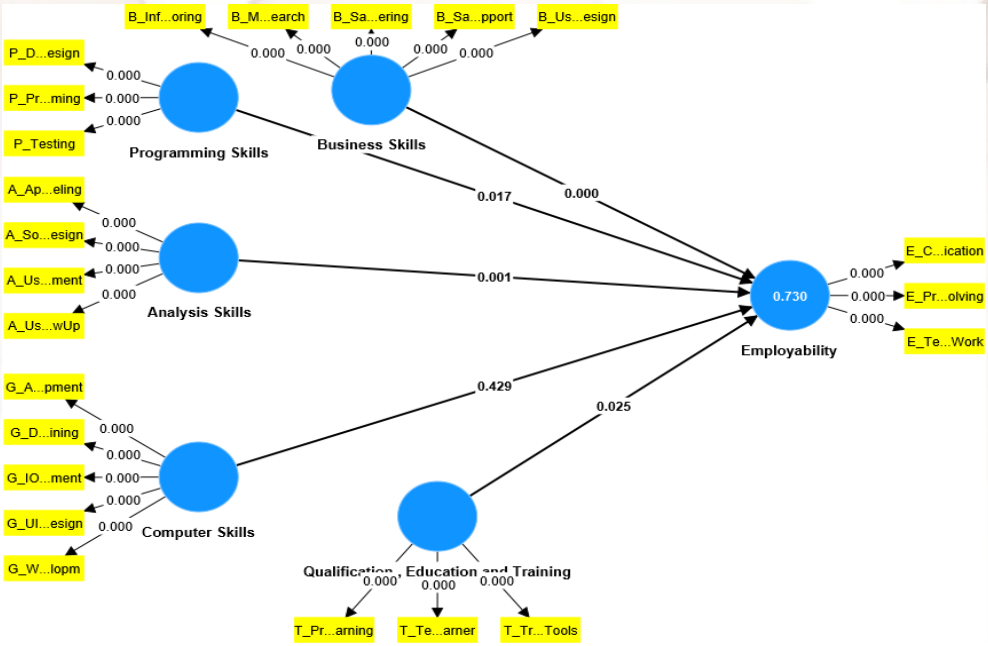
Following the assessment of the measurement model, the next step is the valuational path for the evaluation of path coefficients (relationships amongst study constructs and their statistical significancy.

H1, H2, H4, H5 evaluate where analysis skills, business skills, programming skills and qualification, education, and training are significantly and positively affecting graduate employability. The results revealed that AS, BS, PS, QETS have a significant and positive impact on graduate employability with P value ranging from 0.001 as a minimum value and 0.025 as maximum value as shown in table 6. Hence H1, H2, H4, H5 was supported.

H3 evaluate where computer skills, significantly and positively affecting graduates' employability. The results revealed that CS has insignificant impact on graduate employability. Hence H3 is not supported.

Hypothesis	mean	Standard deviation	T statistics	P values
AS ->GE	0.217	0.066	3.278	0.001
BS -> GE	0.611	0.058	10.571	0.000
CS -> GE	0.05	0.055	0.79	0.429
PS -> GE	0.178	0.076	2.397	0.017
QETS -> GE	-0.13	0.059	2.236	0.025

Table 6 *Direct Relationships (Author 2023)*



The ***Figure 2*** *Structural Model (Author 2023)*

results of mean values and standard deviation of the student's skills on the following table showed how students are far from being employed by their potential employers according to the lack of skills which they gain from their academic education, the skills of QET showed the minimum on the table, which is 2.4, while the AS were the best which is 3.5.

Constructs	Items	Median	Standard deviation
Analytical Skills (AS)	Using App for Projects Follow-up	3	1.16
	User Requirement	4	1.20
	App Modeling	3	1.20
	Software Design	4	1.20
		3.5	
Business Skills (BS)	Safety Engineering	2	1.24
	Information Content Authoring	2	1.18
	User Experience Design	3	1.30
	_Marketing Research	3	1.22
	Sales Support	3	1.36
		2.6	

Constructs	Items	Median	Standard deviation
Programming Skills (PS)	Programming	4	1.20
	Animation Development	2	1.06
	Database Design	2	1.23
	Testing	2	1.20
		2.5	
Computer Skills (CS)	Web Application Development	4	1.20
	IOS and Android Development	2	1.20
	UI UX Design	3	1.37
	Business Analysis and Design	4	1.25
	Application Development	2	1.20
	Data Analysis and Data Mining	3	1.25
		3	
Qualifications, Education and Training (QET)	Project Based Learning Style	3	1.31
	Trending Tools	2	1.23
	Graduates students are self-learner	3	1.23
	Training At Relevant Organization	2	1.35
	Are student graduates ready?	2	1.22
		2.4	
Employability	Self-Management	4	1.26
	Communication	3	1.26
	Teamwork	2	1.13
	Problem Solving	2	1.02
		3.7	

Table 7Means and Standard Deviation of all construct's items (Author 2023)

4.4 *Assessment of measurement properties*

To analyze the data, two phases has been implemented, firstly Partial Least Square (PLS) has been used to examine the data that concern with the validity and reliability of the constructs (measurements) and their observed indicators as well as the structural models themselves, while the Structural Model has been used to assess the relation between variables themselves like the relation between employability as a dependent variable and other skills factors as independent variables.

Assessment of the measurements model involve the examining of the internal consistency, and both of the validity of the construct's items, convergent validity and discriminant validity (Risher, 2018).

In this study and before check the hypothesis, internal consistency, reliability, convergent validity, and discriminant validity have been checked and assessed, and then the hypotheses have been tested. And for testing reliability and internal consistency, the composite reliability technique is used, also convergent validity has been used to assess the overall construct items all together in convergent through using Average Variance Extracted (AVE) metrics, and the value of AVE should be 0.5 to show that at least the item is measuring 0.5 of the item variances.

5. Discussion of Results

The investigation of this study showed that all the variables have a positive effect on the graduate employability of the management information systems graduate in Sudan, however four of them (AS, BS, PS, and QET) have a high effect on the graduate employability (GE) while CS have no significant effect on the graduate employability, which is the major result found by the following author. (Guilbert et al., 2016), (Chen, 2017), (Potgieter & Coetzee, 2013), (Andrews & Higson, 2008), (Mansour & Dean, 2016), (Longmore & Grant, 2018). On the other side and against to the opinion of (Weligamage & Siengthai, 2003), the CS is not significantly supporting the employability as a main factor, and most probably due to the deep technicality associated with this factor by the author, the author clarifies the CS as a very technical skills which is not very common to most of the employer.

6. Theoretical and Practical Implications

This study shed a light on the necessity of taking the subject of information systems graduate employability more seriously in Sudan, and put more focus on embedding the students them selves as a part of the process which the university. Still more studies need to be conducted tacking more factors and exploring more areas and fields of studies. More over this study can help students to have more focus on what is required by the industry as well as giving some clues to the university staff to give more tension toward having a good mutual relation with the business sector in a very interesting mutual benefit that can lead to the interest of both of them.

7. Limitations and further scope

On of the limitation that need to be addressed by this study is the population, this study covered only two universities in Khar-

toum, but it will be better to cover more universities for the sake of generalizations. The second limitation is the skills themselves can be more abroad by covering the most needed skills that required by the industry, because this study only focused on the skills needed by the industry for the entry level, but it can cover more senior level. Another limitation is the area that it covered in Business, which is the Management Information Systems, but it could also be broader to cover other areas like Marketing, Human Resources, etc.

There for the researcher believe that more studies still need to be conducted regards the employability issue, and researcher can make more exploration and more investigation.

8. Conclusions

Despite the growth of the technology and the internet and the availability of many opportunities for the graduate around the globe, but still graduate can be sure that they are going to find a job, so continuous and close observation to the need of the industry and the skills of the graduates should be maintained through a good relationship that should be managed by the the universities and higher education institute. This study could be very valuable to only for the graduates, universities, and the business sector, but it could be valuable for the whole country that will benefit from the match between what they really need from the graduates and what will provide by the institutes of higher education, which it will lead to more efficient and more productive industry.

The Key Recommendations for this research are: Higher education institutions in Sudan should revise their MIS curricula to align with industry needs, focusing on enhancing practical skills in programming, analysis, business acumen, and project-based learning for better qualification, education, and training. Partnerships with the private sector should be established to provide internships, hands-on projects, and workshops. Additionally, universities should reevaluate the relevance of computer skills being taught and ensure alignment with modern technological trends to improve graduates' preparedness for the job market.

Finaly, graduates should be alert and open to adapt to any new technologies and requirements, and university is not enough to equip them with all the tools that can satisfy the need of their potential employers.

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