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The Benefits of Adopting Fourth Industrial Revolution (4IR) Technologies in Higher Education Institutions (HEIs)- a Case of South African Institutions

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Abstract

The 4IR technologies adoption in South African higher education institutions has yet to be consistent. Despite the extensive literature on the possible contributions of technology to learners' development, there is a lack of knowledge on the benefits of 4IR in HEIs to support teaching and learning. This study identified the benefits of 4IR technologies in HEIs. To address this knowledge gap, the data used in this research were derived from both primary and secondary sources. The secondary data was collected through a detailed review of extant literature. In contrast, the primary data was collected through a questionnaire survey distributed to Gauteng province students currently registered in universities. In ensuring the reliability of the research questionnaire, Cronbach's alpha coefficient reliability was conducted on the scaled research questions. Findings from the research were analysed using descriptive statistics and exploratory factor analysis (EFA). Research findings were revealed as per related categories. The findings revealed that 4IR technologies adoption is not only about perceptions but is also influenced by lack of maintenance of 4IR tools, ICT being ignored by the stakeholders of the university/ not amended, poor internet connectivity, deprived ICT approach etc. To address these obstacles and realize the value of 4IR in HEIs, institutions must understand the educational scope associated with 4IR technologies. This can be achieved by conducting more empirical research on the implications of 4IR technologies on the education sector and more trainings must be conducted.

Keywords
Fourth Industrial Revolution; higher education institutions; 4IR benefits.

1. Introduction

In HEIs, the 4IR technologies movement has led to increased data volumes, advanced algorithms, artificial intelligence (AI), automation and robotics to improve service quality. Universities across the globe have implemented more robotic process automation due to growing demands for service quality, enabling them to improve financial reporting, payroll, delivery of modules, and admissions (Duncan & Lundy, 2019). A number of high-ranking South African universities are also embracing robotic process automation and artificial intelligence. To name just a few, the University of Pretoria, Cape Town, University of Johannesburg, and Witwatersrand (University of Pretoria, 2021; University of Johannesburg, 2020; University of Witwatersrand, 2019).

Magout (2020), asserted that the 21st-century civilization is demanding a lot on its members due to the prompt changes in th technological situations. In addition, laptops, social networks platforms, and cell phones which were previously considered playful are progressively impacting the culture of society to a point that it is very difficult

now to survive without them (Magout, 2020). These technologies are affecting every surface of our daily lives comprising of teaching, learning, and company operations. Most of young people are progressively becoming unemployed or underemployed, even though employers have jobs they cannot fill (Deloitte Global Business Coalition for Education, 2018). It is a challenge to some extent rooted in the rising incongruity amongst youths' skills and employer requirements, if not addressed, the problem will more prone to intensify with the speed at which technological revolution is taking place (Deloitte Global Business Coalition for Education, 2018).

Consequently, HEIs and the society must keep pace with the changes that come with 4IR and adapt its skills in all aspects of life (Magout & Magout, 2020). Numerous people in many societies around the globe have a strong belief that various HEIs must provide learners with the prerequisite skills expertise required in this revolution and this raises some questions on whether the superiority of learning and teaching is in line with the demands of the age (Moon & Seol, 2017). Reaves (2019), asserted that the explosion of new technology in the communication world have influenced radical changes in the educational approaches across the world, the kind of skills learners require to be prepared for the 21st century is different from what they required 20 years and odd years ago. Nowadays, companies are looking for young people with new set of skills such as problem solving, interpersonal and team skills, whereas the perceptions of lifelong learning and its role in constructing a knowledge society are also high on the agenda (Moon & Seol, 2017). According to Imenda (2014), it is necessary to develop new ways of teaching and learning and it is very critical if the government is to prepare students to live, work and prosper in the 21st century. Different contemporary educational approaches such as self-directed learning, cooperative learning, experimental-based and active learning have arisen (Imenda, 2014). Magout (2020), stated that there is a debate that teachers be certain of that technology has the power to solve many problems related to the societal change in attitude and delivery of education Hereafter, the need to fully examine the impact of the technological revolution on skills improvement and the general preparedness of the education sector in skills development, there is no single learning theory to follow in the process of revolutionizing the education sector.

2. Literature review

2.1 An Overview of the Fourth Industrial Revolution

The 4IR comprises the digital revolution, establishing the new ways in which technology becomes embedded within society. According to World Economic Forum (2016), the current revolution is prejudiced by 'cyber-physical systems' integrated into its production processes. Schwab (2016) stated that a synthesis of technologies that are distorting the lines amongst the physical, digital as well as biological compasses. It is noticeable by developing technology breakthroughs in numerous fields, counting robotics, artificial intelligence, nanotechnology, quantum computing, biotechnology, the Internet of Things, 3D printing and autonomous vehicles. World Economic Forum (2016) highlighted that 4IR implies a variation in the way growth takes place from industries in limited workshops to being in craft studios. The term 'Cyber-Physical-Systems' is used to define this revolution. The specific features that describe 4IR comprise: a rate of alteration considerably faster than in previous industrial revolution, there are continuing developments in new and developing technologies including nanotechnology, 3D printing, biotechnology, quantum computing, renewable energy and energy storage, the development of "smart manufacturing" and "smart factories" that is manufacturing processes based on the integration of physical production with digital technologies collecting data on plant operations and the supply chain, which analyze data and contribute to real-time improvements in production, procurement and supply chain management (Schwab, 2016). The replacement and augmentation of certain kinds of labour using automation technologies, including robotics and machine learning. This also opens up the possibility of automation of certain types of knowledge work (World Forum, 2016).

Few years ago, 4IR was the central theme at the World Economic Forum (WEF) annual meeting, Davos 2016. Artificial Intelligence (AI) have remained prominent each year, and a lot of research documentation has come from this. At Davos 2019, the theme was "Globalization 4.0: Shaping a Global Architecture in the age of the industry 4.0", based on the idea that we "are entering a fourth industrial revolution, where a new wave of technological progress will launch us into a new era of globalization" (Davos, 2016). Davos (2016) further stated that the 4IR, or 'Industry 4.0" (manufacturing-focused) is the term popularized by the WEF for the current and developing environment in which disruptive technologies and trends are changing the way we live, work and relate to one another. Such emerging technologies include artificial intelligence (AI), the Internet of Things (IoT) cloud computing, cyber security, the sharing economy, robotics, autonomous robots and vehicles, additive manufacturing (3D printing) cyber-physical systems, genome editing, block chain technologies, big data and analytics, virtual reality (VR) augmented reality (AR) and hybrid or mixed reality (MR). Energy infrastructure and distribution. Smart grid technologies are transforming how energy is manufactured and distributed, enabling utility operators to estimate usage and source energy from the most cost-effective suppliers (Bloem, Van Doorn, Duivestein, Excoffier, Maas and Van Ommeren 2014). The World Economic Forum is raising the awareness of global leaders of the expected changes in society as the fourth industrial revolution expands. Klaus Scwab, the founder and executive chairman of the World Economic Forum, claims that this fourth industrial revolution is

different from the preceding revolutions. This is because of its velocity and exponential rate, breadth and depth of convergence and its systems impact on industries, firms, governments and the society (Schwab, 2017). The recent annual and regional meetings of the WEF have focused on the effect, the reach and the pervasiveness of this revolution. Production has long been a major driver for growth, prosperity and innovation, and many economies have experienced accelerated growth and development through industrial station. However, the traditional industrial development models that have supported growth in the past may not be viable models in the future (WEF, 2018a). This explains why developing countries are eager not to fall further behind or even to leapfrog other countries.

Developed countries are also under pressure as falling behind could also have enormous economic and social consequences. The 4IR has profound effects on many spheres including jobs and employment. The WEF observes that new industries create fewer jobs, requiring advanced skills (WEF, 2017). Furthermore, artificial intelligence and robotics technologies may destroy or disrupt many jobs in the service sector and labor-intensive industries. increased digitalization will also necessitate more attention being paid to associated risks such as cybersecurity, privacy and data security, to name a few. According to the WEF (2017), the 4IR is bringing about new techniques and business models, which will fundamentally transform the production process, government decisions, industry, and society, as they will be confronted by a new set of challenges and uncertainties. This shifts the attention from physical technologies towards adaptive social technologies, trust, policy networks, learning by doing, and collaboration between different social actors are critical success factors. These are also areas where developing countries have the most challenges, with inequality, low trust between social actors, centralized government, industry concentration, and higher search, discovery, and failure costs. Despite this understanding, a review of the WEF website and WEF reports shows that most of the attention is on physical and data technologies and how they will affect industries, productivity, costs and societies. With an only occasional reference to the importance of, among others, fostering new social technologies and governance arrangements.
In 2015, Klaus Schwab wrote:

"We stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before."

Schwab (2016) stated that the HEIs are beginning to respond on the 4IR. Schwab (2016), further stated that South Africa (SA) is a mixture, with some sectors in society transitioning between the second, third and fourth revolutions, not losing sight that the 4IR has the latent to influence on the country in socio-economic ways. There is no question that it will be necessary to rely on "the ability of human labour to win the race against technology using education"; Whether it is a case of the technologizing of modern human life subsequent in scarcer jobs, or whether it will release people to do other, new kinds of work. (Frey & Osborne, 2013). If education is to deliver on the desires of society in the face of this revolution, new curricula and teaching approaches will be required.
Ornstein and Hunkins (2012), stated that the consideration of curriculum expansion is impartially restricted to how a 'curriculum is scheduled, applied and assessed, as well as what people, processes and procedures are involved'. They put up with that this view eliminates the human element in curriculum design. Barnett and Coate's (2005) view of curriculum design is that it is not essential to redesign 'spaces for learning'. To impart for an 'unknown future'. Barnett (2004) argues that it is essential to move beyond the curricular that is skills and generic skills. The forward lies in understanding and endorsing a pedagogy for human being with the focus on human qualities and dispositions as an opposite to on what knowledge and skills (Barnett, 2004). Barnett and Coate (2005) define the concept of 'knowing' in Engaging the Curriculum in Higher Education' as follows:

"…an altering sphere does not rule out knowledge as such, but it positions questions as to what kinds of understanding are going to be productive in a varying world. In a curriculum for the twenty-first century, what matters is the student's own engagements with knowledge - in other words their knowing' (Barnett & Coate, 2005)".

Ornstein and Hunkins (2012) described the 4IR as a response from HEIs for a biosphere in which technology will expand exponentially, distorting the lines between physical, digital, and biological spheres. Planning curricula to serve these ends are not, nevertheless, supported in the current indulgence with its focus on predefined categories of learning set out in the Classification of Educational Subject Matter, hereafter referred to as the CESM document and unchanged since 2009; and the prerequisite to obtain prior DHET approval for a programme, or an additional CESM, and then accreditation by the CHE and registration on the NQF by SAQA (2000) a process that takes upwards of 18 months to as long as 30 months.

2.2 The benefits of Adopting 4IR technologies in HEIs

2.2.1 Sharing of resources & promotion of collaborative learning

Eze, Adu, and Ruramayi (2013) stated that the combination of ICTs in education offers a few advantages: sharing assets and learning conditions just as the advancement of collective learning and a general move towards more notable student self-governance. Mereku (2015) pointed out that innovation coordination provides PCs and a web association; it includes the launch of learning exercises with academically educated use regarding ICT apparatuses. The accompanying computerized devices have been referred to regarding ICT mix in the study hall: word processors, information projectors, PowerPoint spreadsheets, web crawlers, intelligent whiteboards, portable advancements, PDAs (messages, web journals, recordings and so on.) tablets, texting, digital recordings, CD-ROMs, Wikipedia, reenactments, movements and digital books (Mooketsi and Chigona, 2014; Mereku, 2015; Assan and Thomas, 2012; Lorenz, Banister, and Kikkas, 2015; Batchelor and Olakanmi, 2015; Govender, 2014; Molotsi, 2014; Tamim, Borokhovski, Pickup, and Bernard, 2015). Nkula and Krauss (2014) demonstrated that ICTs are being utilized in the study hall; in any case, more top to bottom information is required towards understanding the classes of innovations utilized and how this encourages teaching method and substance information.

2.2.2 Computer Literacy

Vandeyar (2015), revealed that reasonable implementation of the e-learning arrangement is lacking. Ndlovu (2016) noted that the irregularities in the comprehension of approaches might influence the reasonable take-up of ICTs in the study hall. Vandeyar (2015), recommended four key systems to improve ICT combination in training, these techniques include building up a connection between the use of ICT in the study hall and learning objectives, understanding the different kinds of advancements accessible, setting up joint efforts with partners to drive e-instruction and breaking down the standard of e-training activities and their imagined outcomes.

2.2.3 Brings educational concept to life.

Given the use of computerization in lecturer education, (Rosi Braidotti, 2015) stated that, "it is no longer sufficient to side with the critical educational theory that accuses computation of reducing human thought to mere mechanical operations" using computerized learning should not certainly be considered the opposite of reason based on the fact that computerization depends on calculation, which is why it is established. Heaven (2017) demonstrated that when students for example are originated into deliberations about deficiency and inequality in SA communal, lecturers could use 3D pictures; also, students would be familiar through virtual reality to picture portraying poverty as well as unemployment. Additionally, Heaven (2017) pointed out that students might become more passionate about helping others work out sympathetic visualization over seeing and putting themselves in the shoes of vulnerable others.

*2.2.4 Ruptured educational practices***.**

Waghid (2016), argued that ruptured educational practices by which lecturers and students take part by themselves deliberatively as equals in educational places of play and concentration so that lecturers and students take risks towards humanizing just communal action. Waghid (2018), argued that raptured educational practices likewise agreed to multicultural reflexivity so that lecturers and students may give their practices an emancipatory motivation. That is responding in the form of ethnic, political and financial domination a matter of imaginatively HEI as an act of decoloniality. HEI's learning and teaching (David and Waghid, 2019) argued that connecting lecturers and students is instructional, meaning that the linkage between the students and lecturers is approachable as a matter of being diffractive.

2.2.5 Emerging technology breakthroughs

Schwab (2016), demonstrated that industry 4.0, commonly depicted as 4IR, the conception has knowingly changed the numerous ways universities in South Africa look at or intend to discourse their institutional practices, particularly, education and learning meetings. Furthermore, Schwab's (2016) pointed out that a "new technology" revolution that would convert the way humans interrelate in the globe today is stimulated by "emerging technology breakthroughs, covering wide-ranging fields such as artificial intelligence (AI) robotics, the internet of things (IoT) autonomous vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage and quantum computing".

3. Methodology

The study embraced quantitative exploratory; descriptive design to analyse the benefits of adopting 4IR technologies on South African higher education institutions.

3.1 The benefits of adopting 4IR technologies on HEIs

This section presents the results of section of the questionnaire that determines the benefits of adopting 4IR technologies in HEIs in South Africa. Using Cronbach's Alpha, the reliability recorded for this section is 0.898

above the stipulated 0.7 to show it is reliable. A definition is given for them to adequately capture the measured variables,

Descriptive statistics

Table 1 presents the Mean Item Score ranking (MIS) and the Standard Deviation (SD) of the respondents' opinion on the benefits of using 4IR tools in HEIs in South Africa. The respondents ranked the level of awareness using a Five-point Likert scale where: 1= Strongly disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree. Advancement of international linked programs was ranked first by the respondents with an MIS of 4.22 and an SD of 0.743; Improved academic performance was ranked second by the respondents with an MIS of 4.11 and an SD of 0.868; Development of new learning & thinking skills was ranked third by the respondents with a MIS of 4.01 and an SD of 1.129; High rate of student admissions was ranked fourth by the respondents with a MIS of 3.99 and an SD of 1.129 while Better communication between students & lecturers was ranked fifth by the respondents with an MIS of 3.94 and an SD of 1.087.

Universities contribution to social development was ranked in the sixth position by the respondents with an MIS of 3.92 and a SD of 1.043; Students would use an electronic forum ranked seventh by the respondents with an MIS of 3.89 and an SD of 1.196; The university can be ranked as one of the best universities of the world was ranked eighth by the respondents with an MIS of 3.75 and an SD of 1.171; In ninth rank is Universities contribution to the economy of the country with an MIS of 3.74 and an SD of 1.161; Lectures will be able to provide tutorial support was ranked second lowest in tenth position by the respondents with an MIS of 3.70 and an SD of 1.181; while Low dropout rate of students was ranked lowest by the respondents with an MIS of 3.65 and an SD of 1.150.

Table 1. Descriptive analysis of benefits of using 4IR tools in HEIs

Benefits of Using 4IR Tools	**Mean**	**Std. Deviation**	**Rank**
Advancement of international linked programs	4.22	0.743	1
Improved academic performance	4.11	0.868	2
Development of new learning & thinking skills	4.01	1.129	3
High rate of student admissions	3.99	1.129	4
Better communication between students & lecturers	3.94	1.087	5
Universities contribution to social development	3.92	1.043	6
Students would use an electronic forum	3.89	1.196	7
The university can be ranked as one of the best universities of the world	3.75	1.171	8
Universities contribution to the economy of the country	3.74	1.161	9
Lectures will be able to provide tutorial support	3.70	1.181	10
Low dropout rate of students	3.65	1.150	11

Exploratory factor analysis

All the identified benefits on using 4IR tools by South African HEIs were subjected to the Exploratory Factor Analysis (EFA) using the SPSS version 27 software. In carrying out the exploratory factor analysis, data suitability was assessed by inspecting the correlation matrix to indicate the 0.3 and above coefficient value suitable for the factor analysis, as shown in Table 2

Table 2. Correlation Matrix

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11
D1	**1.000**										
D2	0.851	**1.000**									
D3	0.498	0.507	**1.000**								
D4	0.738	0.735	0.656	**1.000**							
D5	0.409	0.375	0.578	0.416	**1.000**						
D6	0.366	0.344	0.453	0.351	0.626	**1.000**					
D7	0.630	0.653	0.385	0.549	0.535	0.413	**1.000**				
D8	0.684	0.757	0.435	0.662	0.393	0.314	0.731	**1.000**			
D9	0.501	0.549	0.550	0.567	0.393	0.356	0.420	0.571	**1.000**		
D10	0.365	0.324	0.260	0.218	0.157	0.261	0.247	0.306	0.275	**1.000**	
D11	0.240	0.241	0.163	0.147	0.174	0.372	0.171	0.170	0.227	0.594	**1.000**

The Kaiser-Mayer-Olkin (KMO) is necessary to indicate the adequacy of the value distribution, to proceed with the EFA, According to Pallant (2011:7) a data distribution measure <0.5 is not acceptable, while >0.6 is acceptable for EFA. Table 3 indicates that the KMO value is 0.850 and this means it is acceptable as it above the acceptable 0.6. Bartlett's test of sphericity shows the statistical significance in all variables with a value 0.000, which is less than 0.050 making them factorable. The correlation matrix table indicated the suitability of data for factor analysis as it revealed the correlation coefficient >3 supporting the KMO and Bartlett's test.

Table 3. KMO measure and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.850
Bartlett's Test of Sphericity	Approx. Chi-Square	1385.771
	Df	55
	Sig.	0.000

Table 4 shows communalities of all variables that are determined by their extraction with values that are not less than 0.300. This indicates that all variables fit well in their components and that there is no variance in variables. Factor grouping is valid if each of the variables does not have a low extraction value. As indicated in the table all variables consist of values that are greater than 0.300.

Table 4. Communalities

	Initial	Extraction
Lectures will be able to provide tutorial support	1.000	0.797
Students would use an electronic forum	1.000	0.849
Universities contribution to social development	1.000	0.627
Universities contribution to the economy of the country	1.000	0.750
High rate of student admissions	1.000	0.810
Low dropout rate of students	1.000	0.765
Development of new learning & thinking skills	1.000	0.618
Better communication between students & lecturers	1.000	0.775
The university can be ranked as one of the best universities of the world	1.000	0.508
Advancement of international linked programmes	1.000	0.784
Improved academic performance	1.000	0.821
Extraction Method: Principal Component Analysis.		

Table 5 shows the total variance of all variables indicating the eigenvalues according to Kaiser's criterion. The first three components are reckoned as their values are above 1.0 which mean they meet the criteria under the initial eigen value column. These three components explain a cumulative percentage of 73.648.

Table 5. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.533	50.301	50.301	5.533	50.301	50.301	5.119
2	1.418	12.894	63.195	1.418	12.894	63.195	2.085
3	1.150	10.453	73.648	1.150	10.453	73.648	3.282
4	0.756	6.875	80.523				
5	0.519	4.716	85.238				
6	0.454	4.129	89.368				
7	0.336	3.055	92.423				
8	0.288	2.616	95.039				
9	0.210	1.911	96.949				
10	0.209	1.897	98.846				
11	0.127	1.154	100.000				
Extraction Method: Principal Component Analysis.							
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.							

Figure 1 shows the scree plot that revealed the factors with eigenvalues above 1 on the steep side of the graph, while factors with eigenvalues below one on the lower side of the plot.

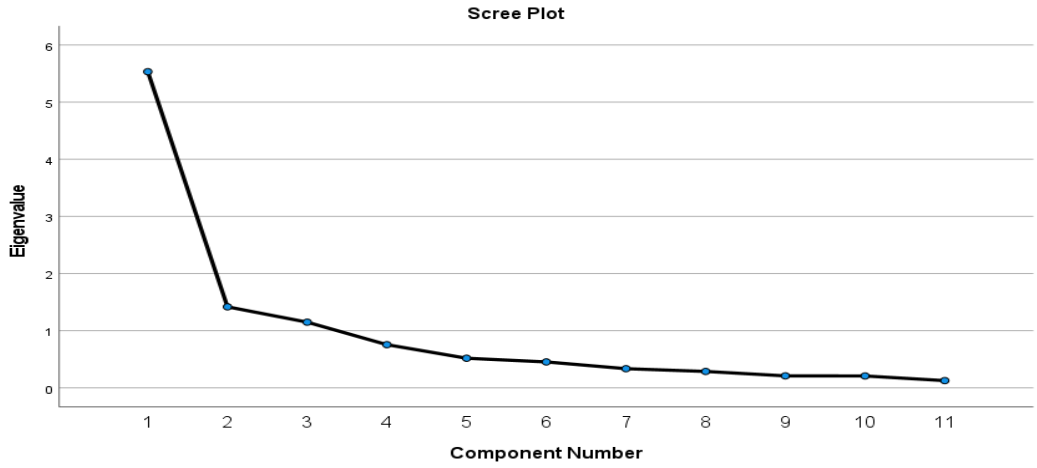

Figure 1. Scree plot on benefits of using 4IR tools in HEIs.

Table 6 shows the pattern matrix with 11 variables identified from the literature and factored into three clusters and interpreted based on the inherent relationship of variables in that cluster.

Table 6. Pattern Matrix

	Component		
	1	2	3
Students would use an electronic forum	0.946		
Better communication between students & lecturers	0.914		
Lectures will be able to provide tutorial support	0.889		
Universities contribution to the economy of the country	0.836		
Development of new learning & thinking skills	0.702		
The university can be ranked as one of the best universities in the world	0.569		
Improved academic performance		0.893	
Advancement of international linked programmes		0.845	
High rate of student admissions			0.874
Low dropout rate of students			0.843
universities contribution to social development			0.556
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

Naming of components/factors of the benefits of adopting 4IR technologies in HEIs

Factor 1: Development of students' academic capacity

As shown in Table 4.23, a total of six variables are loaded in factor 1. These variables include 'Students would use an electronic forum' (94.6%); 'Better communication between students & lecturers' (91.4%) 'Lectures will be able to provide tutorial support' (88.9%) 'Universities contribution to the economy of the country' (83.6%); 'Development of new learning & thinking skills' (70.2%); 'The university can be ranked as one of the best universities of the world' (56.9%). All mentioned variables in this cluster can be said to relate to students' academic development**.** This factor accounted for 50.301% of the total variance.

Factor 2: Students international relevance
Loaded in factor 2 are two variables that are 'improved academic performance' (89.3%) and 'advancement of international linked programs' (84.5%). This factor accounted for 12.894% of the total variance.

Factor 3: Economic development of the institution
Factor 3 contains three variables that are 'high rate of student admissions' (87.4%)' 'low dropout rate of students' (84.3%), and 'universities contribution to social development' (55.6%). This factor can be labelled economic development of the institution with a total variance of 10.453%.

Table 7 shows the component correlation matrix with the clusters having values that are more than 0.300. This indicates that there is a strong relationship between all clusters.

Table 7. Component correlation matrix

Component	1	2	3
1	1.000	0.251	0.478
2	0.251	1.000	0.215
3	0.478	0.215	1.000
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.			

As shown in Table 8, a reliability test was done on all variable clusters using the Cronbach's Alpha. A minimum value of 7 is accepted the table indicated that all the variables measured fitted well in the clusters they were loaded into as they all had a Cronbach's Alpha value is above 7.

Table 8. Reliability of components/factors

Clusters	Cronbach's Alpha Coefficient
Component 1 - DEVELOMENT OF STUDENT'S ACADEMIC CAPACITY	0.914
Component 2 – STUDENT'S INTERNATIONAL RELEVANCE	0.740
Component 3 – ECONOMIC DEVELOPMENT OF THE INSTITUTION	0.788

4. Conclusions and recommendation

The literature revealed that higher education institutions bring men and women to a high level of intellectual development in the arts and science, and traditional professional disciplines and promote high-level research. The primary data retrieved from respondents categorized three namely: development of students' academic performance, students' international relevance, and economic development of the institution. In the former category, it was revealed that the most dominant benefits of adopting 4IR tools in higher education institutions by developing students' academic capacity factors are the development of new learning & thinking skills and better communication between students & lecturers. Good relationship between the lecturers and students coupled with the development of new learning & thinking skills in HEIs, improves teaching, student's achievements and lowers the number of students who drop out because lecturers can easily provide tutorial support via the internet through e-mail and forums. Other benefits are that students would use an electronic forum. The university can be ranked as one of the best universities globally, universities contribute to the country's economy, and lecturers will provide tutorial support. The students' international relevance has the following benefits: advancement of international linked programmes and improved academic performance has the highest benefits. The latter category (Economic development of the institution) has the following benefits in the order of hierarchy: High rate of student admissions; Universities contribution to social development and a low dropout rate of students.

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