Impact of digital disruption influencing business continuity in UAE higher education

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Abstract. Digital disruption has been the most used and discussed topic in the last 6 years and has been a trending topic on the Google trends, only second to the remote working searched on Google search engines. Most business continuities have been put at risk due to significant reasons like COVID-19, Social distancing norms, and technology disruption to name a few. Businesses especially in UAE higher education sector need to take a holistic view that considers potential threats to an organization and look at providing a resilience framework to respond effectively to safeguard the key stakeholder's interests. The research study looks at combining the business continuity maturity model and the digital disruption models and suggests a framework that business managers and owners can consider mitigating the risks and enhancing the resilience of their organization for the future. The organization might be able to enhance its brand value and look at creating more value in its services. This study can help managers and top management look at the factors that can improve performance after the disruption. The participants can be trained to work during disruption to mitigate the risk or crisis, reducing major losses in business.

Keywords: business continuity, business continuity management, maturity model, United Arab Emirates, education sector, higher education, digital disruption

1. Introduction

1.1. Business continuity

Business continuity is planning to deal with desperate & difficult situations, to enable organizations to continue function with minimum disruption. The current market dynamics has disrupted various sectors forcing business to make changes. The main disruptor is the technology and digitalization, as businesses are not prepared for the technological tool's adoption. The education sector has been forced to go online with the advent of COVID-19 since the last 3 years and the earlier resistance from the academicians seem to have melted down due to this forced situation. The way forward for most higher education United Arab Emirates (UAE) enterprises is to anticipate the challenges of disruption and to overcome them to continue with their business and look for enhancement in their organization performance. However, the challenges are unique and changing in short term so, the adjustment to these challenges is becoming the most critical challenge. The organizations need to be agile and flexible to meet the business challenges. Managing the business continuity in post COVID-19 situation has the

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organizations intrigued [2].

1.2. Digitalization of education businesses in UAE

The main contributors to digitalization of UAE higher education are connectivity, using the Internet, human capital, digital public services like libraries, depositaries, digital certifications, and the integration of digital technologies involving AI, VR, MI, cloud computing. Recent studies by Arthur D. Little have indicated that the UAE is poised to become a digital education leader in Middle East. According to the UAE statistics centre report in the newspaper, the infrastructure and online learning support platforms availability across UAE is already at 70 percent, while teacher resources availability on digital tools is 88 percent as reported lastly. This is comparable to the remote learning shifts that has happened successfully in Sweden, Austria, US, and Italy [18, 34].

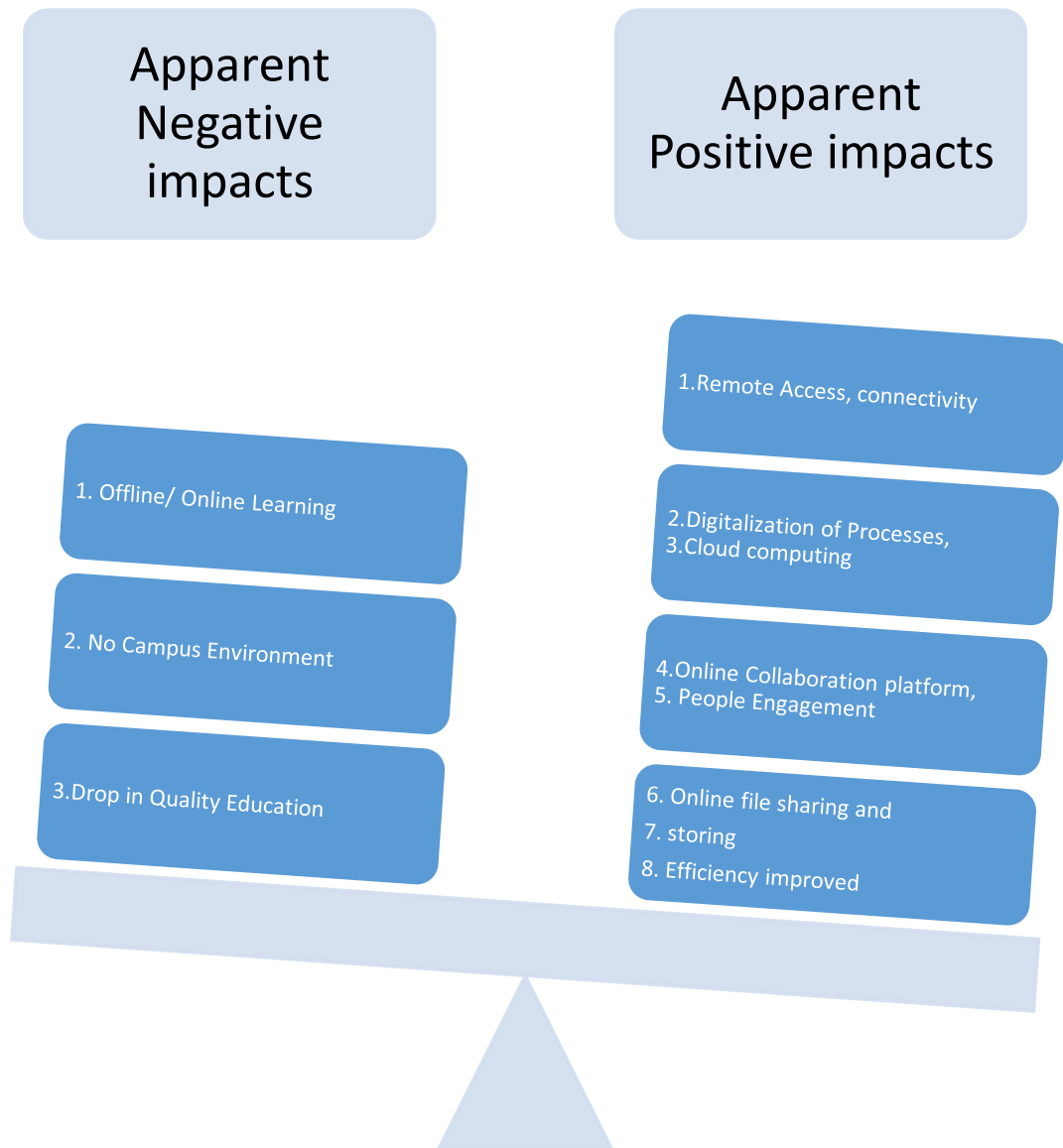## 1.3. Impacts of digital disruption on education business continuity

The education business is being transformed for the better using the digital transformation process as it enables reduction in face-to face, manual activities, connection, and mitigate the disruption risk faced in situation like COVID-19. So, digital transformation enhances business continuity. Digital transformation enables integration of digital technology into all areas of the education business, primarily changing the operations and enhanced customer value. The higher education has utilized the technology to consolidate processes and operations, so the workforce, the organization, and the clients (learners) stay connected always [36].

1.4. Digital disruption impacts on higher education in the UAE

The positive impacts of digitalization on UAE higher education are that it has enabled business continuity even in crisis and to face such future scenarios [26].

Figure 1 showing the positive and negative impacts of digitalization of higher education.

The apparent positive impacts far outweigh the apparent negative impacts. Looking at the figure above the positive impact have been the enhancement in connectivity infrastructure across the globe due to the remote accessibility required during the COVID-19 and in remote working. The emerging technologies like cloud computing, digital tools used have enhanced the business processes and thus leading to a positive impact. The online collaborative platforms like Microsoft Teams, Zoom, Electa, Skype, and many more interactive platforms have led to a positive impact of digitalization in education. Hence, the digitalization has come to stay, and online learning is the new normal. The blended learning will be the future of higher education in UAE [53]. The table 1 shows the negative and positive impacts on higher education digitalization as assimilated from the various research papers cited below. The growth of infrastructure, revenue earned in the education business, the profitability and the number of start-ups, the number of technology companies taking on education courses like IBM-Coursera have tripled. The number of points supporting the positive impact are quantitatively more and the "weight of the points" in terms of revenue, profitability, student reach and the global spread is evident [12].

Apparent Negative impacts

Apparent Positive impacts

1.Remote Access, connectivity

1. Offline/ Online Learning

2.Digitalization of Processes,
3.Cloud computing

2. No Campus Environment

4.Online Collaboration platform,
5. People Engagement

3.Drop in Quality Education

6. Online file sharing and
7. storing
8. Efficiency improved

Figure 1: Positive and negative impacts of digitalization of higher education.

Table 1: Comparing the positive and negative impacts of higher education digitalization.

Positive impacts	Negative impacts
The main points favouring the digitalization as mentioned below: the remote access, digitalization of processes, online collaborations, video conferencing, sharing files online, cloud storage, the connectivity, and people engagement.	The main arguments against the digitalization of UAE higher education are drop in quality of education, online learning/offline learning, and No campus environment regime due to the social distancing during COVID-19.

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Table 1 – continued from previous page

Positive impacts	Negative impacts
Remote access: The employees can access the company networks, data, MOOC, LMS, applications from remote location, home, client location using virtual private network (VPN) to establish secured connection. The data is stored centrally and housed on local devices making it easy for secured access to data [20].	**Drop in quality of education**: This argument is most heard one however without credence to prove it right. Most academicians and community in general have this myth that the quality of education has slipped due to the online mode of teaching and learning. However, this has no scientific or statistical evidence to prove it. The argument is just a matter of convenience to block online education as they cannot be regulated [6].
Digitalization of processes: Smart operations has made paperless education, even certifications are digitalized. All documentation is digitalized, and workflow management tools has reduced manual and physical presence largely. Smart tools and applications have made technology-based handling of all processes [14].	**Online learning/offline learning**: The infrastructure need, internet speeds, power cuts are some of the concerns of online/offline education. However, it is more of mindset and getting using to a mode of study than real inconvenience and can be overcome easily [50].
Online collaboration platforms: Online collaboration platforms allow employees, top management, and clients to be engaged in assignments, projects without having to face physical boundaries. Commonly used collaboration platforms include Microsoft Teams, and SharePoint [7].	**No campus environment**: The main argument and which has credence is the campus environment which is a part of student life which cannot happen during the COVID-19. Post COVID-19 most campuses will open for the learners to be on the premises at least partly as in blended learning models, adhered to in the UAE higher education [49].
Video conferencing and chat: Presentations, trainings, and business and team meetings are done through video conferencing, especially in times of quarantine, video conferencing enables you to continue with business activities that require human interaction. Google chat, Microsoft outlook have high-quality video conferencing services and screen-sharing capabilities that integrate with business applications like GoToMeeting and Zoom. A chat application for exchanging short messages can save unnecessary server loads and emails using Telegram and Slack [10].	

Table 1 – continued from previous page

Positive impacts	Negative impacts
Sharing files online: Data transfer of sensitive and confidential nature is not emailed due to technical limitations and security risks. So, companies use file sharing platforms, such as Citrix ShareFile, to transfer and share files in a secure, efficient way [39].	
Cloud storage: Cloud storage of data enhances accessibility and security. Professional cloud providers manage the data and can make investments in security, availability, and data protection. Cloud storage has simplified the storage problems of the academia and made it efficient and effective, cheaper, accessible anywhere, anytime to the authorized personnel [51].	
Process automation: Automation of processes like registration, classroom allocation, resource sharing, documentation is automated and is capable of handling high volume. The process automation has safeguarded the business-process continuity during the pandemic times [28].	
Connectivity: The digitalization requires ultra-high, high-speed connectivity throughout the day and to sustain automation. Alternative protocols for connectivity are advisable to keep backup lines – for example, through 4G or 5G when the fibre line is down, are prudent steps to take [5].	
People engagement: The people engagement is crucial in the digital transformation process. The acceptance and adoption of technology are necessary for the successful implementation. The coronavirus has forced businesses to rethink their digital transformation strategy. Technology can help us navigate through this crisis and improve business continuity [55].	

1.5. Business Continuity Model Maturity theory

A combination of Business Continuity Model and the Maturity model theories can be applied to the UAE higher education post COVID-19 situation. The UAE higher education sector should use

a holistic management process that is capable to identify potential impacts that are a threat and provide a framework for capable of building resilience for an effective response that safeguards the interests of key stakeholders, & reputation of the organizations. The Gartner Maturity Model suggests maturity model as a staged structure of maturity levels, which defines the extent to which an organization develops and adopts new processes and practices [1]. The Business Continuity Maturity Model would guide the education processes to mitigate the risk of disruption during crisis situations like the COVID-19 and safeguard the stakeholder's values and establish resilience, agile processes for the organizations [37].

2. Survey of literature & review

Table 2 showing the literature review.

Table 2: Literature review

Authors	Major findings	Variables involved	Methodology	Gaps & limitations, future research
AlShamsi et al. [3]	The Higher Colleges of Technology (HCT), the Abu Dhabi based higher education provider across the UAE, has experience of initiation of emergency response and business continuity committee to ensure smooth and successful transition not only to remote learning but to keep the entire system of HCT going.	The Data-driven Academy, Skills & Employment, Security & Integrity, Strained Business Models, Space and Place, The Student Experience.	Secondary and primary research, quantitative using survey questionnaire.	**Comparative analysis** between the effects of the online delivery model on students' achievement of learning outcomes versus a traditional face-to-face in class delivery. (Technology Factors)
Randeree, Mahal and Narwani [43]	The BCM maturity model illustrated a two-stage approach; the first stage was to develop a model based on the analysis of five existing models; and the second stage was to validate the developed model against the formulated objectives through focus groups methodology.	Technology, Facilities Management, Processes, People, Organizational.	Develop a model based on the analysis of five existing models; and validate the developed model using of focus groups.	**Develop sub-Variables** for the main Constructs in the Conceptual **Business Maturity Model** to test for reliability and validity using **Quantitative Methodology** across **Stakeholders** in UAE.
Palacios Osma, Gómez López and Abuchar Porra [37]	The research gives information related to the maturity model implemented in other areas of knowledge, particularly in software development. The maturity model applicable to virtual methodology uses respective criteria and maturity levels with its respective attributes and to validate the presented maturity proposal.	Organization & Infrastructure Technology & Support Curriculum & Contents Learning Processes.	To validate Maturity model, the case of the academic program of graduate in the Universidad Distrital Francisco Jose de Caldas, the	From this proposal and for future research, it would be convenient to establish a metric model for each of the factors and criteria defined, so that the evaluation would not only be **qualitative, but also quantitative**, thus having an integral evaluation model.

Table 2 – continued from previous page

Authors	Major findings	Variables involved	Methodology	Gaps & limitations, future research
			Master's degree in Mobile Telecommunications is studied.	Likewise, the model should be explored and evaluated from the different perspectives of all those involved in the training process, including teachers, administrators.
Jussupova, Bokayev and Zhussip [21]	This research explains recent e-Government maturity models, portrays the principles and levels of development of Digital Government, and conducts a comparative analysis of the concepts of Digital and e-Government. This article presents the Kazakhstan e-Government maturity models using the Gartner model, as well as problems and prospects for the development of digitalization of public administration in Kazakhstan.	Technology Policy, Economic Policy, Infrastructure, Social Policy.	Secondary and primary research, quantitative using survey questionnaire.	Applying the maturity model to other areas of digital Government like **education**.
Marks and AL-Ali [25]	The study's findings reveal a significant disparity between respondents' perceptions of digital transformation maturity levels and the core requirements of digital transformation maturity. The findings also show that the leading challenges of digital transformation are a lack of holistic vision, competency, digital transformation, data structure, and processing.	Institution's level of digital transformation maturity; existence/non-existence of key elements of digital transformation maturity; respondents rating of the challenges faced in implementation.	Secondary and primary research, qualitative research using semi-structured questionnaire interviews and quantitative using survey questionnaire through email.	A corner stone to all of this is to show solid management support to combat **resistance to change and resistance to technology and communicate the long-term value gained from digital transformation**. Digital transformation should be extended beyond the enabling processes to **teaching & learning, governance, and research**. Specifically, the areas of course, program, and student assessment and evaluation. The proposed framework of this study can be used as a scorecard to assess the digital transformation maturity in higher education, assisting institutions in pinpointing processes and criteria that require further attention.
Raman [42]	Online learning will enhance reach to most of the students and its visibility, working professionals across different parts of globe irrespective of time or region to prove the correlation of cost-effectiveness and affordability being a major consideration in student decision-making.	Face to face vs online education, Gaming Technology / Virtual reality for online education, Cost effective-	Mixed Methodology through focus group interviews and survey questionnaire through email for data collec-	Technology disruptions and student expectations will enhance online learning with the technology supporting peer learning, **using emerging technologies like Virtual reality, Gamifications** etc.

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Authors	Major findings	Variables involved	Methodology	Gaps & limitations, future research
		ness, Flexibility and Adaptability.	tion for the Quantitative study.	
Supising et al. [52]	Teachers must redesign most of their teaching methods by means of a flexible approach for all groups of students. Education might be the new normal form. Moreover, schools must cooperate with many sectors, including government and private sectors, by reviewing teaching and learning management system. Therefore, the school management paradigm in digital disruption era is more suitable for new normal management.	School management system, learning management platform, Supporting factors. Essential skills. Cooperative network.	Mixed Methodology through focus group interviews and survey questionnaire through email for data collection for the Quantitative study.	There should be the study of the school management paradigm in **digital disruption era in primary level, vocational level, and higher educational level**. There should be the monitoring results of school management paradigm in digital disruption era for the **new normal management** of Thai education.
Mason, Khan and Badar [27]	The Education disruption due to technology has also thrown open opportunity of online education and the social distancing can be easily handled by technology platforms.	Technology, Perceived usefulness. Infrastructure availability.	Secondary Research and Qualitative research using interviews of stakeholders.	The **web collaborative space**, Classroom reimagined using **technology**.
McGrath, Palmgren and Liljedahl [30]	Digital working and learning environments bring with them a host of affordances, availability and accessibility being among the most obvious. Education institutions have endeavored to transform pedagogy by downsizing lectures; flipping the classroom; implementing novel technology to replace laboratories; and invoking active self-directed and self-paced independent learning activities. These developments in education can be set against the broader backdrop of advances in society at large and a push towards the digitization of core societal functions. The emergence of e-learning, artificial intelligence and learning analytics is often presented as offering unbounded possibilities.	Blended approaches to education, flexibly merge virtual, students' emotions in their learning processes, acquisition of knowledge and skills.	Secondary Research and conceptual model building.	A sense of belongingness and the development of a professional identity may very well depend on emotional and social dimensions of learning. **Qualitative and Quantitative Methodology** can be used to confirm these factors mentioned by the researchers.
Jabeen, Khan and Ahmad [19]	The purpose of this article is to look into the factors that influence students' attitudes and intentions to use technology in higher education in the UAE. Acceptance of technology can be defined as a user's willingness to use technology for the tasks that it is intended to support. Researchers have attempted to identify and comprehend the forces that shape user acceptance in order to influence the design and implementation processes in	Perceived Computer literacy, ease of use & usefulness, Perceived Usefulness, e-satisfaction and retention. TAM Model.	Secondary Research and Quantitative Survey research was conducted. A model was developed, and structural equation	Mobile learning and various other **technologies**, Information and communication technology improves both access to and effectiveness of learning in the form of **e-learning systems**.

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Authors	Major findings	Variables involved	Methodology	Gaps & limitations, future research
	ways that avoid or minimize resistance or rejection when users interact with technology.		modeling was used to ascertain the goodness of fit of the model.	
Iyer, Seetharaman and Maddulety [18]	The education sector is undergoing technological transformation. Traditional classrooms are being replaced by virtual classrooms. The proposed model is student-centric, with the student having the option to model his curriculum based on his interests and area of work, rather than following the traditional model, with credits from micro-credentials added per unit. The challenge is to use Blockchain's features and benefits to introduce this new Education model technology in order to improve efficiency by lowering costs and increasing accountability. The transformation of the Education Framework has the potential to revolutionize the future Learning and Teaching Industry by reducing costs and time. This revolution will also improve Learners' chances of finding work.	People's related Factors, Technology Related, Environmental Related, Organization.	Modified TAM Model, Business Transformation theory and ADKAR model. Secondary Research and Mixed methodology used by interviews and survey questionnaires circulated through emails and analyzed using SEM-PLS.	Use of **emerging technologies** to future classroom activities, **Lack of successful implementations of Blockchain, Lack of Sponsor Organization and Regulatory body**.
Kumar, Seshadri and Paramaiah [23]	However, to ensure continuity in a positive direction, collaborative efforts would be required. Businesses and government should join hands to fight the post-crisis impact on the economy. There are different frameworks available for post-crisis recovery in literature, and there is a high probability that each stakeholder would adopt a framework suitable to its own respective capacity and need. But in that case, the intended outcomes would not be sustainable, and a new wave of virus could push the economy further into deep trouble. Thus, there is a need to adopt a comprehensive model wherein there is sufficient interaction with the citizens of the economy who are indeed a contributor to the GDP.	Economic Recovery Model, Business Continuity Plan, Business Recovery Strategies in Crisis.	Qualitative review of the literature, and Quantitative analysis of economic data of the UAE, Business Continuity Model.	**Business Continuity Maturity model and Gartner Maturity Model**.
Margherita and Heikkilä [24]	In our study, we look into the responses to the pandemic taken by 50 of the world's most powerful corporations. We extract 77 actions related to 13 sub-	Operations, customer, workforce, leadership,	Work on conceptual development based on an exami-	Researchers would be able to strengthen the model by including more fine-grained actions implemented by

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Authors	Major findings	Variables involved	Methodology	Gaps & limitations, future research
	areas from web pages and social network posts using content analysis and integrate them into a five-level framework that includes operations, customer, workforce, leadership, and community-related responses. We also provide six illustrative company examples of how an emergency can create opportunities for new value creation. The study contributes to the scholarly debate on the impact of emergencies on business continuity and can assist leaders in defining response strategies and actions in the current crisis.	and community-related.	nation of available web-based information. Content analysis is a method of measuring variables by studying and analyzing communication in a systematic, objective, and quantitative manner.	managers if they had access to real company knowledge and objective analytical reports.
Dohaney et al. [8]	Natural disasters can disrupt learning and teaching (L&T) for weeks, months, or even years. Some institutions have created business continuity plans to safeguard critical organizational services and structures, allowing L&T to continue. However, little research has been conducted on how academics, learners, and communities of practice may respond before, during, and after disasters, as well as how their resilience to disruption can be fostered in order to reduce the impact on L&T. We investigated academics' perceptions of building resilience to major L&T disruptions in the New Zealand context in this study. We looked specifically at how academics define a resilient academic and institution, as well as the benefits, barriers, and incentives for building resilience.	Attributes, Capabilities, Knowledge of individuals, schools, and leaders.	Qualitative Methodology using semi structure interviews.	**Resilience to disruption** will be experienced differently across educational and socio-political contexts, where benefits, barriers, and incentives may be of greater/lesser importance. Every university, therefore, needs to build a customized plan taking into consideration its unique vulnerabilities and areas for improvement.
Mihardjo et al. [33]	The findings indicate that human capital, training, and reward have a significant impact on employee commitment, which in turn influences SRP to improve. Employee commitment was also found to be influential and statistically positive and significant as a mediator between key HR practices (human capital, training, and rewards) and SRP.	Human capital, training, rewards, Service Recovery Performance, Employee Attitudes.	The data was collected from 350 front line agents of the Takaful industry operating in Malaysia and Indonesia on convenience sampling technique. Data was analyzed by using PLS-	People factors matter the most in **Organization Resilience and Business continuity**. This is achieved by having mock drills and preparing for the worst scenario and training for the same.

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Authors	Major findings	Variables involved	Methodology	Gaps & limitations, future research
			SEM to examine the relationship between constructs.	
Setianingrum et al. [48]	The researchers used the McKinsey 7 S model and build on it to formulate Plus Model by adding the Spirituality at work. The research formulated the House of Sharia as a new business strategy developed based on the existing House of Strategy model. This research found that including spiritual elements in managerial transformation and business strategy models made sharia Mandiri bank survive and ensure profitability.	Strategy, Structure, System, Staff, Style, Share Value, and Skill + Spirituality at work.	Secondary Research and the Qualitative methodology being used and used mono case study design by conducting in-depth interviews with stakeholders.	Resource based **competitive advantage, BSI** resource-based competitive advantage

The regulation, the disruptions due to COVID-19, and increasing competition in the UAE education sector coupled with a demand for continuous and uninterrupted service, education institutions in the UAE are focusing on BCM. The extent to which they incorporate BCM in their institutions (IT-based, critical site-based, institutions wide or integrated) depends on the complexity and criticality of their Institutions. Moreover, compliance to industry standards and regulators also drives decisions on the scope of BCM that an organization intends to implement [43].

The literature review has identified Digital Disruption Factors (DDF) which need to be overcome for the successful implementation of these technology programmes in education organizations. The resistance to the technology adoption in training programmes can be construed at three levels like individual level, team/department level and the organization level. The lack of skills, lack of training are the factors that make most employees resist any technology implementation in the training programmes. The sudden changes only increment the speculation regarding the technology, the way it will spread unemployment because of ignorance & knowledge regarding the technology. The bad management practices are the major contributor of these issues as there is no awareness programmes, the relevant discussions about the change, transparency of the way forward. The employees need to know that the changes are due to the customer expectations, and it is necessary for survival.

2.1. BCM model and Gartner Maturity Model combination

The objectives of the BCM model and the maturity model combined can be summed as ensuring the continuity of the education sector mission critical processes which is to teach, always develop the skills of the students and to ensure quality of the education. The maturity model will examine the maturity level of the organization and compare to the best practices and

look to improve the maturity level. BCM covers both the prevention of disasters/disruptions and mitigating the impact to business in case of a disaster/disruption. Hence, it has combines preventive, repressive, and corrective actions. Further the Maturity model evaluates of the processes, identify the application and gaps to achieve realistic targets and open to comparison to industry best practices [37].

Further the existing theories, concepts, research studies on the topic have revealed the following themes that come from the above literature. Business models have been scattered as the businesses were failing in the COVID-19 advent and the social distancing being mandatory. The education organization were forced to online teaching and learning from the face-to-face which was in vogue till the 2019 and after the COVID-19 will normalize to the blended learning and not back to the brick-and-mortar model in totally. The education hub models were quickly earning reputation and credence as the new business model over the brick-and-mortar models. Most of the factors listed below are the main factors of the Business Continuity Model and the Maturity Model applicable to the organization [9].

Technology has been the main disruptor and leading drive changer to other business models for the UAE higher education sector. The technology has been instrumental in the shift from Brick-and-Mortar to the virtual model using online distance learning platforms for teaching and learning, recording the evidence for the certifications like MOOC [18]. Technology infrastructure, willingness to invest, technology availability, customer willingness to use, cost of technology, investment needs have become decisive.

Facilities Management in the UAE higher education sector will closely monitor to provide the organization with proper workplace environment physically and virtually, provide the right platforms, ensuring health and safety of the assets used and no harm to any user. The facilities department must adhere to the government policies & regulations issued like social distancing norms, ergonomics to ensure efficiency and effectiveness of the employees. The infrastructure set up and upkeep is another major responsibility of the facilities management team [43].

People involvement in the UAE higher education sector will determine the business continuity after any crisis and will totally depend how well prepared the employees are for this disruption. In current scenario the technologies are instrumental in keep the education business going and would be remain the key factor. All employees need to develop technology, technical skills to continue to contribute to the future education endeavours in the UAE higher education. The mindset of the employees, staff will determine the way they will participate in the implementation of the future processes and make it successful. The attitude of the employees needs to be positive and techno savvy towards the implementation of the technology, system, and processes for the successful continuity of the business organization [23].

Processes the pandemic also poses a significant risk to businesses and the continuity of their operations. Organizations are now being forced to build resilience in the face of numerous events that threaten the continuity of their business processes. Companies have been urged to develop an immediate response to operational breakdowns and infection risks both within and outside the organization. Successful responses have relied on the adoption of agile business processes (which required the redesign or adaptation of existing activities) and the use of digital technologies as key enablers. Ensure that mission-critical processes and services are up and running [24, 44].

Organization barriers that might impede the successful implementation of business con-

tinuity after disruption are lack of resources, insufficient tools and technology and Lack of constant training that might demoralise the employees to participate in the process. If the organization resources are not sufficient to further continue the processes of the business the top management and executive support seem to be lacking [8].

Successful implementation of the business after the disruption or business continuity depends on better employee relations, enhanced employee performance motivated by better rewards which will lead to enhanced brand image and enhanced customer goodwill. Businesses continually strive to achieve the above success on continuous basis or should undergo a change to achieve success in business continuity after any crisis [33].

The change management proposed by McKinsey 7's Model can be applied at this juncture with improvements of feedback for continuous improvement. The McKinney 7's model discusses the hard S's the structure, the system and the strategy which are at the organization level and would be difficult to change easily for the business organization, however the soft S's can be first started with the shared values, the skills, the staff, and the style of leading the business which can easily change the hard S's by proper implementation [48].

Resilience of the education organization is the key factor which determines how fast the organization bounds back during crisis and emergencies situation. The resilience of the organization depends on the organization culture, the top employee and top management character, the support from the top management and the individual mindset [8]. The resilience of the organization determines how fast the company responds to crisis and to overcome the initial setback in business continuity, revenue earning, profitability.

2.2. Research questions

a. How can the UAE education businesses continue their activities during and post crisis like COVID-19?
b. How the higher education in the UAE negotiate the challenges and barriers during the crisis?

2.3. Research objectives

a. The processes, the system, the facilities, the technology and the people involved need to align to meet the new business strategy and goals.
b. The workplace environment can be made conducive to mitigate the organization barriers and risks to the businesses.

Conceptual model based on the literature review suggestions and gaps has been shown in figure 2 and the hypotheses for the research study have been developed.

2.4. Hypotheses

H1: There is significant relationship between the technological factors and people's factors caused in higher education business
H2: The technology factors have significant relationship with the successful business continuity caused in higher education business
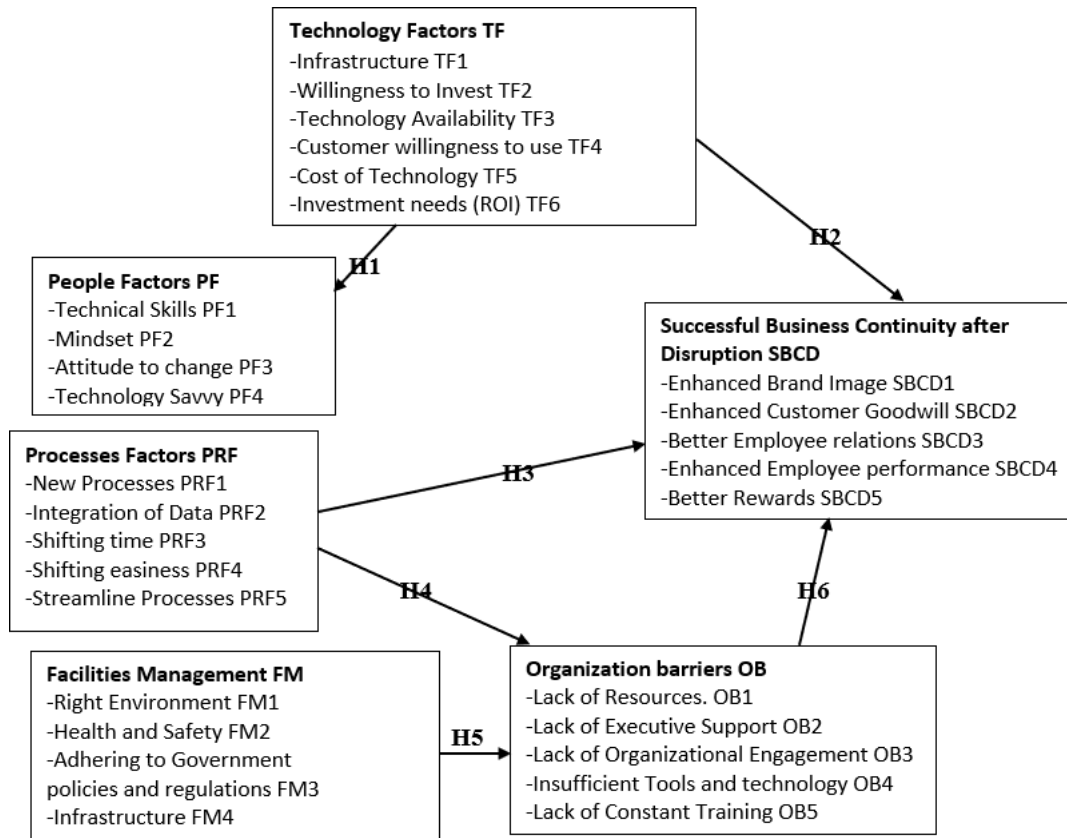
Figure 2: Conceptual model.

H3: The business process factors have significant relationship with the successful continuity factors in higher education organization

H4: The business processes has significant relationship with the organization barriers in higher education business

H5: The facilities management factors have significant relationship with the successful business continuity in higher education organization

H6: There is significant relationship between the organization barriers and successful business continuity in higher education organization

3. Methodology

Mixed method – using the qualitative approach by interviewing the educational owners and CEOs/HODs on the various factors of business continuity using semi-structured virtual interviews (15) and the quantitative analysis involves the SEM analysis using Adanco (Smart PLS) on a sample size of 446 respondents, having distributed to 1200 stakeholders including owners, staff, students, parents in the UAE.

Table 3 contains the summary of the interviews conducted and transcript.

Table 3: Summary of the Interviews conducted and transcript

Interviewee number (experience in years)	Designation / responsibility in organization	Location	Main comments education digitalization and disruption, leading to business continuity issues in COVID-19 and crisis situation (other interviewees agreeing to these comments)
1. (16)	CEO – Education Hub	Dubai	The Myth that the online education is not worth its salt is slowly melting. Most Institutes and Universities are forced into online or blended learning format thus ensuring the continuity of business during crisis. However, the quality of the education needs to be ensured to make the business sustainable and it is the onus of the stakeholders to guarantee this. The Quality is measured by the employability, the skills developed by the learners and add value to their personalities during this learning process. (5, 8, 10, 13)
2. (17)	Regional Head MENA – Training Center	Dubai	The COVID crisis has thrown open opportunities to online, remote learning platforms, education hubs and the multiple tasking abilities of the teachers, students, and other stakeholders. The ROI for campus-based learning has turned more adverse and the gestation period has increased which might not be very conducive to private investors. Universities are struggling to keep students and parents happy and to deliver the quality curriculum to make them employable. The resilience of the organizations will be deciding factor in future education endeavors. (3, 8, 10)
3. (11)	Government Institute CEO	RAK	The processes that affect our decision making are the cost factors, the ROI, data processes that blend with our specific requirements, how we can analyze the data available to maximize our returns. Organizational barriers are a collective mindset of all major stakeholders, lack of credible tech manpower to cater to creating technology platforms desired by us. (4, 7, 9, 11)
4. (15)	HOD Government Business School	Abu Dhabi	It is important for the Businesses to get used to new processes during the crisis period, be agile to adjust to the remote learning and teaching platforms, adjust the new processes. The data integration is another great challenge to be handled skillfully. The streamlining of the processes and adjust to the new timings and location of remote working will ensure smooth business continuity. The way the business continuity happens will determine the enhanced Brand Image, enhance the customer satisfaction and goodwill. The employees are the key to the success of the implementation and the employee relations and motivation will lead to better performance of the team. All these will lead to the better rewards system for everyone. (2, 5, 7, 11)
5. (13)	Education group Owner / Founder	Abu Dhabi	The successful implementation of processes after crisis will depend on the people involved in the processes to find alternate working systems like remote working tools, platforms during the COVID social distancing requirement. The integration of existing system into new technologies will dictate the time involved and the investment cost. However, the environment, the training and the proper handling of the manpower can mitigate the risks involved in recovering to the earlier success in business and enhanced performance to use this opportunity as others might not survive this crisis. (1, 5, 7, 15)
6. (20)	Education Hub Owner	UK / UAE / Qatar / USA	Technology factors affecting our decision making is the infrastructure we possess currently, the cost factors, how technology can assist us in the education sector using AI and Blockchain technologies and how do we get max ROI. The processes that affect our decision making are the cost factors, the ROI, data processes that blend with our specific requirements, how we can analyze the data available to maximize our returns. Business continuity after disruption will have to bank upon enhancing one's brand image, managing damage control, creating better

Table 3 – continued from previous page

Inter-viewee number (experi-ence in years)	Designation / respon-sibility in organiza-tion	Location	Main comments education digitalization and disruption, leading to business continuity issues in COVID-19 and crisis situation (other interviewees agreeing to these comments)
			customer goodwill, employee engagement, etc. (4, 9, 12, 15)
7. (16)	Sharjah Education Institute – Dean	Sharjah	The Resilience of the Organization will ensure the continuity of the business post any crisis and it comes from the organization culture and employee mindset and commitment. The major component is from the top management in providing the environment, training, and investing in the employee upskilling and professional development. The ROI will follow over a period. The digital disruption in education might be badly handled by some organizations if they are not involving the employees in taking decision to meet the challenges and not training them. The insecurity in negotiating the challenges will involve resistance from the employees, teams, and the organization itself if not discussed and spreading awareness of the need to change. (3, 8, 11, 14)
8. (10)	Government University HOD	Sharjah	The safety of the students and teachers is the priority in the COVID crisis, and the social distancing government policy has ensured the remote learning model of education business. The mental health of the employees also was a concern due to the forced indoor activities of the students has led to life-work balance. The interviewee was of the view that the new normal is there to stay and the quality of the education and the regulations will be future concerns of the higher education in the UAE. (1, 2, 13)
9. (15)	Private College HOD	Dubai	The new business models based on blended learning and on education hub business model are very attractive in the last 3 years and might be the future of the education giving the students to choose their micro credentials and select their area of studies and away from the university centric models of the earlier years. The cost bearing capability of the students and parents have declined drastically in times of uncertainty and fewer employability opportunities. (2, 6, 12, 14)
10. (12)	Government University	Abu Dhabi	Business continuity after disruption will have to bank upon enhancing one's brand image, managing damage control, creating better customer goodwill, employee engagement, etc. The agility of the organization, the culture, the employee training will lead to high resilience of the organization. The risks involved in the business discontinuity will need to be analyzed for the future models. (5, 9, 11, 13)
11. (11)	Education Consultant	Abu Dhabi / Al Ain	The ROI of the Investors in Education is getting reduced as the students are dissatisfied with the quality of programs, curriculum given to them which are just University centric. The learners and their parents are not getting their expected ROI that is necessary to make the Brick-and-Mortar model viable as the students are not getting any employment across the globe for the fees they are paying. This has led to many legal issues in Europe, USA, India, China as the student loans is not getting repaid due to lack of employment. (4, 8, 13)
12. (13)	Education College Owner	UAE / Kuwait	The management change is eminent in the Higher education as the system need to change to suit the new student centric business model of education hub. Employees need to be reskilled and professional development is urgently required. The Universities need to employ the latest technologies and make sure the students, teachers use these extensively for the change to be permanent.
13. (17)	Institute Dean	Sharjah	People factors are having the correct mindset to adopt to the changes, getting the right skills of tech people who can transform our vision to useful pragmatic implementable resources. In facilities management, having the right infrastruc-

Continued on next page

Table 3 – continued from previous page

Inter-viewee number (experi-ence in years)	Designation / respon-sibility in organiza-tion	Location	Main comments education digitalization and disruption, leading to busi-ness continuity issues in COVID-19 and crisis situation (other intervie-wees agreeing to these comments)
			ture is extremely important, ease of integration with other technology platforms, ease of usage, adhering to data protection and other govt. policies are also very important factors. (4, 8, 12, 14)
14. (19)	Higher Edu-cation Insti-tute Dean	Dubai	The education businesses need to be agile and adopt resilient culture for facing the dynamic current and future scenario in education. The old model of tra-ditional University is melting to newer education hub model and still fluid to become just education platform dishing out education and enabling blockchain technology to record student portfolio and using emerging technologies for teaching, learning and innovative curriculum involving micro-credential across trans multi-disciplinary programs. (1, 5, 11, 13)
15. (21)	Education Consultant	UAE / UK	Business Continuity is major concern of all Business, and the resilience of the organization will play a major role in ensuring the continuity. The Organization agility, the management support, the employee mindset and the environment or ambience provided in the organization for survival in the future higher education. (2, 6, 10, 11)

3.1. Summary of the findings of the qualitative study

Most of the interviewee agreed the business continuity is a major issue in recent crisis and they should prepare for it. They believed if the crisis can be simulated like in fire drill and often discussed, the crisis does not take the organization by surprise. So, the trick is to build a robust, resilient organization which is agile and ready to change to accept and face challenges. This attitude, culture is the responsible of the top management and to train the employees in handling and overcoming challenges. The right tools need to be given by investing in the latest emerging technologies to support the transformation to be resilient. Majority of the interviewees cited the quality framework difficulty to establish for online/offline teaching and to have a benchmark. This will determine the sustainability of higher education in the years to come as it will be able to measure the quality with the number of students managing to upskill or reskill or gain new skills to get into jobs. The bane of today's education model is the lack of guarantee of jobs in the industry as the alignment, between what is required by the industry and what are the skills that are imparted in the academics, is missing. Some of the academicians and owners are clear in change management policies, techniques to meet the current, dynamic challenges to be resilient and agile. Only the companies who adopt, technologies like blockchain, AI, machine learning, cloud computing will make the processes cheaper in long term and enable the students to get ROI for their monies, time invested in education. The digital disruption in higher education can be handled by the management in convincing the employees at the need to change and adopt new technologies and assuring them to support in reskilling the employees [17].

The major points that stand out from the various interviewee regarding business continuity in UAE higher education are:

- *Blended learning in vogue*: Most institutes and universities are forced into online or blended learning format thus ensuring the continuity of business during crisis. The COVID-19 crisis has thrown open opportunities to online, remote learning platforms, education hubs and the multiple tasking abilities of the teachers, students, and other stakeholders.

- *Quality concerns*: However, the quality of the education needs to be ensured to make the business sustainable and it is the onus of the stakeholders to guarantee this. The quality is measured by the employability, the skills developed by the learners and add value to their personalities during this learning process.

- *Technology*: Technology can support businesses to be resilient. It is important for the businesses to get used to new processes during the crisis period, be agile to adjust to the remote learning and teaching platforms, adjust the new processes. The data integration is another great challenge to be handled skillfully. The streamlining of the processes and adjust to the new timings and location of remote working will ensure smooth business continuity.

- *Investment returns*: The ROI for campus-based learning has turned more adverse and the gestation period has increased which might not be very conducive to private investors. Universities are struggling to keep students and parents happy and to deliver the quality curriculum to make them employable. The processes that affect our decision making are the cost factors, the ROI, data processes that blend with our specific requirements, how we can analyze the data available to maximize our returns. The ROI will follow over a period. The digital disruption in education might be badly handled by some organizations if they are not involving the employees in taking decision to meet the challenges and not training them. The insecurity in negotiating the challenges will involve resistance from the employees, teams, and the organization itself if not discussed and spreading awareness of the need to change.

- *Resilience*: The resilience of the organizations will be deciding factor in future education endeavors. The resilience of the organization will ensure the continuity of the business post any crisis and it comes from the organization culture and employee mindset and commitment. The major component is from the top management in providing the environment, training, and investing in the employee upskilling and professional development. The resilience of the organization will ensure the continuity of the business post any crisis and it comes from the organization culture and employee mindset and commitment. The major component is from the top management in providing the environment, training, and investing in the employee upskilling and professional development. The new business models based on blended learning and on education hub business model are very attractive in the last 3 years and might be the future of the education giving the students to choose their micro credentials and select their area of studies and away from the university centric models of the earlier years.

- *Government policies*: The safety of the students and teachers is the priority in the COVID-19 crisis, and the social distancing government policy has ensured the remote learning model of education business. The cost bearing capability of the students and parents have declined drastically in times of uncertainty and fewer employability opportunities. The

new normal is there to stay and the quality of the education and the regulations will be future concerns of the higher education in the UAE.

- *Organization factors*: Organizational barriers are a collective mindset of all major stakeholders, lack of credible tech manpower to cater to creating technology platforms desired by the employees/users. Business continuity after disruption will have to bank upon enhancing one's brand image, managing damage control, creating better customer goodwill, employee engagement, etc. The agility of the organization, the culture, the employee training will lead to high resilience of the organization. The risks involved in the business discontinuity will need to be analyzed for the future models.

- *Employees (people)*: The employees are the key to the success of the implementation and the employee relations and motivation will lead to better performance of the team. All these will lead to the better rewards system for everyone. The mental health of the employees also was a concern due to the forced indoor activities of the students has led to life-work balance. The interviewee was of the view that the new normal is there to stay and the quality of the education and the regulations will be future concerns of the higher education in the UAE. The learners and their parents are not getting their expected ROI that is necessary to make the brick-and-mortar model viable as the students are not getting any employment across the globe for the fees they are paying. This has led to many legal issues in Europe, USA, India, China as the student loans is not getting repaid due to lack of employment. People factors are having the correct mindset to adopt to the changes, getting the right skills of tech people who can transform our vision to useful pragmatic implementable resources. In facilities management, having the right infrastructure is extremely important, ease of integration with other technology platforms, ease of usage, adhering to data protection and other government policies are also very important factors.

- *Processes*: The education businesses need to be agile and adopt resilient culture for facing the dynamic current and future scenario in education. The old model of traditional university is melting to newer education hub model and still fluid to become just education platform dishing out education and enabling blockchain technology to record student portfolio and using emerging technologies for teaching, learning and innovative curriculum involving micro-credential across trans multi-disciplinary programs.

- *Top management (employers)*: The major component is from the top management in providing the environment, training, and investing in the employee upskilling and professional development. The management change is eminent in the higher education as the system need to change to suit the new student centric business model of education hub. Employees need to be reskilled and professional development is urgently required. The Universities need to employ the latest technologies and make sure the students, teachers use these extensively for the change to be permanent.

4. Findings and discussions

Partial least squares structural equation modeling (PLS-SEM) is an analysis technique used to detect or construct predictive models (figure 3). The causal model analysis between latent
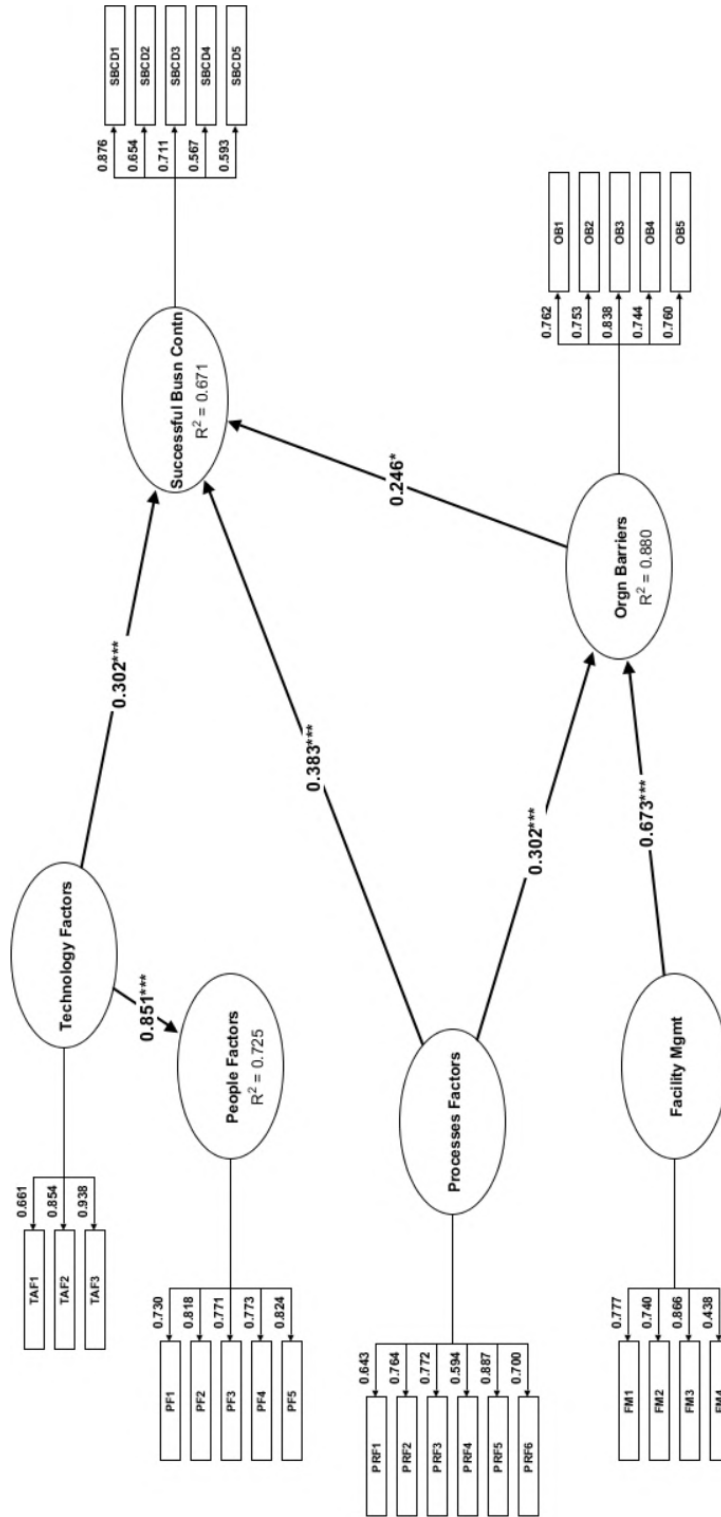
Figure 3: SEM-PLS output model (Adanco software output).

variables is better than the general linear structural relationship model, which is very suitable for exploratory research [31, 38].

The relationship between the constructs is very significant as indicated by the *** status on each relationship and the R^2 value are well over 0.225, which also indicates good model fit and significance. The path coefficients β values are indicative of these relationships. The overall model R^2 is 0.6706 which means the relationship between constructs are explained to 67%, which is statistically significant [11].

Table 4
Coefficient of relation R^2.

Construct	Coefficient of determination (R^2)	Adjusted R^2
People Factors	0.7246	0.7239
Orgn Barriers	0.8800	0.8794
Successful Busn Contn	0.6706	0.6684

4.1. Demographics

Gender-wise breakup: male (M) − 284; female (F) − 162 (figure 4).
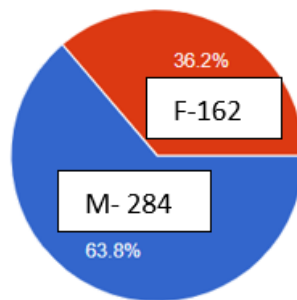
Figure 4: Gender-wise breakup.

Age-wise breakup of the sample (446 respondents) is shown in figure 5.
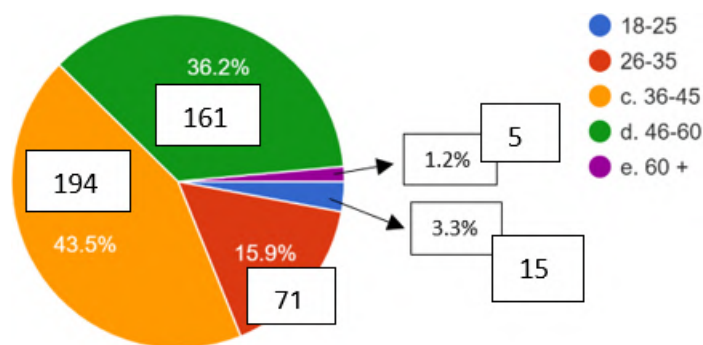
Figure 5: Age-wise breakup.

Qualifications of the respondents (446) is shown in figure 6.
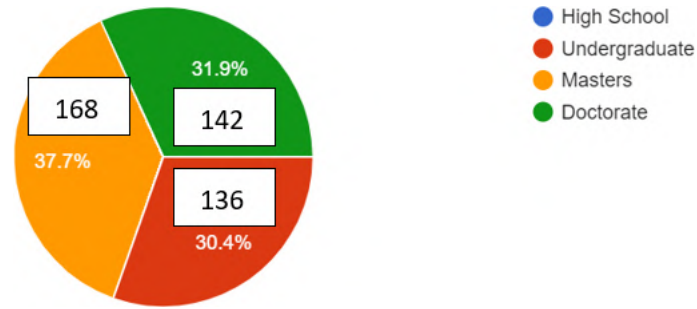
Figure 6: Highest qualifications of respondents.

Breakup of participants field of work is given in table 5.

Table 5
Breakup of participants field of work.

Description of field	%	Numbers
Education	66.7	297
IT / Technology	50.7	226
Logistics / Transportation	14.5	65
Hospitality & Tourism	18.8	84
Medical Field	11	49
Sports	20.3	91
Jewellery & Fashion	15.9	71
Construction / Engineering	13	58
Others	44.9	200

Figure 7 and table 6 illustrate the salary group-wise breakup (446 participants).
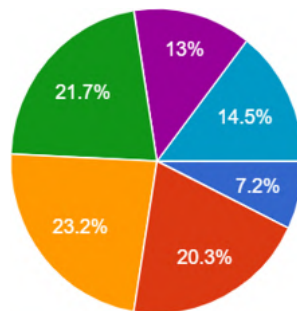
Figure 7: Breakup of salary of participants.

The salary level of the participants shows that participants belong to all levels of the organizations and their contribution in terms of their opinion on the importance of business continuity successfully after COVID-19 shows that the participants believe that the business continuity depends on the factors as suggested by the conceptual model.

Table 6
Breakup of salary of participants.

Salary, AED	%	Numbers
≤ 5000	7.2	32
$5001-10000$	20.3	91
$10001-15000$	23.2	103
$15001-20000$	21.7	97
$20001-25000$	13	58
≥ 25000	14.5	65
Total		446

4.2. The goodness of fit of model

The goodness of fit values (table 7) are well within the range of HI95 and HI99 indicating that the model suggested has good chances of being true and which can be confirmed by the various reliability and validity tests [32].

Table 7
Goodness of fit of model.

	Value	HI95	HI99
SRMR	0.0316	0.0292	0.0320
$\mathbf{d_{ULS}}$	0.3996	0.3471	0.4156
$\mathbf{d_G}$	0.2576	0.2483	0.2916

4.3. Measurement model parameter estimation

Each loading factor, the Cronbach's alpha value, the composite reliability value are well over 0.7 (table 8), indicating a very good reliability and internal consistency [15]. The AVE value of each dimension is greater than 0.5, indicating good convergent validity. The diagonal AVE (table 9) is greater than other correlation coefficient values in the matrix indicating excellent discriminant validity [29].

The heterotrait discriminant validity has all values below 0.9 (table 10) which shows good validity [15].

4.4. Structural equation modeling analysis

The problem of collinearity must be eliminated while evaluating structural equation modeling, When the Variance Inflation Factor (VIF) is greater than 5, it means that there may be a collinearity problem between the dimensions [13]. The VIF value of the structural equation modeling in this study is less than 5, which is between 1 and 4.132, indicating no collinearity among the study dimensions. SRMR, NFI and RMS_theta are commonly used indicators for PLS-SEM in order to evaluate the appropriateness of the overall model [41]. The range of the SRMR value is from 0 to 1. When SRMR is less than 0.08, it can be regarded as a good fit of the model [35]. The range of the NFI value is between 0 and 1. The larger the value of NFI, the

Table 8
Measurement model parameter estimation.

Construct	Sub variables	Factor loading	Cronbach's alpha (α)	Composite reliability Jöreskog's rho (ρ_c)	Dijkstra-Henseler's rho (ρ_A)	AVE
Technology Factors (TAF)	TAF1	0.8953	0.8627	0.8630	0.8843	0.7817
	TAF2	0.8234				
	TAF3	0.9251				
People Factors (PF)	PF1	0.8643	0.8876	0.8903	0.8959	0.8205
	PF2	0.8715				
	PF3	0.8843				
	PF4	0.8675				
	PF5	0.8923				
Processes Factors (PRF)	PRF1	0.8631	0.8715	0.8722	0.8827	0.8762
	PRF2	0.8744				
	PRF3	0.8756				
	PRF4	0.8967				
	PRF5	0.8976				
	PRF6	0.9034				
Facility Mgmt (FM)	FM1	0.8023	0.8066	0.8357	0.8356	0.8177
	FM2	0.8324				
	FM3	0.8593				
	FM4	0.8745				
Orgn Barriers (OB)	OB1	0.8134	0.8605	0.8813	0.8819	0.8728
	OB2	0.8432				
	OB3	0.8542				
	OB4	0.8678				
	OB5	0.8954				
Successful Busn Contn (SBCD)	SBCD1	0.8321	0.8169	0.8269	0.8342	0.8448
	SBCD2	0.8458				
	SBCD3	0.8567				
	SBCD4	0.8765				
	SBCD5	0.8895				

Table 9
Discriminant validity test (Fornell-Larcker criterion).

Construct	AVE	Technology Factors	People Factors	Processes Factors	Facility Mgmt	Orgn Barriers	Successful Busn Contn
Technology Factors	0.7817	0.7917					
People Factors	0.8205	0.7838	0.8405				
Processes Factors	0.8762	0.7682	0.8353	0.8562			
Facility Mgmt	0.8177	0.7616	0.8221	0.8323	0.9056		
Orgn Barriers	0.8728	0.75970	0.7697	0.7696	0.8560	0.9162	
Successful Busn Contn	0.8448	0.7218	0.7434	0.7511	0.7903	0.8472	0.9148

Table 10

Heterotrait-monotrait ratio of correlations.

Construct	Technology Factors	People Factors	Processes Factors	Facility Mgmt	Orgn Barriers	Successful Busn Contn
Technology Factors						
People Factors	0.7946					
Processes Factors	0.7540	0.8145				
Facility Mgmt	0.7546	0.7679	0.8497			
Orgn Barriers	0.7175	0.7104	0.8363	0.8905		
Successful Busn Contn	0.7104	0.7029	0.7534	0.8167	0.8947	

Table 11

Direct effects.

Effect	Original coefficient	Standard bootstrap results					Percentile bootstrap quantiles			
		Mean value	Standard error	t-value	p-value (2-sided)	p-value (1-sided)	0.5%	2.5%	97.5%	99.5%
Technology Factors → People Factors	0.8449	0.8423	0.0341	24.7720	0.0000	0.0000	0.7203	0.7644	0.8973	0.9104
Technology Factors → Successful Busn Contn	0.3032	0.3037	0.0559	5.4281	0.0000	0.0000	0.1608	0.1956	0.4158	0.4546
People Factors → Facility Mgmt	0.6497	0.6488	0.0629	10.3215	0.0000	0.0000	0.4724	0.5197	0.7680	0.8056
Processes Factors → Orgn Barriers	0.2842	0.2836	0.0587	6.8413	0.0000	0.0000	0.1224	0.1673	0.3975	0.4370
Processes Factors → Successful Busn Contn	0.3837	0.3840	0.1112	13.4517	0.0006	0.0003	0.0962	0.1719	0.6137	0.6856
Facility Mgmt → Processes Factors	0.8381	0.8366	0.0280	29.9104	0.0000	0.0000	0.7524	0.7776	0.8874	0.8983
Facility Mgmt → Orgn Barriers	0.6870	0.6874	0.0620	11.0771	0.0000	0.0000	0.5216	0.5657	0.8091	0.8448
Orgn Barriers → Successful Busn Contn	0.2445	0.2424	0.1186	12.0609	0.0394	0.0197	-0.0926	-0.0099	0.4568	0.5202

better performance it obtains. When NFI is greater than 0.8, it indicates that the model fits well [40]. The RMS_theta value is only suitable for evaluating reflective measurement models. An RMS_theta value less than 0.12 indicates that the model fits well [46]. The SRMR value of the model evaluation verification in this study is 0.051. Although the NFI value of 0.819 is less than 0.9, it is not much different. The RMS_theta value is 0.153. Although it is greater than 0.12, it is also acceptable. Therefore, the model in this study is reasonably well-fitted in general [45]. The collinearity analysis and model fit are shown in table 13.

Next, the model verification is analyzed and explained by the path analysis (table 14) and R^2.

Table 12
Indirect effect.

Effect	Original coefficient	Standard bootstrap results					Percentile bootstrap quantiles			
		Mean value	Standard error	t-value	p-value (2-sided)	p-value (1-sided)	0.5%	2.5%	97.5%	99.5%
Technology Factors → Processes Factors	0.4600	0.4583	0.0595	7.7273	0.0000	0.0000	0.3005	0.3385	0.5718	0.6066
Technology Factors → Facility Mgmt	0.5489	0.5466	0.0583	9.4106	0.0000	0.0000	0.3888	0.4274	0.6568	0.6893
Technology Factors → Orgn Barriers	0.5079	0.5058	0.0587	8.6554	0.0000	0.0000	0.3534	0.3862	0.6148	0.6506
Technology Factors → Successful Busn Contn	0.3007	0.2988	0.0495	6.0708	0.0000	0.0000	0.1797	0.2063	0.3991	0.4338
People Factors → Processes Factors	0.5445	0.5438	0.0645	8.4417	0.0000	0.0000	0.3636	0.4149	0.6668	0.6995
People Factors → Orgn Barriers	0.6011	0.6002	0.0631	9.5195	0.0000	0.0000	0.4243	0.4689	0.7190	0.7567
People Factors → Successful Busn Contn	0.3559	0.3543	0.0542	6.5711	0.0000	0.0000	0.2231	0.2515	0.4628	0.5006
Processes Factors → Successful Busn Contn	0.0695	0.0666	0.0337	8.0614	0.0393	0.0197	-0.0310	-0.0032	0.1310	0.1565
Facility Mgmt → Orgn Barriers	0.2382	0.2372	0.0499	4.7715	0.0000	0.0000	0.1058	0.1413	0.3381	0.3728
Facility Mgmt → Successful Busn Contn	0.5478	0.5455	0.0591	9.2731	0.0000	0.0000	0.4011	0.4292	0.6625	0.6987

4.5. Relationship for each hypotheses

The β and t-values for all the paths and the hypotheses (figure 8) are well over the acceptable limits like β over 0.24 and the t values well over 5 making the model structurally and statistically acceptable with high value of significance [22].

4.6. Discussions

The technology to the people factors explains that ultimately the usage of the technology can happen once the people are convinced of the usefulness and the opportunities in using technology for their processes. Initially the academia was reluctant to use technology or remote teaching methods as the face-to-face was considered superior in quality however with the advent of COVID-19 every university and lecturer has been forced to use the remote or teaching online and offline using modern tools and platforms like Zoom, Microsoft Teams, Electra to name a few [16]. The results are not so bad as the mindset for the change to be adoption has taken over and most stakeholders are not finding the online classes exactly disastrous as assumed earlier. The training in the tools, workshops and the new processes have made the whole facilities acceptable to most stakeholders leading to the successful continuity of the education during the COVID-19 crisis and even in war situations like Ukraine, Yemen. The

Table 13
Collinearity analysis and model fit.

Dimension correlation	VIF (Variance Inflation Factor)	Model fit
TAF1	2.2501	SRMR = 0.051
TAF2	2.7974	NFI = 0.819
TAF3	2.0036	RMS_theta = 0.148
PF1	2.0945	
PF2	3.9882	
PF3	2.7213	
PF4	4.1322	
PF5	2.6318	
PRF1	1.9148	
PRF2	1.7513	
PRF3	3.0166	
PRF4	2.2917	
PRF5	3.1597	
PRF6	2.3872	
FM1	1.8865	
FM2	2.5980	
FM3	2.9181	
FM4	1.4639	
OB1	1.9021	
OB2	2.3164	
OB3	3.1224	
OB4	3.2122	
OB5	2.7959	
SCBD1	2.1868	
SCBD2	2.2021	
SCBD3	3.0737	
SCBD4	3.3788	
SCBD5	1.6061	

Table 14
Path analysis verification.

Path	Path coefficient	t-value	p-value	Hypothesis
Technology Factors → People Factors	0.851***	24.7720	0.0000	H1 is valid and supported
Technology Factors → Successful Busn Contn	0.302***	5.4281	0.0000	H2 is valid and supported
People Factors → Successful Busn Contn	0.383***	10.3215	0.0000	H3 is valid and supported
Processes Factors → Orgn Barriers	0.302***	6.8413	0.0000	H4 is valid and supported
Facility Mgmt → Successful Busn Contn	0.673***	13.4517	0.0006	H5 is valid and supported
Orgn Barriers → Successful Busn Contn	0.246***	29.9104	0.0000	H6 is valid and supported

organization barriers have slowly dissipated, and the total acceptance of the online classes are making the education ROI attractive and making the current generation educators to invest in these modern emerging technologies for the future education ventures. The integration of old
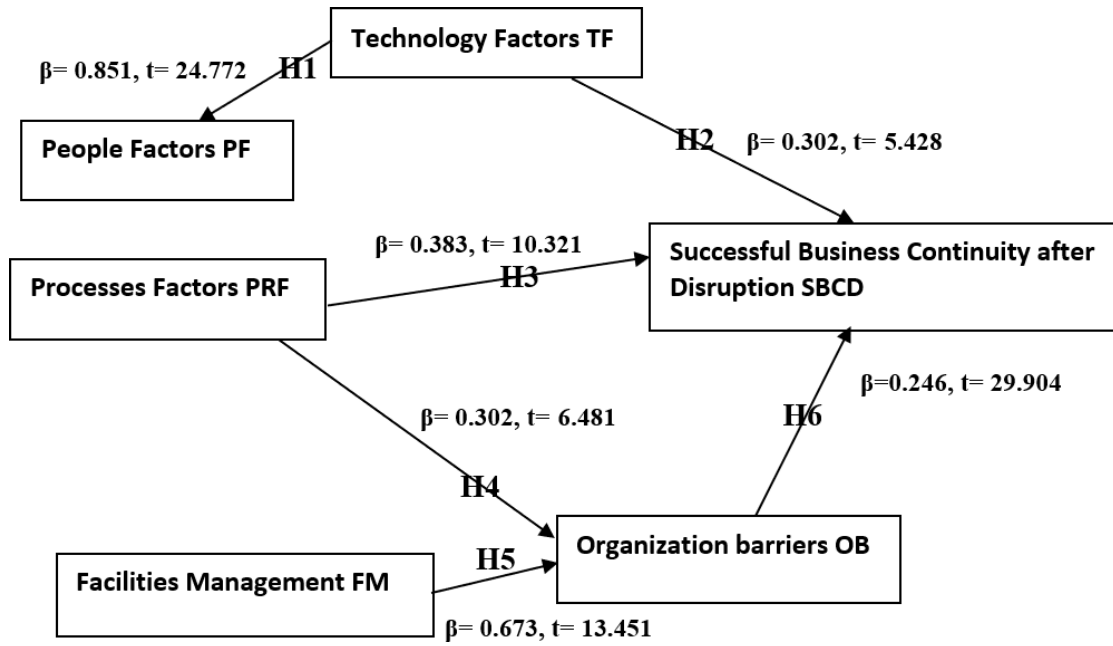
Figure 8: Path coefficients β and t-values.

data with the new platform data have been sorted by the hi-tech companies like Cisco, IBM to make these remote learning ventures viable. The education hub model seems to be the likely future of the higher education as universities and institutes are scrambling to remote areas globally to scale up so that the burden of the fixed costs and the high cost of education can be reduced to justify the cost liked to the employment opportunities [54]. The agile culture and the mindset of the employees to accept change, to flow with the change will make the organization resilient. The resilience in the organization to face any calamities, crisis and to get back to normal within the shortest time will enable the business continuity. These are the points, views coming from the experts in the interviews and the survey questionnaire analysis. The risk of

Table 15
Relationships between constructs and Successful Business Continuity after Disruption.

Hypotheses	Construct description	β-value	t-value	Significance (t$\geq$2.59)
		Direct relationships		
H2	Technology Factors (TF)	$\beta_{\text{TF-SBCD}} = 0.302$	5.4280	Strong
H3	Processes Factors (PF)	$\beta_{\text{PF-SBCD}} = 0.383$	10.321	Strong
H6	Organization Barriers (OB) Factors	$\beta_{\text{OB-SBCD}} = 0.246$	29.904	Strong
		Indirect relationships		
H4	Processes Factors (PF)	$\beta_{\text{PF-SBCD}}$ through OB = 0.0744	8.061	Strong
H5	Facilities Factors (FF)	$\beta_{\text{FF-SBCD}}$ through OB = 0.165	9.273	Strong
		No relationship		
H1	People Factors (PF)	$\beta_{\text{PF-SBCD}} = 0.00$	00.00	No relationship

business discontinuity can be reduced to great extent by discussing the worst scenario situation and preparing for the same. Modern technologies like AI, machine learning, virtual reality, gamifications can help simulate such situations to study how the organization will behave in such crisis [47].

Table 15 showing the relationships between constructs and Successful Business Continuity after Disruption (SBCD).

4.7. Similarities between the qualitative, quantitative and the earlier research available

Table 16
Similarity in outcomes and differences.

Qualitative outcomes	Quantitative outcomes
Similarity in outcomes	
The Technology, Processes, and the Organization Barriers will influence the Successful Business Continuity after Disruption directly and confirms with the secondary resources by earlier research.	Direct Effects in relationships H2 – Technology Factors (TF), $\beta_{\text{TF-SBCD}}$ = 0.302, t = 5.4280 indicates a Strong relationship H3 – Process Factors (PF), $\beta_{\text{PF-SBCD}}$ = 0.383, t = 10.321, indicates a Strong relationship H6 – Organization Barriers (OB) Factors, $\beta_{\text{OB-SIBC}}$ = 0.246, t = 29.904, indicates a Strong relationship
This exactly coincides with both the methodologies so; it is validated, and reliability tested to greater extent	
The Processes Factors and Facilities Factors also have indirect influence on the outcome of Successful Business Continuity after Disruption and to some extent agrees with the secondary resource and Qualitative interviews with the experts.	H4 – Processes Factors (PF), $\beta_{\text{PF-SBCD}}$ through OB = 0.0744, t = 8.061, indicates a Strong relationship H5 – Facilities Factors (FF), $\beta_{\text{FF-SBCD}}$ through OB = 0.165, t = 9.273, indicates a Strong relationship
Differences in outcomes	
However, does not confirm with the People Factors having no relationship with the outcome as cited by the earlier secondary resource and the interview with the experts.	H1 – People Factors (PDF), $\beta_{\text{PF-SBCD}}$ = 0.00, t = 00.00, No relationship None

4.8. Differences in outcomes

The main areas of disagreement in both the methodologies are very less that is restrictive to the **None** seen in the quantitative methodology as proven statistically is as pointed out due to the lack of awareness of the stakeholders on the business continuity successes in various applications, which the top management educationists or BCT experts have exposure to the issues. Another area is the COVID-19, war, sanctions, natural disasters, and recession which most stakeholders only know as possibilities, however, do not know the impact on the Business continuity. The education continuity is possible with the collaboration and cooperation of the stakeholders and to make resilience a habit.

The McKinsey Change Management applicable to these agile, resilient, and dynamic organization in the UAE higher sector can be summarized in the figure 9 showing the extended McKinsey 7S Model.
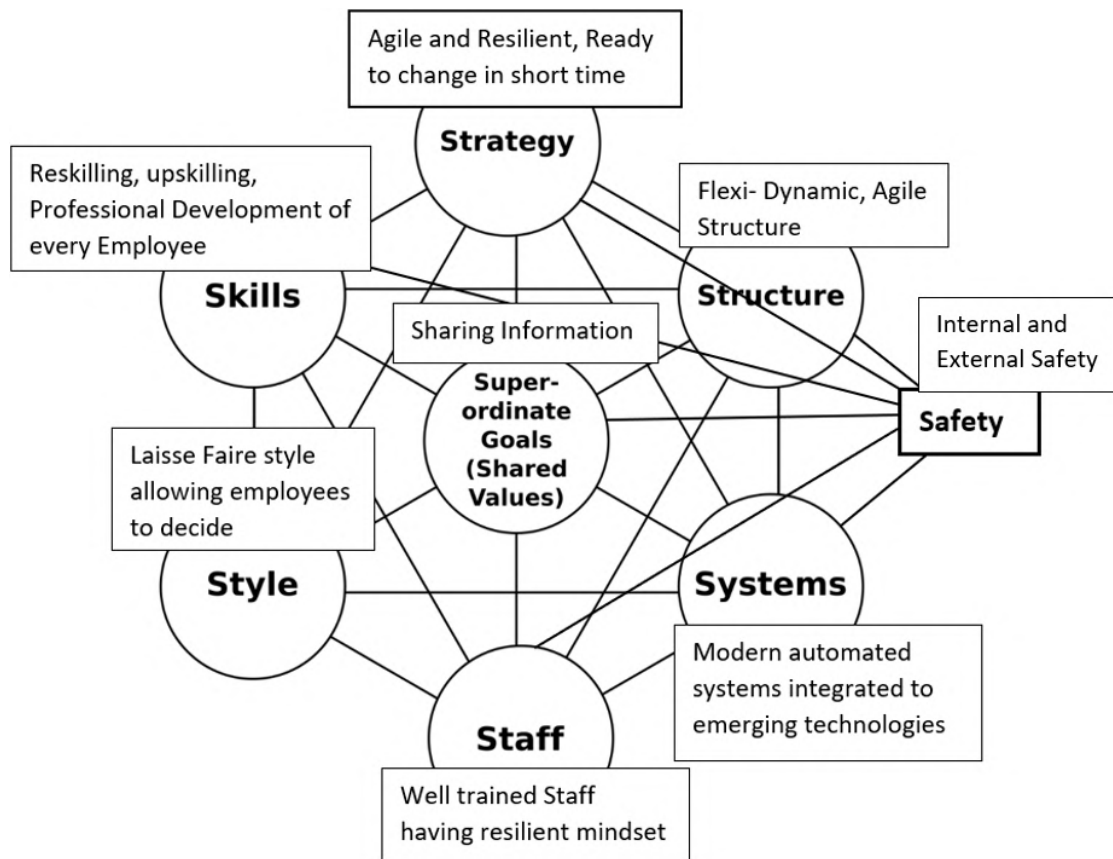
Figure 9: Extended McKinsey 8S Model.

The new extended McKinsey management change model illustrates the importance of strategy change that is necessary to face challenges in crisis and difficult situations like COVID-19. The organization should be involving teams that can take on rapid functions as necessary drawing from the various departments and specialists in crisis to be resilient and agile to face the dynamics of the market environment. The collaboration and sharing of information with other departments, customers and authorized personnel gives the flexibility and valuable inputs from the employees at all levels to face challenges in crisis. This builds the resilience culture in the organization [48]. The staff needs to be trained in acquiring new skills, adjust to the changes with mindset to accept this culture and uncertainty. All this can be motivated by intrinsic and extrinsic rewards for the participating employees. The systems need to be updated and upgraded to integrate the new emerging technologies and with the old database. The laissez-faire leadership will work better in such situations getting the employees involved at each stage of the implementation [4].

5. Limitations

The research study used the longitudinal section population sample from the UAE and restricted to higher education heads of institutes, universities, head of departments, owners of training institutes, education experts, consultants using convenience and snowballing sampling techniques. The researchers realize that the cross-sectional sampling can further the factors of impact of the business continuity in UAE higher education or take it to other regions of Gulf Cooperation Council, Middle East or MENA region also. Also, the education sector can be in total and not restricted to higher education. The sample size can be increased in future research studies.

6. Highlights and contribution

The main contribution of this research study is that it is the mixed methodology usage to validate the conceptual model using semi-structured Interview qualitative approach and the quantitative analysis using Adanco SEM-PLS methodology. The theoretical framework has been based on the combined business continuity model and the Gartner Maturity model with additional factors. The research studies have explored agility and continuous improvement factors which are a priority in the crisis situations. The business continuity approach has been studied in detail, to help various stakeholders to prepare for the future crisis. The extended McKinsey 7S change management model has been reworked by adding the safety aspect which shows the importance of internal and external safety aspects of the employees which has been to closely be monitored in crisis situation like COVID-19.

7. Managerial implications

Some of the managerial implications that this research study is noticeable. Firstly, this study contributes to the prior research on the business continuity models and the handling of crisis like COVID-19. The digital technology to education domain has been disruptive and useful in the crisis period and will continue to be the major contributor in the future models. The research topic will help the education managers to face crisis and be prepared for future crisis situations by embedding resilience into the business models and mitigating the risks involved in keeping the business secured and stable. Secondly, empirical evidence indicates that the digital education tools enhance operational performance in the higher education. The importance of integrating the old, current data to the future cloud-based data managements will be interesting to understand and to optimize by the education managers. The agility and resilience of the organization will decide the future business continuity.

8. Recommendations for future research

Due to the time restrictions some factors might have missed out by the researchers like resilience, risks factors which came out in the survey answers and in the expert interviews. The quality of the higher education now during the new normal seems to be discussed a lot, however there are

no frameworks to measure this except for the student surveys. The real quality according to the researchers is how the learners get skilled or upskilled to further their careers or get new jobs or get employable. This criterion is not a favorite topic of discussions as most programs cannot guarantee employability for the learners. However, the researchers feel that the sustainability of any business model will ultimately depend on the quality and the employability skills it is able to transfer to the learners. There are indications that the major popularity of the education model hub among the students, is its convenience to take up courses in trans and multidisciplinary, looking at micro-credentials as progressive career paths. The quality framework needs to be established in the near future. There is need to research these factors in further research studies. Instead of the semi-structured interviews the Delphi technique of conducting a structured assessment and exploring expert judgements, might be used in the future.

9. Conclusion

The objective of establishing a business model and structural conceptual model and test it qualitatively and quantitatively have been achieved. Digital transformation provides competitive edge to the education companies over the competition by delivering student satisfaction, support innovations and enhance efficiency by reducing costs. The main benefits of business maturity models are to make organizations more resilient, ensuring zero downtime and support the agility to face any future crisis and challenges in the business scenario. The modern technologies like IoT, AI, ML, virtual reality, robotics, cloud computing and 3D printing can enhance the agility of the organization to simulate crisis situation and prepare for the worst scenarios.

The business continuity factors have been well researched and the similarities between the secondary resources, the expert opinions and the stakeholders expression have been assimilated using the qualitative and quantitative methodologies, for the first time and the similarities and differences tabulated and for the confirmation through further research.

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A. Survey questionnaire

A.1. Demographic profile

This section is collection of demographics of the participants for further analysis.

1. Please specify your age group

   - 18–25
   - 26–35
   - 36–45
   - 46–60
   - 60 +

2. Please specify your gender

   - Male
   - Female

3. Please specify your highest qualification achieved

   - High School
   - Undergraduate
   - Masters
   - Doctorate

4. Please indicate your field of work

   - Education
   - IT / Technology
   - Logistics / Transportation
   - Hospitality & Tourism
   - Medical Field

- Sports
- Jewelry & Fashion Design
- Construction / Engineering
- Others

5. Please specify your salary group per month

  - Less than 5000 AED
  - 5001 to 10000 AED
  - 10001 to 15000 AED
  - 15001 to 20000 AED
  - 20001 to 25000 AED
  - Above 25000 AED

A.2. Relation study between the independent variables and the dependent variable

6. Technology Factors (TF) – The technology adoption is a major issue as it depends on the User, Employee, Customer orientation to new technology and its usefulness to them.

   I believe that the Technology adoption factors that will lead to Digital Disruption in Higher Education are: (Express your opinion on the statement by marking the most appropriate one)

Technology Factors (TF)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Perceived Usefulness of the Technology (TAF1)					
Perceived Ease of Using the Technology (TAF2)					
Technology Availability (TAF3)					

7. People Factors (PF) – People, Employees, Customers are the main component of any Business more so in the Education Sector and their mindset, attitude, behavior matter towards using technology and towards Education Business.

   I believe that the Organization People factors that will lead to Digital Disruption in Higher Education are: (Express your opinion on the statement by marking the most appropriate one)

People Factors (PF)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Technical Skills (PF1)					
Mindset (PF2)					
Attitude to change (PF3)					
Technology Savvy (PF4)					
Readiness to Learn (PF5)					

8. Processes Factors (PRF) – The Organization Processes determine the effectiveness and efficiency of the performance of the various departments and are crucial part of the study.

   I believe that the Organization Processes factors that will lead to Digital Disruption in Higher Education are: (Express your opinion on the statement by marking the most appropriate one)

Processes Factors (PRF)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
New Processes (PRF1)					
Integration of Data (PRF2)					
Shifting time (PRF3)					
Shifting easiness (PRF4)					
Cost of Technology (PRF5)					
Streamline Processes (PRF6)					

9. Facilities Management (FM) – The Organization Facilities Management will enhance the Digital Transformation and the Disruption will ensure future Business Continuity of UAE higher Education, enhancing it as an Education Hub to the Middle East.

   I believe that the Organization Facilities Management factors that will lead to Digital Disruption in Higher Education are: (Express your opinion on the statement by marking the most appropriate one)

Facilities Management (FM)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Right Environment (FM1)					
Health and Safety (FM2)					
Adhering to Government policies and regulations (FM3)					
Infrastructure (FM4)					

10. Organization barriers (OB) – The Organizations need to be identified, studied, understood to overcome these barriers for Successful Business Continuity in UAE Higher Education.

I believe that the Organization Barriers that will negatively impact the Successful Business Continuity after Disruption are: (Express your opinion on the statement by marking the most appropriate one)

Organization Barriers (OB)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Lack of Resources (OB1)					
Lack of Executive Support (OB2)					
Lack of Organizational Engagement (OB3)					
Insufficient Tools and technology (OB4)					
Lack of Constant Training (OB5)					

11. Successful Business Continuity after Disruption (SBCD) – The Successful Business Continuity after Disruption for an Organization in UAE Higher Education can enhance the Performance, brand name of the Institution.

    I believe that the Successful Business Continuity after Disruption will lead to: (Express your opinion on the statement by marking the most appropriate one)

Successful Business Continuity after Disruption (SBCD)	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Enhanced Brand Image (SBCD1)					
Enhanced Customer Goodwill (SBCD2)					
Better Employee relations (SBCD3)					
Enhanced Employee performance (SBCD4)					
Better Rewards (SBCD5)					