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FHM- University of Applied Sciences
Germany

Business Sustainability Strategies in Today's Socio-Edu Challenges and Tomorrow's Crises of Contagion of Covid/Post-Covid 19 Era:

Theories, Education, Skill and Qualification

Prof. Dr. Dr. h.c. Hamid Doost Mohammadian

Abstract:

Science ecosystem has been evolved during modern human life. Teaching, learning, education, and doing research connecting elements of this ecosystem include students, professors, administrators and researchers from academia and industry. Different learning systems have been developed in different countries results in various science ecosystems that interact with each other. While the main goals are the same and there are many collaborations between them, but their reactions are different during the world paradigm shifts such as ICTs, IoTs and the Internet revolution and recently emerged Covid-19 Pandemic. In this paper we are going to study and share some experiences of different education systems. This may help developed and developing courtiers to tune current or determine new strategies, especially when the world faces with the crisis of Covid-19 Pandemic. We will discuss about the digital transformation in academic society and innovative ecosystems in the world beyond Covid19-Pandemic by using 7PS model and the 5th wave theory. The Covid-19 pandemic is changing our society on diverse dimensions (not only on an economic or social level). Before the 1970s, various businesses and economics could affect and improve technologies, and humans' life. Since we reached the 70ies, and with the beginning of the 3rd wave or the post-industrial era, the new modern technologies such as Information Technology (IT), Internet of Things (IoT), Internet of Business (IoB), Internet of Energy (IoE), Internet of Manufacturing (IoM), Internet of Health (IoH), the emerging digitization, and innovative smartness in addition, issues such as know-how, do-how, Artificial Intelligence (AI), Neural Networks, Machine Learning and others could influence businesses, the economy, urban infrastructures, societies, social impacts and even human life. The Covid-19 pandemic is changing our society on diverse dimensions (not only on an economic or social level). Before the 1970s, various businesses and economics could affect and improve technologies, and humans' life. Since we reached the 70ies, and with the beginning of the 3rd wave or the post-industrial era, the new modern technologies such as Information Technology (IT), Internet of Things (IoT), Internet of Business (IoB), Internet of Energy (IoE), Internet of Manufacturing (IoM), Internet of Health (IoH), the emerging digitization, and innovative smartness in addition, issues such as know-how, do-how, Artificial Intelligence (AI), and others could influence businesses, the economy, urban infrastructures, societies, social impacts and even human life. Wars, sanctions, sciences, technologies, IT, IoT, and smartness work together and have impacts on each other's, businesses, economy, and human life. Fundamentally, during humans' history inventions and innovations have been created through restrictions and challenges. Wars, sanctions, low sustainability, risks of contagion, recessions, climate pollution, environmental change, biodiversity collapse, urban sprawl, growing urbanizations, lack of infrastructure, gentrification, economic instabilities, and recently health crises are introduced as main restrictions. Wars and welfare integrate with human's life desirably or undesirably and make innovation. Improvement through such innovative digital technologies are so admirable because most of them have changed the world. Sustainability has an important role for societies and urbans to improve their quality of livability and life. The world academic economy has changed from an academic SocioEdu economy to a data and innovative academic SocioEdu, ecosystem and economy, leading to the concept of the "Internet of Business-Education". with many popular IoT applications involved (i.e. wearables, smart city, smart society, smart

healthcare, smart welfare, smart SMEs, smart retail, smart supply chain). This pandemic throws a spotlight on the interdependencies among business, nature, society, economy, and education. It may be tempting right now, when it is hard to see beyond the next few weeks, to dismiss the 17 Sustainable Development Goals (SDGs) as a distraction. But they have been described as a "crowd-sourced purchase order from the future" precisely because they offer a tremendous business opportunity. Based on SDGs all developed and developing countries in a global partnership have to go with CSR strategies and Hybrid Businesses for improving social cohesion and welfare, health, education, inequality, blue-green environmental sustainability, and economic efficiency. In this article we will discuss how the 5th Wave/Tomorrow Age and i-Sustainability Plus theories could help us for a readiness to forecast, prevent and face to the SocioEdu Consequences of Covid-19.

Keywords: The 5th wave theory, i-sustainability Plus theory, tomorrow's crises, IoB, Contagion of Covid-19, SocioEdu, e-Science, Strategy, Ecosystem, Innovation, Partnership, 7PS model,

1) Introduction:

Information and Communication Technologies (ICTs) and IoTs have pushed the world in its most recent technological revolution on the last decade of past century result in changing our lifestyle in many fields in starting the new millennium. Learning and science ecosystem were no exception; and digital transformation efforts will continue with evolving the new paradigm in learning, science and innovation ecosystem we called it E-science. E-science had been defined in literature; and many scientific conferences and workshops have been held during past years. Large scientific data sets and highly distributed scientific networks as well as flexible and scalable computing power are the most important technological aspects in this new paradigm which have continuously grown. Collaboration in level of scientists, research labs and universities have considerable effects on the way in which research is conducted and on the innovation process. Therefore the partnership between universities and research and innovation centers, in running joint programs and common courses, professor and student exchanges and doing collaborative research projects, has become one of the most important issues that should be considered in future science ecosystems which are moving toward the knowledge societies.

(1) What are the new opportunities and challenge for academia in the Post-Corona era?
(2) What are dimensions of new emerged academic and innovation ecosystem after Covid-19 Pandemic?
(3) What are the best reactions in science and learning ecosystem in Germany and Iran during Covid-19 Pandemic?

20 years after this brilliant technological start for the millennium, while the ICT infrastructures and applications have been vastly deployed, Covid-19 Pandemic has suddenly appeared and results in unpredictable changes in our life and seems it is shaping a new world. While this crisis has had catastrophic consequences, it reveals the value of digital transformation; and in many cases we see the acceleration of the transition. In fact, the timing of the events and reactions might not be ideal, but the force caused by crisis make many impossible matters to be real. For example, e-learning have a rapid jump and more than 90% of the classes in high schools and university run in the web-based system. In first stages of pandemic and while the quarantine suddenly applied in almost all parts of the world, many web-based communication tools and digital channels have been used instead each other to overcome the limited capacity of them. Video conferencing apps such as Zoom and Adobe Connect, messengers apps such as WhatsApp and Telegram, video sharing apps such as YouTube, and video chat apps such as Skype are used in a mixed manner for connecting students and teachers as well as the meetings between students and supervisors in universities. Some of these apps reach to unpredictable records; for example, zoom has surpassed 300 million daily

meeting participants. This is good news, but the bad news is security and privacy concerns. On the other hand, many other issues have been highlighted. For instance, whether the current remote web-based system and facilities is sufficient to perform all exams or not, and should we have changed our vision and change the evaluation methods in the schools and universities? Another important concern is removing the face to face collaborative activities of the students and classmate. Although learning materials and servers can be accessed remotely but the main lack is the small space i.e. how they spent all the time physically alone. Referring to the crisis caused by the Covid-19 pandemic, the Corona's era will not end and we never back to normal! Because we in the period called "deep crisis".

According to the speaker's researches we have the following results:

(1) The world will change
(2) Behaviours will change
(3) Humanity will return
(4) The economy after the contagion crisis
(5) The authority/power of most technology companies
(6) Contagion/outbreak of Covid-19 and reconciliation with technologies
(7) Privacy risk (Data security) and health risk because staying at home and doing home office
(8) Intensification of domestic economic shifts/crises
(9) Strengthening bonds between people (because of understanding the values that already existed)
(10)   The provision of the health and medical care is evolving. (Medical doctors, nurses, and pharmacies on the front line)
(11)   Resumption of world trade
(12)   To regain the opportunity for living in a better way and prosper the economy

Wars, sanctions, low sustainability, risks of contagion, recessions, climate pollution, environmental change, biodiversity collapse, urban sprawl, growing urbanizations, lack of infrastructure, gentrification, economic instabilities, and recently health crises are introduced as main restrictions.

The mentioned restrictions, technologies, IT, IoT, AI and smartness work together and have impacts on each other's, businesses, economy, and human life.

Fundamentally, during humans' history inventions and innovations have been created through various restrictions, challenges, and crises. The mentioned today's challenges and tomorrow's crises and recently health crises are introduced as main restrictions.

The hybrid welfare integrates with human's life desirably or undesirably and makes innovation. Improvement through such innovative digital technologies are so admirable because most of them have changed the world. Sustainability has an important role for societies and businesses to improve their quality of liveability and life.

The world business economy has changed from a traditional business economy to a data and innovative academic sustainable SocioEdu, ecosystem and economy, leading to the concept of the "Internet of Sustainable Innovative Business (IoSIB)". with many popular IoT applications involved (i.e. wearables, smart city, smart society, smart healthcare, smart welfare, smart SMEs, smart retail, smart supply chain and sustainable life).

This pandemic throws a spotlight on the interdependencies among business, nature, society, economy, and education. It may be tempting right now, when it is hard to see beyond the next few weeks, to dismiss the 17

Sustainable Development Goals (SDGs) as a distraction. But they have been described as a "crowd-sourced purchase order from the future" precisely because they offer a tremendous business opportunity. Based on SDGs all developed and developing countries in a global partnership must go with CSR strategies and Hybrid Businesses for improving social cohesion and welfare, health, education, inequality, blue-green environmental sustainability, and economic efficiency. In this article we will discuss how the 5th Wave/Tomorrow Age and i-Sustainability Plus theories could help us for a readiness to forecast, prevent and face to the SocioEdu Consequences of Covid-19.

2) BACKGROUND

a) Covid19-Pandemic:

It should be noted that the quality of actions in the teaching and learning ecosystem depends on the environment and equipment available to the students. In this new situation in which the students left campuses and removed from physical resources such as libraries, computer labs and common spaces, the financial and digital divide between their homes have become even more evident. Also removing from the labs reduces the performance of professors and researchers. On the other hand, since the crisis has been going on for a long time, we see that second priority activities such as holding large scientific conferences have been prepared to be run in virtual manner. In fact, after placing too much focus on daily operational needs, now long-term investment and movement has been emerged. There are fundamental changes occurred on the work of teachers, students, researches and scientists, and on the upcoming new challenges. By passing the hard time, and adapting with the new situation, now we are looking for the synergy between elements of learning and science ecosystem. This can be done by knowledge exchange and sharing best practices. Germany has one of the best reactions to the crisis of Covid-19 Pandemic and has valuable experiences achieved in the crisis which can be used for Post-COVID-19 Environment.

Generally, the top 3 negative impacts of COVID-19 crisis in the field of this proposal are:

o   Inability to face to face visit for professors, students and researchers.
o   Significant decline in experimental activities in the research and training lab.
o   Inability to resume the international mobilization especially in short term.

and the top 3 positive impacts are:

o   Wide recognition of the value of digital transformation and information technology among professors, students and staffs.
o   Improved corporate ability of long-distance collaborative work.
o   Provision the opportunities and motivations for developing Leap Frog strategies.

Our main questions in the current situation are:

o   How can have the agility in this new condition because the learning is a continuous procedure.
o   How can keep the momentum of active research projects.
o   How can cooperate effectively in new condition.

The main activities we consider in this project are holding conferences and workshops to study and share best practices and exchange innovative ideas between Germany and Iran in the field of the project. We are going to find innovative techniques, strategies and processes to increase readiness of academic society for post-covid-19 era by:

1.   Sharing the best practice between entities and countries
2.   Exchanging knowledge and experience
3.   Establishing educational join programs and workshops
4.   Establishing a professional network of the experts in this filed from two countries
5.   Doing applied and developing research project like Erasmus +
6.   Preparing advice for development in a Post-COVID-19 environment

b) 7PS model

Based on the traditional model for sustainability, sustainability has three pillars (Environment, Social and Economy) but Prof. Dr. Doost Mohammadian believes that sustainability has more pillars than these three ones. Seven pillars are required to develop sustainability. Environment, economic, social, educational, cultural, technical, and political aspects are formed sustainability. These aspects make a puzzle that all of the segments directly or indirectly are related to each other. Figure 1 is presented seven aspects of sustainability and its' classification.

To achieve educational sustainability all these seven parameters should improve approximately equable. Sustainability is occurred when the figure is more regular.
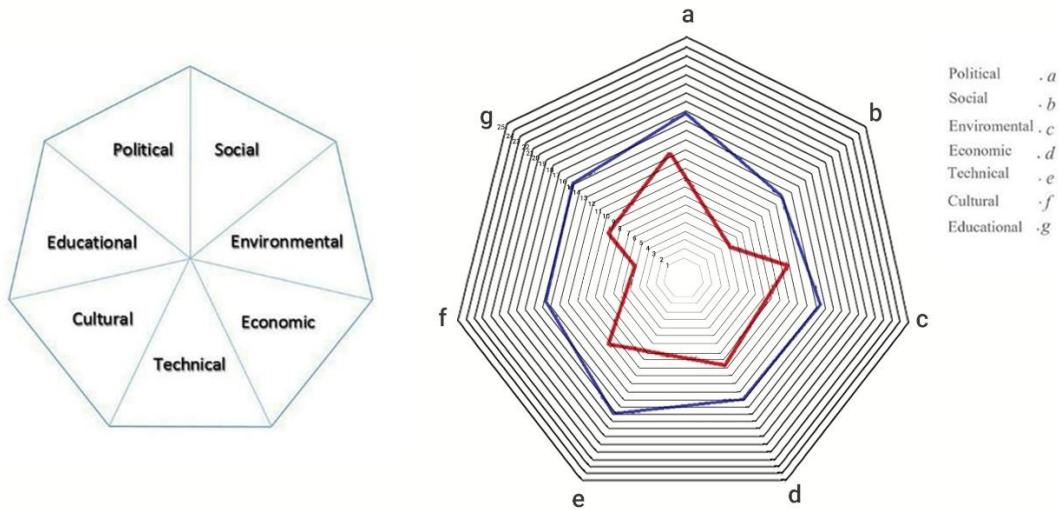
Figure 1. 7 P.S Model [Doost. H, 2017-19]

Generally, high quality of livability and life, health and prosperity with social justice, being environmentally friendly and preserving the earth's capacity to support future life are the main aims of the sustainable development.

c) 7PS Pattern and DPIr Models

Based on the 7PS model, it is possible to measure the sustainability compass with using 7PS DPIr Model (Doost. H, 2017-19). Figure 2 is presented how to measure the educational sustainability which is made of the trinity of Impact (I), Probability (P) and ratio (r).
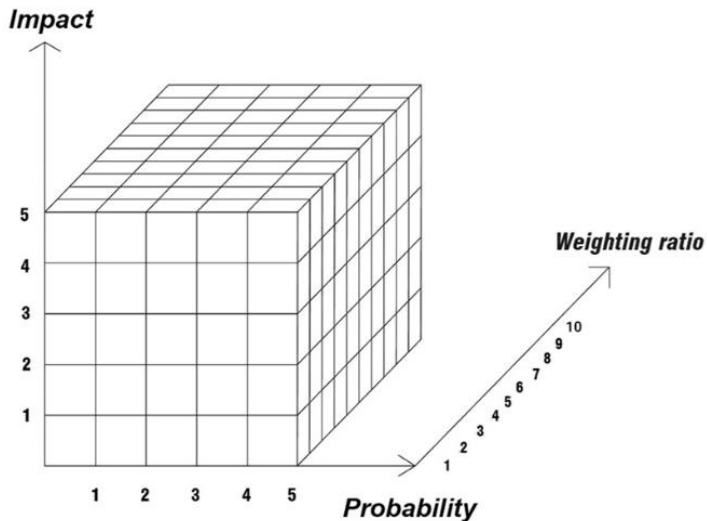

Figure 2. 7PS DPIr Model [Doost. H, 2017-19]

7PS package model is combination of 4 models related to seven pillars of sustainability with a focus on educational sustainability. Figure 3 is presented how to calculate sustainability based on 7PS model for each seven factors.

Index	Description	Row

Si	Sustainability for each pillars	1
Pi	Probability for each pillars	2
Ii	Impact for each pillars	3
ri Normal	Normalized ratio for each pillars	4
Effective Educational Si = $\sum$ (Pi * Ii * ri Normal)		

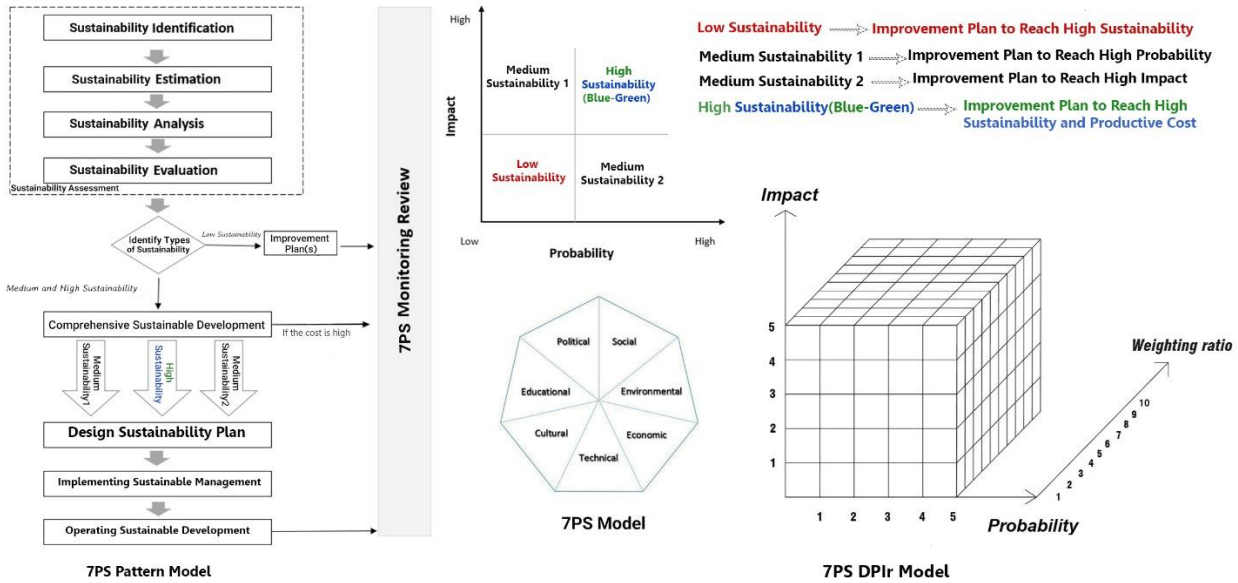Table 1. How to measure educational sustainability [Doost. H, 2017]

Figure 3. 7PS package Model [Doost. H, 2017-19]

d) The 5th Wave/Tomorrow Age Theory and Education:

The 5th wave/tomorrow age theory is about proceeding of future of I4.0 (I5.0) as a symbol for west, Society 5.0 (Society 6.0) as a symbol for non-west and edge of tomorrow that has been invented and introduced by Prof. Dr. Hamid Doost Mohammadian for the first time in 2010 and had been evaluated and improved between 2017-2019. Based on this theory, education, has a very important vital role to reach social responsibility, CSR strategies, and environmental friendly could improve quality of livability and life based on 7PS model to reach sustainable development.
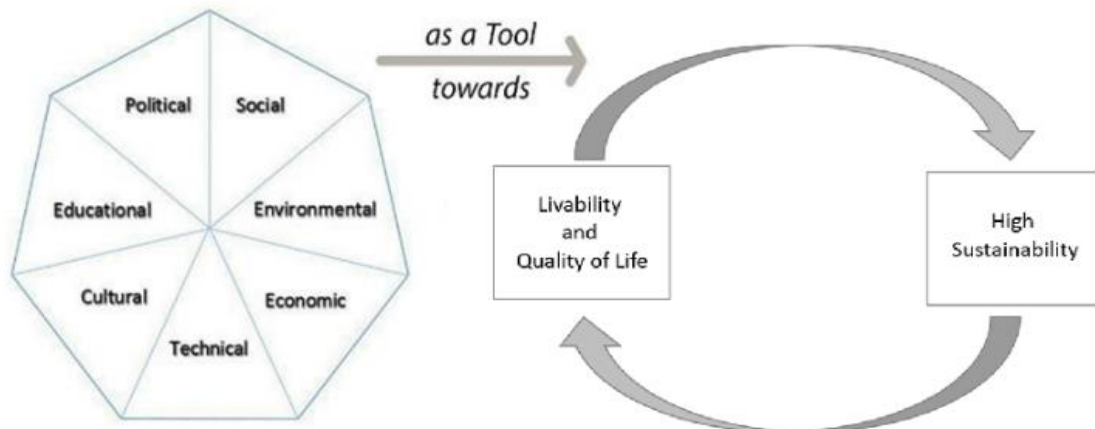
Figure 4. Relation Among Quality of Liveability and Life & 7 Pillars of Sustainability [Doost. H, 2017-19]

Generally, the 5th wave or tomorrow age theory is a tool to achieve one of the seven pillars, such as educational sustainability; that is a path to deal with today's challenges and tomorrow's crises as well as maintain the world for future. These theory can be as a readiness for sustainability with seven pillars with a focus on education and academic aspect based on being educational focus and get ready for the academic society and innovative ecosystems in the world beyond global tomorrow's crises such as contagion of Covid19 to make the word as a better place for living. Therefore, this theory is a way to create modern business which could deal with future concerns through HR competencies, implementing, developing, and applying high 4.0 technologies like IoT and IoT-Education.
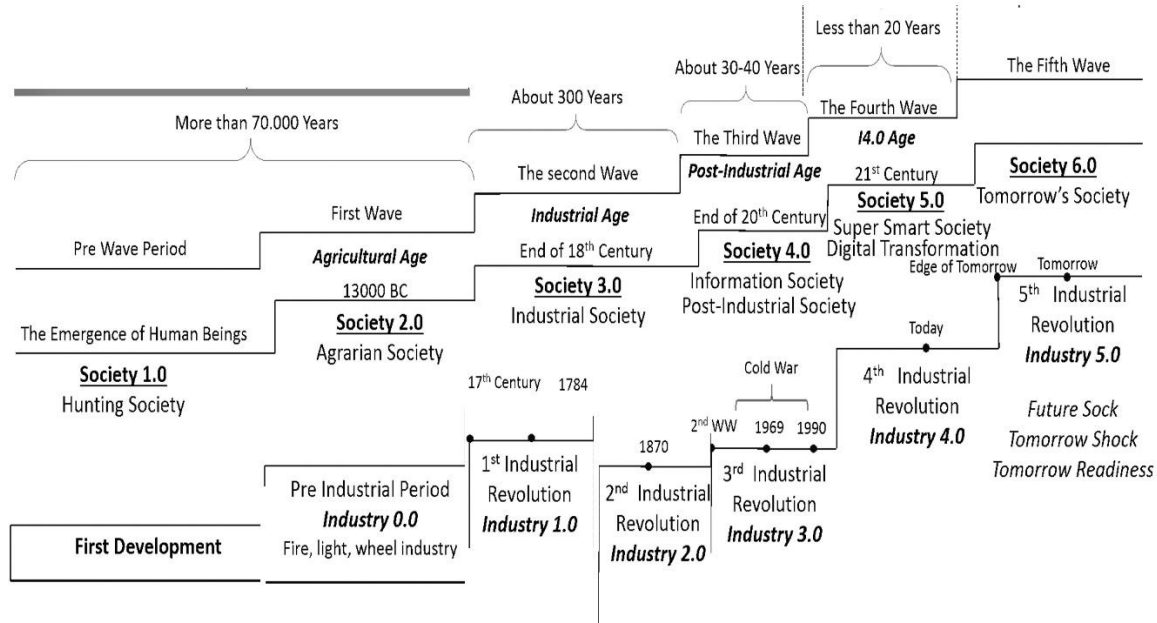

Figure 5. The 5th Wave/Tomorrow Age Theory [Doost. H, 2010-17]

Technology development has led to new opportunities for business improvement in educational sector. The world academic economy has changed from an academic society and economy to a data and innovative academic society, ecosystem and economy, leading to the concept of the "Internet of Thing-Education". Human being strategies and high technologies are fundamental tools to implement in the 5th wave theory readiness.
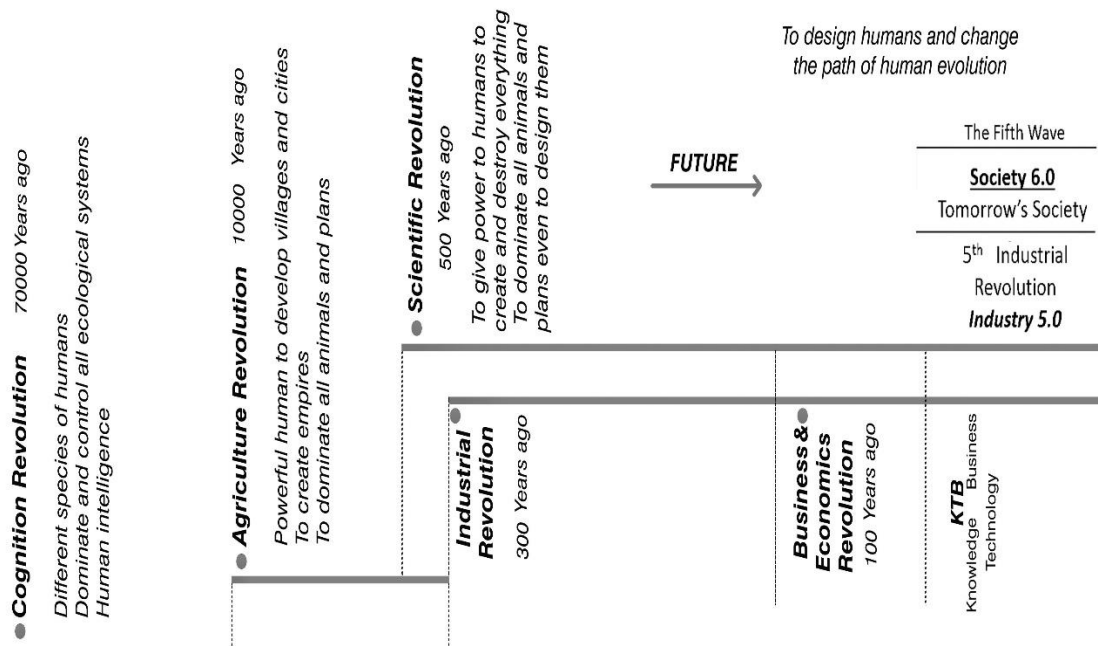
Figure 6. The 5th Wave Theory: Revolutions [Doost. H, 2010-17]

e) i-Sustainability Plus Theory for academic society and innovative ecosystem:

i-Sustaianbility Plus Theory has been invented and introduced by Doost. H. in 2010 and has been evaluated and improved between 2017-2019, which is made of the trinity open innovation, sustainability and 4.0 smart high technologies e.g. digitization and smartness. This construct which is including the idea of sustainable smart education is probed as a new idea of academic society and innovative ecosystem in tomorrow's schools, universities, and societies. The idea of i-Sustaianbility Plus theory derived from the combination of real life, high technology, and virtual reality for which again digitization is a prerequisite. In recent decades, digitization, smartness, innovation and sustainability are remarkable drivers of sustainable development.

Figure 5 is presented the i-Sustaianbility Plus theory, which is made of the trinity open innovation, seven pillars of sustainability (7PS model) and 4.0 smart high technologies such as IoT-education:
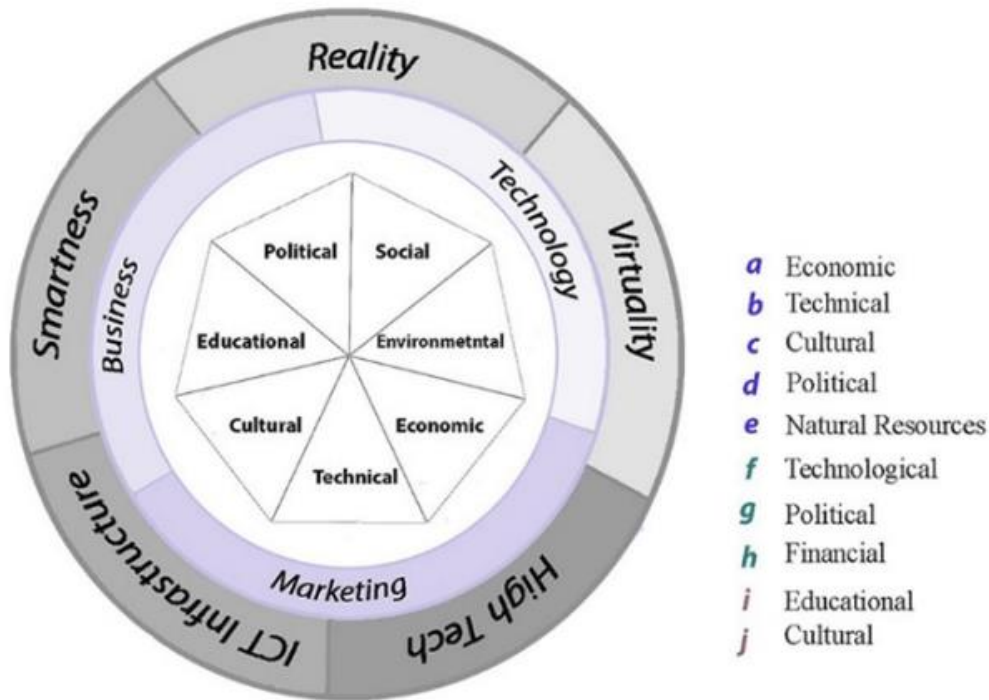
Figure 5. i-Sustainability Plus Theory [Doost. H, 2017-19]

f) digital transformation in academic society &innovative ecosystems in Covid/Post-Covid19 Era

IoT-education technologies could support to improve, develope and impelment trianing, learning, and educational procedures, for digital transformation in academic society and innovative ecosystems for different courses to forecate, prevent and face with the today's challanges and tomorrow's criese caused by the contagion of the Covid19 in the World beyond Covid/Post-Covid19 Era. The most important challenges of educational management and digital transformation in academic society and ecosystems in Covid/Post-Covid19 Era is related to:

- Lack of Innovative Academic Ecosystem
- STEM for Vocational and Technical Training
- Actors Competencies
- Financial and Economics Restriction
- Quality of E-Science / Distance Learning / E-Learning
- Cultural Synergies Challenge
- Applicable and Practical courses
- Online Exams
- Online Logistics
- The Other Schools and Universities (Competitors)
- Lack of Balancing among Theory, Labor Market and Industry
- New Job Market in Covid/Post-Covid19 Era
- Lack of Motivation to Use IoT-education

3) Result and DISCUSION

According to the Matthias Horx as a researcher for future studies in Germany, and his colleagues at the ''Institute for Future Research'' have recently published a book entitled ''The World after Corona'', which has been widely reported in the German medias. Referring to the crisis caused by the outbreak of the disease, he writes: "These days I'm often asked, 'When will Corona's era end and we'll be back to normal? ''I say: never. There are some historical periods that change the course of the future. We call these periods a "deep crisis" We are now in this position and the result of his team research''
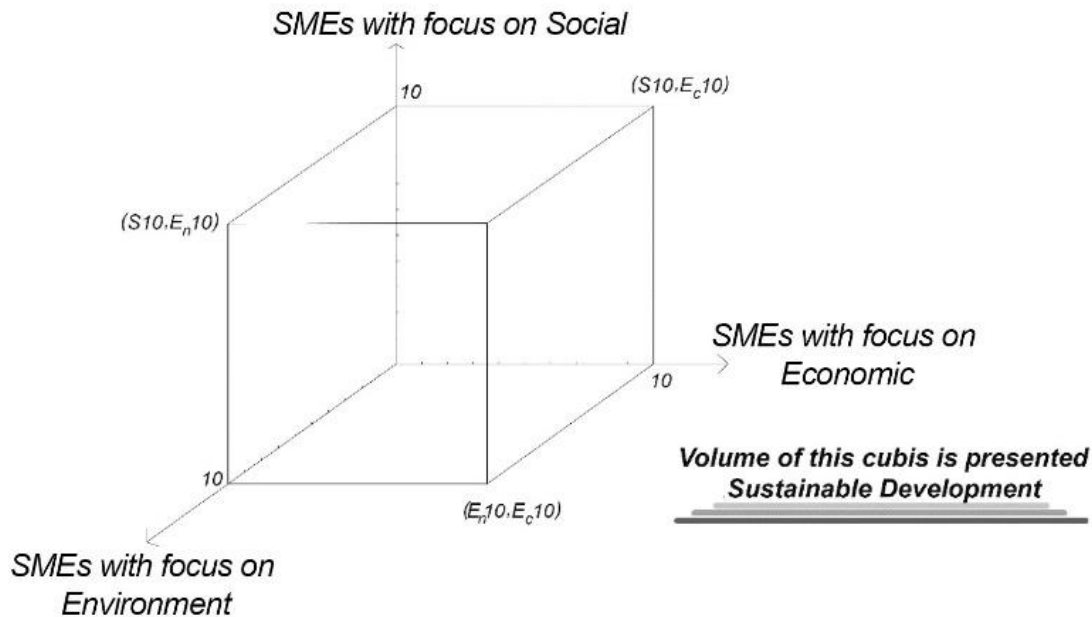

Figure 6. Sustainable SMEs in SocioEdu Environment (Doost. H, 2019)

(1) The world will change: The contagion of Covid-19 made us realize how much we do not understand. / Families, neighbors, and friends became closer

(2) Behaviors will change: Digital culture technology has taken its place in practice. / Most co-workers, who previously avoided remote video conferencing and preferred mission flights, now realize that it's a more practical and constructive approach. / Education stakeholders (professors, students, and executives) have learned a lot about Internet education, and working in online form (Home-office)

(3) Humanity will return: The medical staff helps, but along with advanced medical techniques, our social behavior is also crucial. / After the outbreak, we look back and remember how much humanity was really before contagion.

(4) The economy after the contagion crisis: Humans will also look at the economy to see how far the economy has been weakened, without dying. / Although we have experienced infrastructure damage and stock markets have fallen by 50 percent and many companies have gone bankrupt, we have never reached zero, the notion of economics is a living being that can sleep and even dream but continue to live.

(5) The main losers of the contagion of the Covid-19: Those who want to incite people against each other are not playing a role in future issues

He has shown the result of a research concerning the most likely challenges, risks and crises in next year as below:

The 31 risks have been grouped into five major categories:

(1) Economic: 10 risks

(2) Societal: 9 risks

(3) Geopolitical: 6 risks

(4) Technological: 4 risks

(5) Environmental: 2 risks

At the end he forecasted the next huge crises until 2030 as below:

TODAY, CONTAGION OF THE COVID-19 CHALLENGE
SOCIOEDU CONSEQUENCES OF COVID-19
TOMORROW, RECESSION CRISES
HYBRID WARFARE
  ❖ **SOFT (VELVET) REVOLUTION**
  ❖ **COGNITIVE WARFARE**
  ❖ **BIOLOGICAL WARFARE**
TOMORROW, CLIMATE CHANGE CRISES
TOMORROW, BIODIVERSITY COLLAPSE CRISES
TOMORROW, TECHNOLOGICAL CRISES

The theoretical basis for this approach is diverse, but the focus lies on "the 5th wave and i-Sustaianability theories" which have implications on this priority:
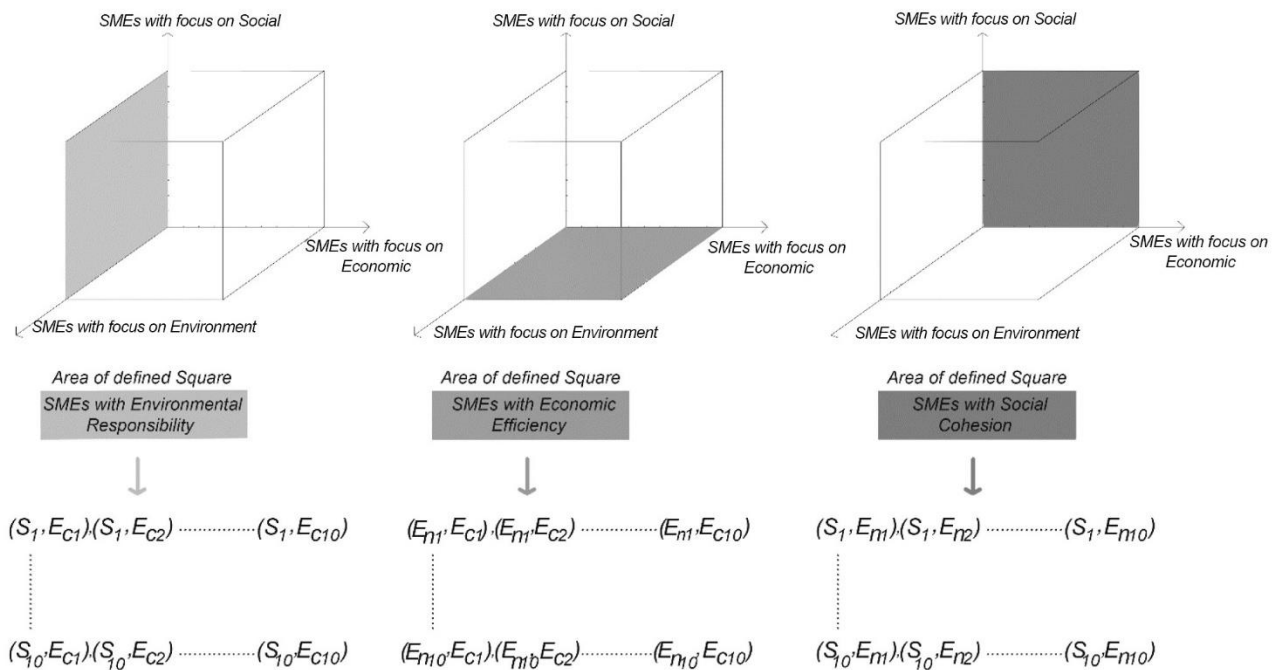
Figure 7. Sustainable SMEs with focus on 3D Socio Eco Environment (Doost. H, 2019)

   1) SMEs with environmental responsibility including a focus on blue-green sustainability,

   2) SMEs with social cohesion and

   3) SMEs with economic efficiency (figure 8,9).

The 5th wave and i-Sustainability theories make us able for

   (1) Forecasting

   (2) Preventing and

   (3) Facing

to the Post Sustainability Impact of Contagion of Covid-19, today's social challenges and tomorrow's social shocks with using

   1-) open innovation,

   2-) implementation,

   3-) development and

   4-) applying these technologies to provide a Blue-Green sustainability and Digital readiness and recovery strategies with CSR approach.

(e.g. for the SME 5.0 in Industry 5.0 and the super intelligent society entitled Society 6.0).
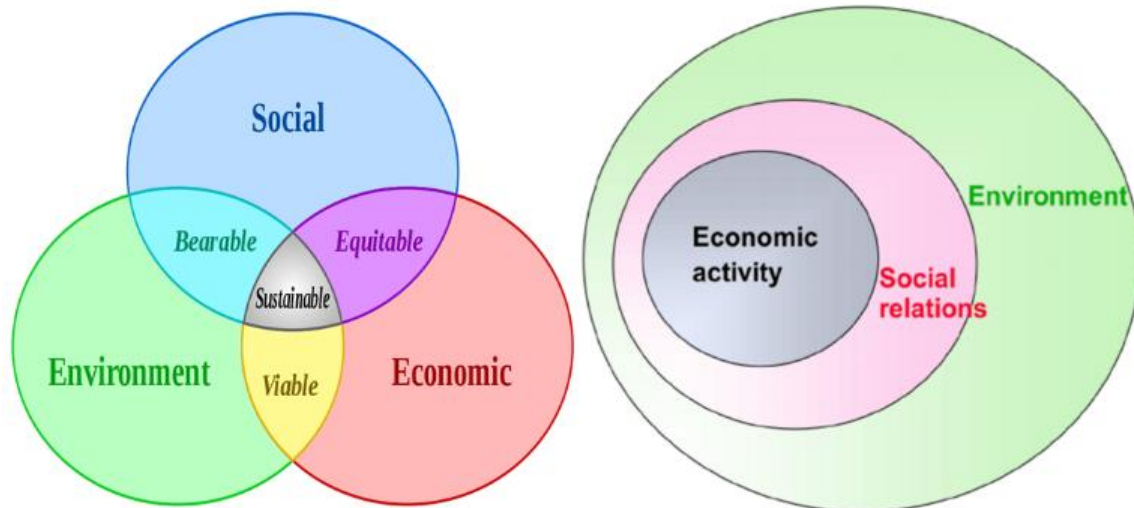

Figure 8. Traditional Sustainability Priority & Aspects

   Another aim of this proposal is running a series of workshops across the globe in partnership with global and local networks, to help SMEs of all sectors understand how they can build back better in a post-COVID world. This pandemic throws a spotlight on the interdependences between business, nature, and society. If you didn't think that encroaching on natural ecosystems or protecting public health were relevant to your business, you almost certainly see the links now.

   The most important advantages of new technology are:

- Accelerating innovative processes
- Realizing new chances in markets
- Creating new ideas and using them into innovations
- Modeling products and services into market to test them in order to find out new results
- Developing businesses with maximum profit and effectiveness

In addition, high SocioEdu sustainability that includes environmental responsibly, economic efficiency,and social cohesion, with business and economic efficiency.

High educational technologies and social, can play an important role in achieving this theory. Figure 11 is presented how these four factors such as:

1. *Digitalization*
2. *Sustainability*
3. *Comprehensive Strategic Urban Plan*
4. *And their Impacts*

Can influence on the SocioEdu consequences caused by Covid-19 Pandemic.

Figure 9. D-SDIC Model (Doost. H, 2019)
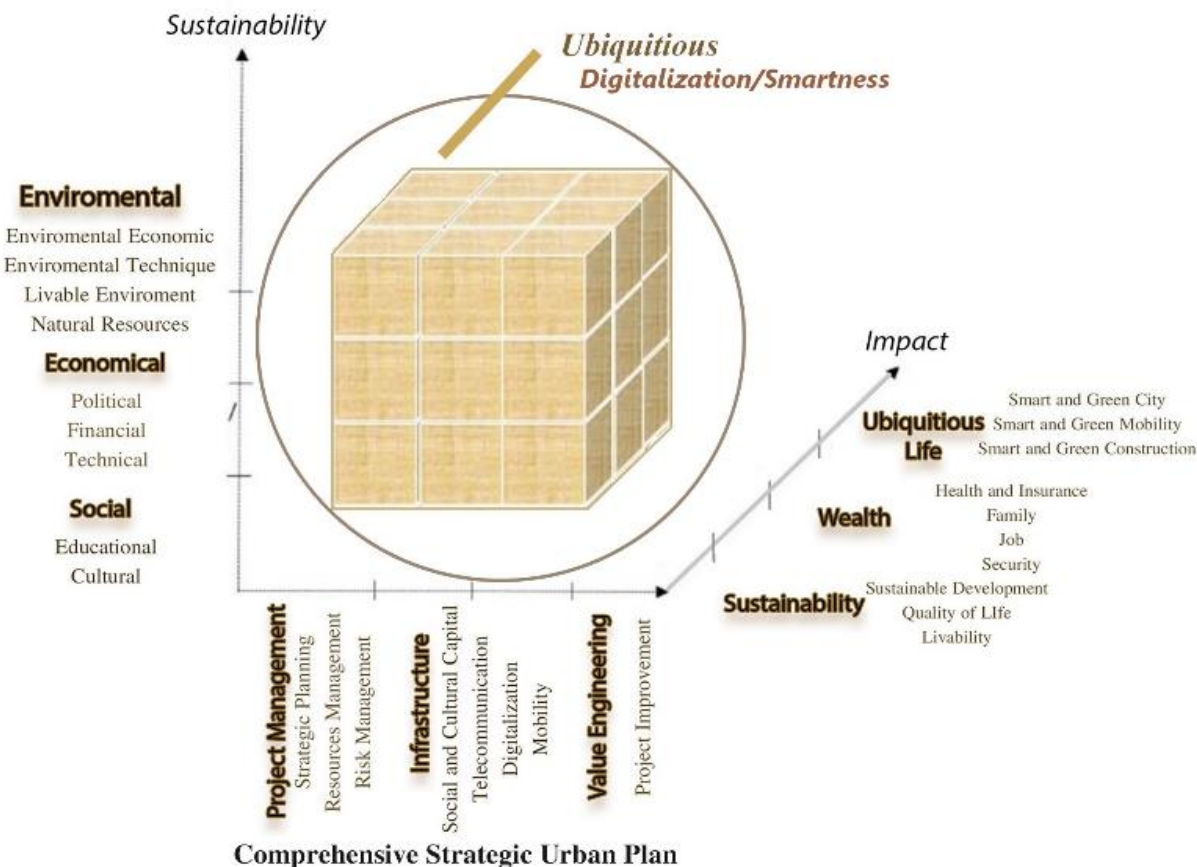
4) Conclusion

Based on the result of a research in UK concerning the most likely challenges, risks and crises in next two years as below:

The 31 risks have been grouped into five major categories:

1. Economic: 10 risks

2. Societal: 9 risks
3. Geopolitical: 6 risks
4. Technological: 4 risks
5. Environmental: 2 risks

At the end I am going to forecast the next huge crises until 2030 as below:

TODAY, CONTAGION OF THE COVID-19 CHALLENGE
SOCIOEDU CONSEQUENCES OF COVID-19
TOMORROW, RECESSION CRISES
HYBRID WARFARE
   SOFT (VELVET) REVOLUTION
   COGNITIVE WARFARE
   BIOLOGICAL WARFARE
TOMORROW, CLIMATE CHANGE CRISES
TOMORROW, BIODIVERSITY COLLAPSE CRISES
TOMORROW, TECHNOLOGICAL CRISES

The theoretical basis for this approach is diverse, but the focus lies on "the 5th wave and i-Sustaianability Plus theories" which have implications on this priority:

a. Businesses with environmental responsibility including a focus on blue-green sustainability,
b. Businesses with social cohesion and
c. SMEs with economic efficiency

The 5th wave and i-Sustainability Plus theories make the businesses able for

(1) Forecasting

(2) Preventing and

(3) Facing

To the Post Sustainability Impact of Contagion of Covid-19, today's challenges and tomorrow's shocks with using the new mentioned theories, HR skills and qualifications.

In this speech also the author will talk how to optimize the usage of Smartness in business (to find the HR chain actors) and for reliability with using tools and technologies e.g. IoT, AI, Machine Learning and etc in I4.0 to capture more data to control them and people with suitable skills and competencies to analysis data to control devices not out of the standard conditions and for this we need some kind of competencies in businesses' HR, technologies & infrastructures to provide the required data for this HR In this HR we need to have some expertise to do:

i.   open innovation,
ii.   implementation,
iii. development and

iv. applying these technologies to provide a Blue-Green sustainability and Digital readiness and recovery strategies with CSR approach.

According to the 5th wave theory, global businesses are expected to enter a new phase soon called the recovery opportunity and the boom of the economy (in the edge of tomorrow).

According to my research results, I have divided the challenge and crisis management process and strategies into the following five steps:

1) Step of providing health cares and medical services
2) Tolerance step to achieve stability
3) Steps to regaining the opportunity to live again and prosper the economy
4) Step of forecasting, prevention, and post-epidemic exposure
5) Recovery and reconstruction step

Business sustainability strategies in today's challenges and tomorrow's crises of contagion of Covid/Post-Covid 19 Era and recovery strategies for the opportunity to revitalize and prosper the economy are divided into the following two categories:

- *Content-oriented strategies: which mostly indirectly change the nature of business by changing the structure, culture, and leadership.*
- *Process-oriented strategies: which emphasize the change of operations and core business processes and are divided into the following five categories:*
  - *(1) Strategies for sustainability and continuity of operations of the business*
  - *(2) Business modernization strategies*
  - *(3) Business model innovation strategies*
  - *(4) New business development strategies*
  - *(5) Integrated strategies with the help of innovative sustainability theories e.g. the 5th wave and i-Sustainability Plus theories*

COVID-19 presents a major threat to the global economy and the health of millions of people around the world, Chinese cities have been placed on lockdown in an attempt to contain the novel coronavirus (COVID-19), as increasing pressdatadataes are placed on Chinese and international health professionals. Surprisingly, planning and design professionals are absent in the conversation even though previous pandemics reveal severe impacts on the urban fabric from social and economic perspectives. This paper is regarding digital transformation in academic society and innovative ecosystems in the world beyond Covid19-pandemic and developing a preparedness and continuity learning plan to include pandemics in their disaster management strategies so that their involvement in designing protocols with other learning and health related organisations can be entertained and enabled, and their deployment in pandemic stricken businesses/SMEs can be effected as integral components of normal educational environment planning activities and also in incident situations like containing the current novel coronavirus (COVID-19). In this regard the following key question, result and impact will be addressed to shape the basis of this research and turn COVID-19 massive challenges into meaningful changes.

✓ Key question: How to Identify possible COVID-19 scenarios, realizing the potential risks and assess impacts on People, Processes, Profits and Partnerships (the "4Ps" framework)?

✓ Key Result: Responding to aforementioned question may result in mitigating actions and preparedness plan based on specific scenarios for which merit more focused planning. This will be completed by developing the steps needed to establish a educational business continuity plan (BCP).

✓ Key Impact: This framework will bring knowledge and experience to provide insight, help identify previously unconsidered risks and impacts to support businesses and provide an effective response to current and future crisis of a pandemic situation emerging.

IoT applications in education sector are related to:

❖ Cyber Security

❖ Educational Apps

❖ Increasing Efficiency

❖ Electronic certificates

❖ Interactive Learning

❖ Rating of teachers and schools

This paper deals with the digital transformation in academic society and innovative ecosystems in the world beyond the Covid/post-Covid19 pandemic Era and application of IoT-education, This paper proposes a new model to do the three stpe: 1)forecast, 2)prevent, and 3)face to the educational sustainability impacts, called seven pillars if sustainability (7PS). The role of education in the age of technology development is very important and according to the 7PS model, it is possible to forecast and measure the educational sustainability and effect of educational managers to fulfill educational project and some of the major challenges facing the IoT-education. In 21st century, after this brilliant technological start for the millennium, while the IoT infrastructures and applications have been vastly deployed, Covid-19 Pandemic has suddenly appeared and results in unpredictable changes in our life and seems it is shaping a new world. While this crisis has had catastrophic consequences, it reveals the value of digital transformation; and in many cases we see the acceleration of the transition. In conclusion, IoT's application in education (IoT-education) are limitless and we are already seeing it in some of the intelligent universities today. It not only provides a better learning process for students but also reduces operational costs and a balance between operational and financial costs. Since 2000, digital technology transformation has been already started but the contagion of Covid19 could push it to do faster as a super accelator. The results of this paper demonstrate that IoT-education technology is capable to recognize it's quite evident that organizations all over the world are boarding onto IoT-driven digital transformation ventures to drive competences and education suppleness. In fact, the timing of the events and reactions might not be ideal, but the force caused by crisis make many impossible matters to be real. e.g e-learning have a rapid jump and more than 90% of the classes in high schools, institutions and universities run in the web-based system. In first stages of Covid-19 pandemic and while the quarantine suddenly applied in almost all parts of the world, many web-based/IoT-based communication tools and digital channels have been used instead each other to overcome the limited capacity of them. Video conferencing apps such as Zoom and Adobe Connect, messengers apps such as WhatsApp and Telegram, video sharing apps such as YouTube, and video chat apps such as Skype are used in a mixed manner for connecting students, professsors, administrators as well as the meetings between students and supervisors in universities (defenses). Some of these apps reach to unpredictable records; e.g, Zoom has surpassed more than 300 million daily meeting participants. This is good news, but the bad news is security and privacy concerns. On the other hand, many other issues have been highlighted. Therefore the partnership between universities and research and innovation centers, in running joint programs and common courses, professor and student exchanges and doing collaborative research projects, has become one of the most important issues that should be considered in future science ecosystems which are moving toward the knowledge societies.

1. What are the new opportunities and challenge for academia in the Post-Corona era?

2. What are dimensions of new emerged academic and innovation ecosystem after Covid-19 Pandemic?

3. What are the best reactions in science and learning ecosystem in Germany and Iran during Covid-19 Pandemic?

As it mentioned, IoT application in education and educational sustainability could give some research suggestions for the educational actors in academic society and innovative ecosystem as below:

• A comperehensive plan for digital transformation in academic society and innovative ecosystems in the world beyond contagion of Covid19

- Developing IoT-education technology to solve the educational management challenges for today's challanges and tomorrow's crises
- Preparing the European Universities and VET providers to forecast, prevent, and face to the educational challenge in the world beyond contagion of Covid19 and offer courses on IoT
- Role of IoT-education in preservation and transmission of social values to sustainable development
- Defining the domains affected by the implementation of intelligent educational management system
- Presentation of a model for the infrastructure and the implementation of IoT-education technology
- Developing a plan for IoT security, interoperability, management and privacy
- Solutions for IoT-educational challanges to implement the cultural sustainability based on 7PS model
- Design a comperehensive plan for the social educational consequences of Covid/Post-Covid19 Era

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HOW TO ENCOURAGE BETTER FINANCIAL DECISION-MAKING
A QUANTITATIVE STUDY OF PORTUGUESE ADOLESCENTS

Cordeiro, Carlos Décio

cdecio@gmail.com

CeiED, Universidade Lusófona, Lisboa

In recent years, financial literacy has been growing in the area of education, thanks to numerous educational programs which have reinforced these skills in the population. An example of its implementation is OECD introducing financial literacy in PISA studies in 2012. It is a given that psychological factors play a considerable role in our actions, and with this in mind, studies on scarcity and its influences have indicated a relationship between the scarcity of certain goods, either tangible or non-tangible. Moreover, the performance of individuals has been studied, where the decision of agents as their focus is biased towards the goods they cannot have, which ends up occupying 'bandwidth' for more correct reasoning.

Another contributing factor is individual confidence concerning their abilities, which has a catalytic effect on learning. This study intends to validate this paradigm using data from the PISA 2018 survey. A quantitative methodology was used, using a machine learning study. More than 70 algorithms were used to measure the best performance of machine learning methodologies. This study was applied in 2018 to more than 3,000 Portuguese students aged 15 who lived and studied in Portugal. Strong relationships were found in the following factors: family background; trust and knowledge of their abilities; attitude towards financial decisions; and finally, financial literacy. It was concluded that the latent variable financial literacy measured by the plausible values of a financial literacy test is largely explained by such background factors of the abovementioned students. These results suggest an investment in material and indicate certain psychological components that may allow young adults to be better prepared for financial issues.

INTRODUCTION

Financial education seems more important now than ever, and not merely for family and consumer economics professionals. Financial institutions, the student loan community, financial professionals, and educators among others have all identified education in personal financial management as a priority (Cude *et al*, 2006).

This study focuses on 15-year-old Portuguese students participating in the 2018 Survey Program for International Student Assessment (PISA) carried out by the Organization for Economic Co-operation and Development (OECD). It lists three factors: family background; familiarity and attitude towards financial issues; and self-confidence in individual financial literacy.

THEORETICAL FRAMEWORK

Financial literacy

We can define financial literacy as a 'meaning-making process' in which individuals use a combination of skills (reading, writing, speaking, reflection), resources (for example, books, newspapers, internet-derived information, ideas, opinions) and contextual knowledge to process information and make decisions with knowledge of the financial consequences of that decision (Mason & Wilson, 2000).

PISA 2018

The data used were obtained through the PISA 2018 survey. The PISA project has been running every three years since 2000, and it initially assessed reading, mathematics and science literacy, having later added two optional questionnaires regarding financial literacy and collaborative problem solving. The study is applied to 15-year-old students who live and study in the country where the study is being developed, in our case Portugal. The survey is applied in the context of Portuguese schools, using a computer-based questionnaire component of economic and social background and application of some booklets of questions that intend to evaluate the five latent variables related to their knowledge. Our study focuses on a social background questionnaire, as well as a financial literacy test. The knowledge test has a scale from 0 to 1000 with an average of 500 and standard deviation of 100. The test results use the Item Response Theory (IRT) methodology to be converted to this scale.

Family background

Parents play a key role in their children's financial socialization (Cude *et al*, 2006). The knowledge parents possess, alongside their belongings, play a significant role in students' personal financial literacy (Nidar & Bestari, 2012). Sociological theories focus on this theme, concluding that family income is invariably and strongly related to children's ability and achievement (Brooks-Gunn & Duncan, 1997).

There is a field in the economy that looks more closely at the problems of poverty and the reasons of its existence. These papers use the findings of studies in psychology, as well as 'behavioural economics'. These studies define bandwidth as a major reason for weak performance by the poorest. This concept is based on the fact that when the individual has a need, or experiences a shortage (for example, of food, money, time, or certain freedoms), then the individual enters a metaphorical 'tunnel of thought', or a certain narrowing of cognitive space, which reduces attention to all other areas of life.

A real-life example of this is of an individual working as a farmer, who displayed a cognitively impaired performance before the harvest, when poor, compared to after the harvest, when rich. We suggest that the former condition is the result of concerns related to poverty, which consumes mental resources, leaving less for other tasks (Mani *et al*, 2013).

Clearly, bandwidth is not the only important aspect of the psychological life of the poor; no metric can assume this function. However, it provides a way to understand, at least partially, many of the thought

processes that drive decision-making by individuals experiencing poverty (Schilbach, Schofield & Mullainathan, 2016).

Following this, we have formulated the following hypothesis:

H1: There is a positive relation between family background and financial literacy

Familiarity and attitude towards financial issues

The propensity of consumers to save, budget and control spending depends in part on their level of perceived control over results, as well as on knowledge and financial resources (Perry & Morris, 2005).

Behavior towards money may reflect a need for achievement, acquisition and recognition (Shih & Ke, 2013), which describes why financial attitudes and financial knowledge play important roles in explaining the behavior in the domain of financial management (Mien, & Thao, 2015). It is of some concern for society that, at a time when the level of savings has reached a historical low, many individuals within the population demonstrate poor financial literacy. There is a proven positive relationship between impulse purchases and poor results in financial literacy (Lai, 2010).

This ability to make good financial decisions must also be applied and worked with practical cases; young people must be familiar with the practical concepts of financial management from early on in their development, as individuals learn best from experience (Hoch & Ha 1986). As a consequence, we offer the following hypothesis:

H2: There is a positive relation between familiarity and attitude towards financial issues and financial literacy.

Self-confidence

In general, self-confidence is defined as an individual's recognition of their abilities, higher self-esteem, and awareness of their emotions. Self-confidence can also be described as a sense of wellbeing resulting from the deepening of positive emotions. Self-confident people trust their own abilities, have a general sense of control over their lives and believe that they will be able to accomplish what they hope, desire and plan to achieve. (Kukulu *et al*, 2012).

Self-confidence is widely valued as a desirable educational asset, and is often placed as a variable that facilitates the achievement of other desired results, such as academic performance. (Craven, Marsh & Debus, 1991) Confidence is one of the most influential variables that affect learning (Al-Hebaish, 2012), and low self-confidence is displayed the quality of academic performance is reduced, increasing the social distance from their peers (Rubio, 2007). As students begin to trust their skills and the value of their achievements, a sense of greater capacity and willingness to solve problems increases (Reisser, 1995).

Students' perceptions about their academic preparation appear as significant predictors of academic effectiveness and expectations of career-related results (Santiago & Einarson, 1998). There is a

correspondence between economic self-confidence and the notion of adhering to meticulous savings plans, as well as more accurately formed self-control of emotions. (Engelberg, 2007).

In a study on academic competences carried out by the OECD, the Trends in International Mathematics and Science Study (TIMMS), 2007, found that academic confidence is the strongest variable in the conceptual model for students. This finding also indicates that self-confidence in personal skills is the strongest variable in students' academic performance (Park, Lawson, & Williams, 2012). With this in mind, we have formulated the following hypothesis:

H3: There is a positive relation between self-confidence and financial literacy.

METHODOLOGY AND RESULTS

From a theoretical framework, we have formulated the following model:

Family Background

Familiarity and attitude towards financial issues

Self Confidence

Financial literacy
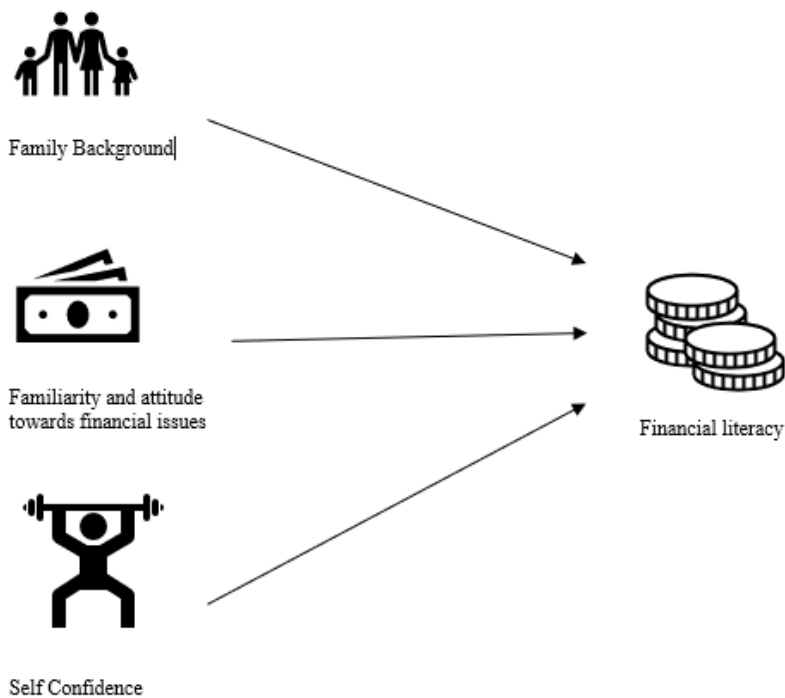
Secondary data collected from the OECD database (OECD, 2017), PISA 2018 study, were used. 3,158 valid responses were obtained from 15-year-old students residing in Portugal. To define the factors, the following context questions were used (Note: questions started with PA were made to parents, while the others were made to students):

Factor 1 - Family background

ST011Q02TA

In your home: a room of your own

1. Yes
2. No
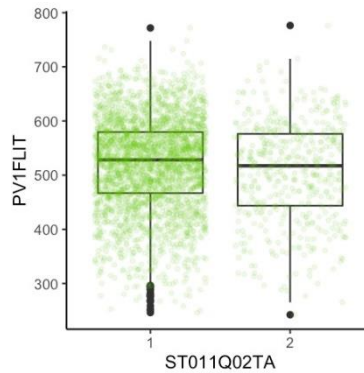
FIGURE 1: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST011Q02TA

ST011Q06TA
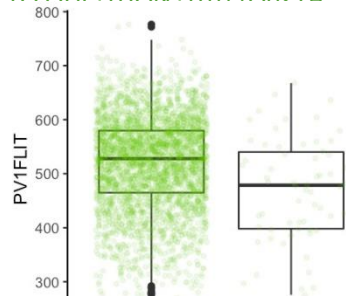
In your home: link to the Internet

1. Yes
2. No

FIGURE 2: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST011Q06TA

ST012Q01TA

How many in your home: Televisions
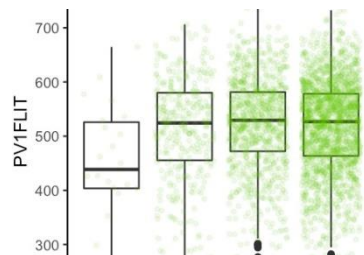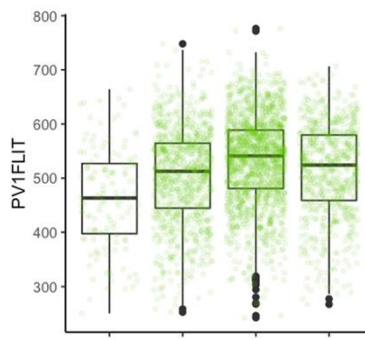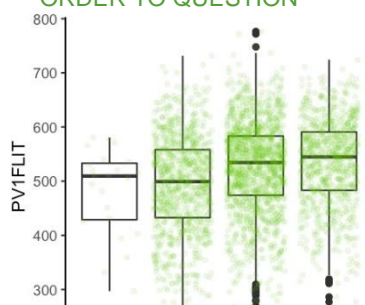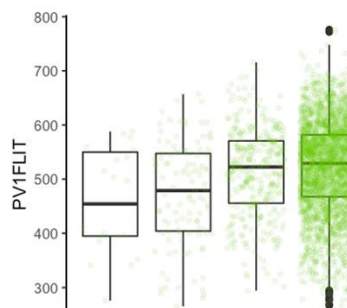
1. None
2. One
3. Two
4. Three or more

FIGURE 2: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST012Q01TA

ST012Q02TA

How many in your home: Cars

1.   None

2.   One

3.   Two

4.   Three or more

FIGURE 4: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION

ST012Q03TA

How many in your home: Rooms with a bath or shower

1.   None

2.   One

3.   Two

4.   Three or more

FIGURE 5: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST012Q03TA

ST012Q05NA

How many in your home: Cell phones with Internet access (*e.g.* smartphones)

1.   None

2.   One

3.   Two

4.   Three or more

FIGURE 6: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST012Q05TA

ST012Q06NA

How many in your home: Computers
(desktop computer, portable laptop, or notebook)
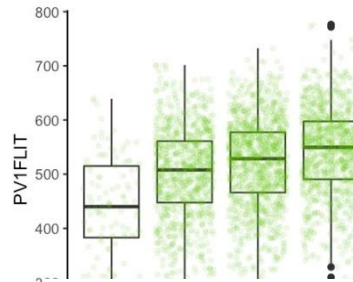
1. None
2. One
3. Two
4. Three or more

FIGURE 7: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION

ST012Q07NA

How many in your home: Tablet computers (*e.g.* iPad, BlackBerry PlayBook)
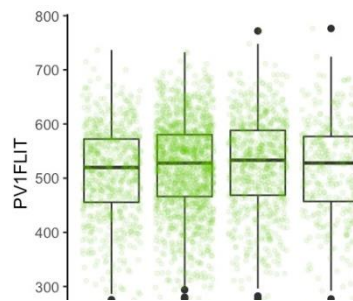
1. None
2. One
3. Two
4. Three or more

FIGURE 8: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST012Q07TA

ST012Q09NA

How many in your home: Musical instruments (*e.g.* guitar, piano)

1. None
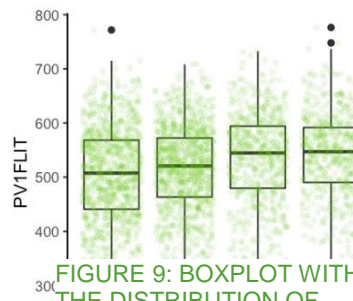2. One
3. Two
4. Three or more

FIGURE 9: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST012Q09TA

ST013Q01TA

How many books are there in your home?

1. 0-10 books

2. 11-25 books

3. 26-100 books

4. 101-200 books
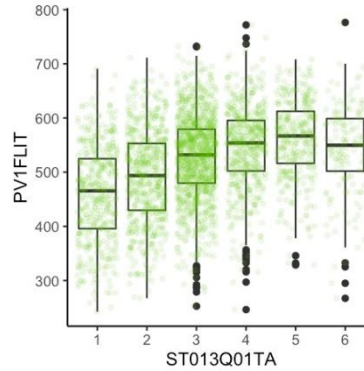
5. 201-500 books

6. More than 500 books

PA170Q01HA

How informed are you about the following topics? Climate change and global warming

1. I have never heard of this

2. I have heard about this, but I would not be able to explain what it is really about

3. I know something about this and could explain the general issue

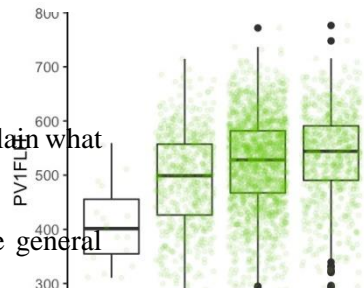4. I am familiar with this and I would be able to explain this

PA170Q02HA

How informed are you about the following topics? Global heal (*e.g.* epidemics)

1. I have never heard of this

2. I have heard about this, but I would not be able to expl it is really about

3. I know something about this and could explain the issue

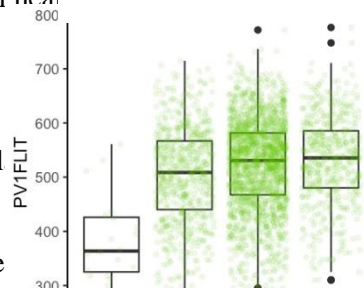4. I am familiar with this and I would be able to explain

PA170Q04HA

How informed are you about the following topics? Migrat (movement of people)

1. I have never heard of this

2. I have heard about this but I would not be able to expl it is really about

FIGURE 10: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST013Q01TA

FIGURE 11: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION PA170Q01HA

FIGURE 12: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION PA170Q02HA

3. I know something about this and could explain the general issue

4. I am familiar with this and I would be able to explain this

PA170Q07HA

How informed are you about the following topics? International conflicts

1. I have never heard of this

2. I have heard about this but I would not be able to explain it is really about

3. I know something about this and could explain the issue

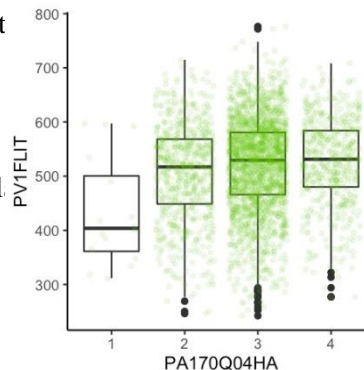4. I am familiar with this and I would be able to explain

FIGURE 13: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION PA170Q04HA

PA170Q08HA

How informed are you about the following topics? Hunger or malnutrition in different parts of the world

1. I have never heard of this

2. I have heard about this but I would not be able to explain it is really about

3. I know something about this and could explain the issue

4. I am familiar with this and I would be able to explain

FIGURE 14: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION PA170Q07HA

PA170Q09HA

How informed are you about the following topics? Causes of poverty

1. I have never heard of this

2. I have heard about this but I would not be able to explain it is really about

3. I know something about this and could explain the issue

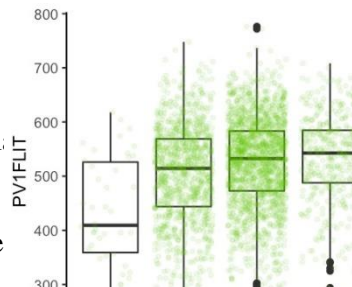4. I am familiar with this and I would be able to explain
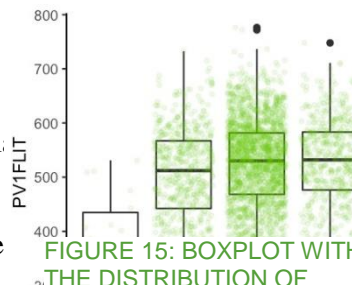

FIGURE 15: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION PA170Q08HA
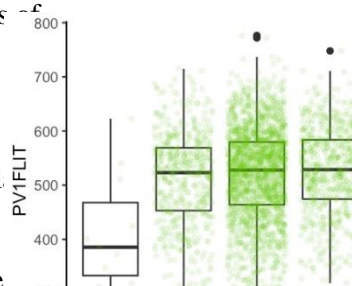

FIGURE 16: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION PA170Q09HA

PA170Q12HA

How informed are you about the following topics? Equality between men and women in different parts of the world

1. I have never heard of this

2. I have heard about this but I would not be able to expl it is really about

3. I know something about this and could explain the issue

4. I am familiar with this and I would be able to explain
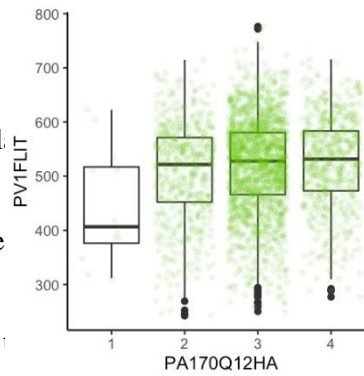
The following Cronbach alpha was obtained:

Confiability	
Cronbach alpha	Nr. of itens
0.769	17

FIGURE 18: CRONBACH ALPHA FOR FACTOR FAMILY BACKGROUND

Factor 2 – Familiarity and attitude towards financial issues

FL160Q01HA

Think about buying a new product from your allowance:

Compare prices in different shops

1. Never

2. Rarely

3. Sometimes

4. Always
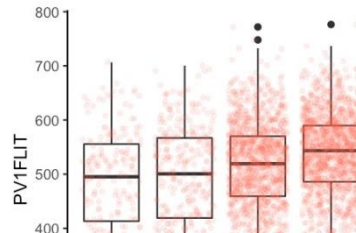
FIGURE 19: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL160Q01HA

FL162Q01HA

Confidence about doing the following: Making a money transfer (*e.g.* paying a bill)

1. Not at all confident

2. Not very confident

3. Confident
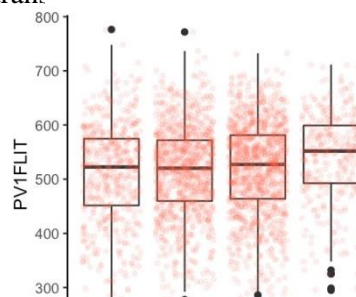
4. Very confident

FIGURE 20: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL162Q01HA

FL162Q02HA

Confidence about doing the following: Filling in forms at bank

1. Not at all confident

2. Not very confident

3. Confident

4. Very confident

FIGURE 21: BOXPLOT WITH

FL162Q03HA

Confidence about doing the following: Understanding bank statements

1. Not at all confident

2. Not very confident

3. Confident

4. Very confident
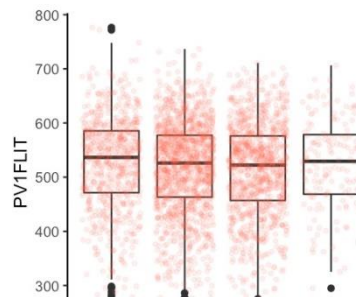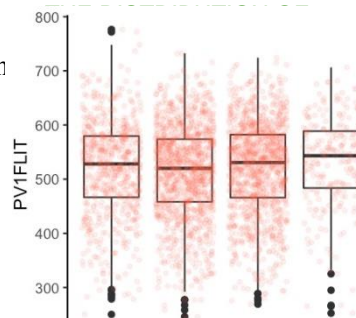

FIGURE 22: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL162Q03HA

FL167Q01HA

Discuss the following with your parents (or guardians or relatives): Your spending decisions

1. Never or hardly ever
2. Once or twice a month
3. Once or twice a week
4. Almost every day

FIGURE 23: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL167Q01HA

FL167Q02HA

Discuss the following with your parents (or guardians or relatives): Your savings decisions

1. Never or hardly ever
2. Once or twice a month
3. Once or twice a week
4. Almost every day

FIGURE 24: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL167Q02HA

FL167Q03HA

Discuss the following with your parents (or guardians or relatives): The family budget

1. Never or hardly ever
2. Once or twice a month
3. Once or twice a week
4. Almost every day

FIGURE 25: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL167Q03HA

FL167Q04HA

Discuss the following with your parents (or guardians or relatives): Money for things you want to buy

1. Never or hardly ever
2. Once or twice a month
3. Once or twice a week
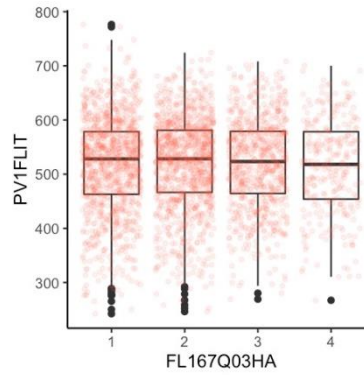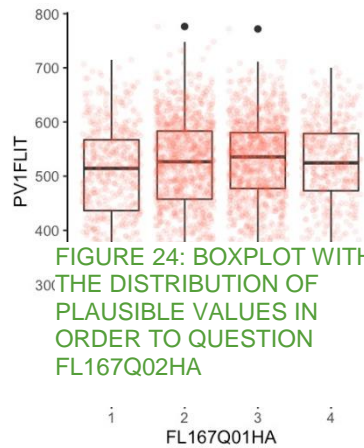4. Almost every day
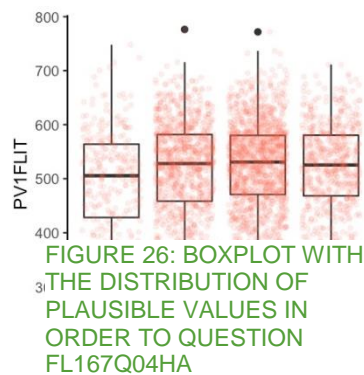
FIGURE 26: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL167Q04HA

FL167Q05HA

Discuss the following with your parents (or guardians or relatives): News related to economics or finance

1. Never or hardly ever

2. Once or twice a month

3. Once or twice a week

4. Almost every day

The following Cronbach alpha was obtained:

Confiability	
Cronbach alpha	Nr. of itens
0.804	9

FIGURE 28: CRONBACH ALPHA FOR FACTOR FAMILIARITY AND ATTITUDE TOWARDS FINANCIAL ISSUES

1. Strongly disagree

2. Disagree

3. Agree

4. Strongly agree

FIGURE 27: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION FL167Q04HA

Factor 3 – Self-confidence

FIGURE 29: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST161Q01HA

ST161Q02HA

Agree: I am able to understand difficult texts.

1. Strongly disagree

2. Disagree

3. Agree
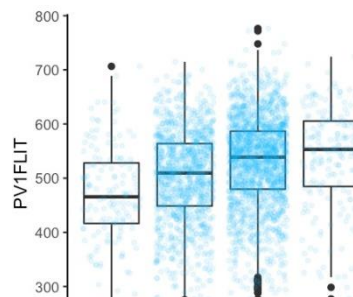
4. Strongly agree

FIGURE 30: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST161Q02HA

ST161Q03HA

Agree: I read fluently.

1. Strongly disagree

2. Disagree

3. Agree
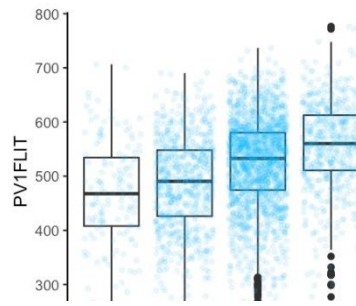
4. Strongly agree

FIGURE 31: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST161Q03HA

ST182Q03HA

Agree: I find satisfaction in working as hard as I can.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree
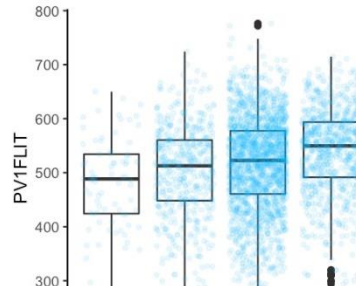
FIGURE 32: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST182Q03HA

ST182Q04HA

Agree: Once I start a task, I persist until it is finished.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree
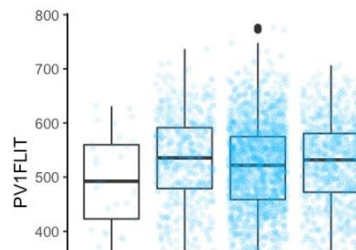
FIGURE 33: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST182Q04HA

ST182Q05HA

Agree: Part of the enjoyment I get from doing things is when I improve on my past performance.

1. Strongly disagree
2. Disagree
3. Agree
4. Strongly agree
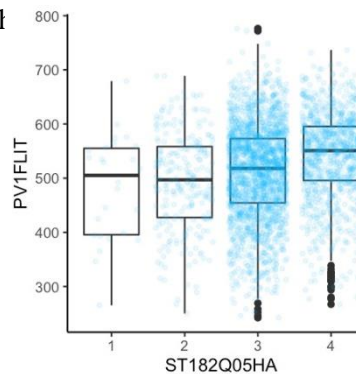
ST182Q06HA

Agree: If I am not good at something, I would rather keep struggling to master it than move on to something I may b at.

1. Strongly disagree

2. Disagree

3. Agree

4. Strongly agree

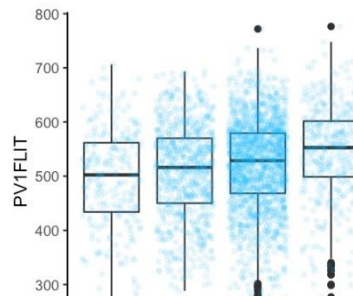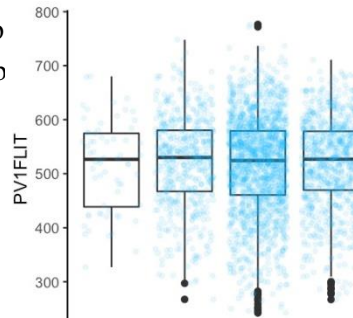FIGURE 35: BOXPLOT WITH THE DISTRIBUTION OF PLAUSIBLE VALUES IN ORDER TO QUESTION ST182Q06HA

The following Cronbach alpha was obtained:

Confibility	
Cronbach Alpha	Nr. of itens
0.726	7

FIGURE 36: CRONBACH ALPHA FOR FACTOR SELF-CONFIDENCE

All Cronbach alphas were accepted for having coefficients above 0.7. Data processing was used using the R software (R Core Team, 2020) and several parameterizations were developed for each of the 77 algorithms used, and the best output data for each algorithm is presented.

Algorith	Ranking RMSE	RMSE	Ranking Rsquared	Rsquared	Ranking MAE	MAE
svmPoly	1	49.44	2	0.67	2	28.69
gaussprPoly	2	49.68	1	0.67	1	23.90
cubist	3	59.58	8	0.65	4	36.22
qrf	4	59.81	3	0.66	3	29.51
Rborist	5	60.76	4	0.66	5	43.86
parRF	6	61.82	6	0.65	51	61.82
rf	7	61.84	5	0.65	7	45.21
ranger	8	61.88	7	0.65	6	45.16
gaussprRadial	9	70.47	11	0.35	11	55.56
svmRadialSigma	10	71.13	10	0.37	8	52.80
svmRadial	11	72.28	12	0.33	9	55.02
svmRadialCost	12	72.32	13	0.33	10	55.10
cforest	13	72.45	9	0.41	12	57.05
penalized	14	73.09	16	0.27	13	57.88
bstTree	15	73.11	15	0.28	19	58.13

msaenet	16	73.18	20	0.27	14	58.00
spikeslab	17	73.29	25	0.27	15	58.06
lm	18	73.32	17	0.27	16	58.06
bayesglm	19	73.33	27	0.27	17	58.07
glmnet	20	73.34	26	0.27	18	58.12
foba	21	73.42	24	0.27	20	58.14
glm	22	73.47	19	0.27	22	58.16
rlm	23	73.51	33	0.27	21	58.15
svmLinear3	24	73.51	18	0.27	24	58.18
lars	25	73.52	22	0.27	28	58.23
ridge	26	73.52	23	0.27	29	58.25
enet	27	73.52	30	0.27	25	58.19
gaussprLinear	28	73.57	21	0.27	27	58.23
lasso	29	73.64	28	0.27	30	58.28
glm.nb	30	73.65	29	0.27	23	58.18
monmlp	31	73.74	31	0.27	26	58.22
bagEarthGCV	32	73.74	35	0.26	34	58.55
bagEarth	33	73.74	36	0.26	35	58.55
lmStepAIC	34	73.78	37	0.26	32	58.46
blasso	35	73.78	38	0.26	40	58.71
gamLoess	36	73.84	43	0.26	31	58.44
svmLinear	37	73.97	34	0.27	33	58.55
brnn	38	73.98	42	0.26	38	58.66
gamSpline	39	74.05	39	0.26	36	58.63
bam	40	74.14	44	0.26	39	58.69
gam	41	74.17	46	0.25	41	58.71
nnls	42	74.18	45	0.26	43	58.80
rqlasso	43	74.21	40	0.26	42	58.74
svmLinear2	44	74.23	41	0.26	37	58.66
ppr	45	75.07	47	0.24	44	59.29
plsRglm	46	75.53	48	0.23	45	59.82
widekernelpls	47	75.90	49	0.22	46	60.13
simpls	48	75.92	52	0.22	47	60.14
kernelpls	49	76.17	50	0.22	48	60.40
pls	50	76.28	51	0.22	49	60.46
glmboost	51	76.57	53	0.22	50	61.00
logreg	52	78.00	54	0.19	52	61.86
BstLm	53	78.12	55	0.19	53	62.09
treebag	54	79.82	57	0.14	55	63.89
nodeHarvest	55	80.00	56	0.17	56	63.95
leapBackward	56	80.51	59	0.12	57	64.51

leapSeq	57	80.63	60	0.12	58	64.51
knn	58	81.37	58	0.13	60	65.30
leapForward	59	81.59	61	0.10	59	65.21
rpart1SE	60	82.46	63	0.08	62	66.04
ctree2	61	82.47	64	0.08	61	65.88
rpart2	62	83.10	65	0.07	63	66.56
partDSA	63	83.36	66	0.06	65	66.81
icr	64	83.56	68	0.05	66	66.88
ctree	65	83.61	62	0.10	64	66.80
rpart	66	83.80	67	0.05	67	67.20
dnn	67	85.94	74	N/A	70	68.99
mlpWeightDecay	68	86.18	72	0.00	69	68.63
mlpWeightDecayML	69	86.18	73	0.00	71	69.72
kknn	70	89.81	14	0.29	54	63.72
relaxo	71	90.79	32	0.27	68	67.41
rfRules	72	114.37	74	N/A	72	97.05
avNNet	73	524.50	70	0.02	73	517.42
pcaNNet	74	524.54	69	0.03	74	517.45
nnet	75	524.67	74	N/A	76	517.64
rbf	76	524.72	74	N/A	75	517.63
rbfDDA	77	525.41	71	0.01	77	518.33

To compute the algorithms, the 'Caret' package was used (Kuhn, 2020) with the optimism boost methodology running 50 times, using the methodology of leaving one out, recommended by Efron & Tibshirani (1997) due to the reduction of the variance of the error. The results are presented in order of the rankings of the Root Mean Squared Error (RMSE), which corresponds to the square root of the mean squared error (MSE). Both the RMSE and the R Square are decent adjustment measures of fit, considering that both use the sum of the explained squares (SSE) as a basis. While the R-squared has a value between 0 and 1 dividing SSE by the sum of the total squares (SST), the RMSE presents a real average realized by the square root of MSE, which corresponds to the multiplication of SSE by the sample number (n). In data science, the most frequently used measure is RMSE, and for this reason our study presents this ranking in the main. Mean Absolute Error (MAE) presents a similar measure but instead of raising the differences to the square, it places them in the absolute value.

Using the highest-rated algorithm, the relationships between each factor were calculated using the aforementioned approach. The selected algorithm was 'svmPoly', a Support Vector Machine (SVM) algorithm that calculates the longest distance between points, employing a hyperplane. It uses a polynomial kernel to solve non-linear problems. The settings used were Degree = 3, Scale = 0.1 and Cost = 0.25.

The following results were obtained:
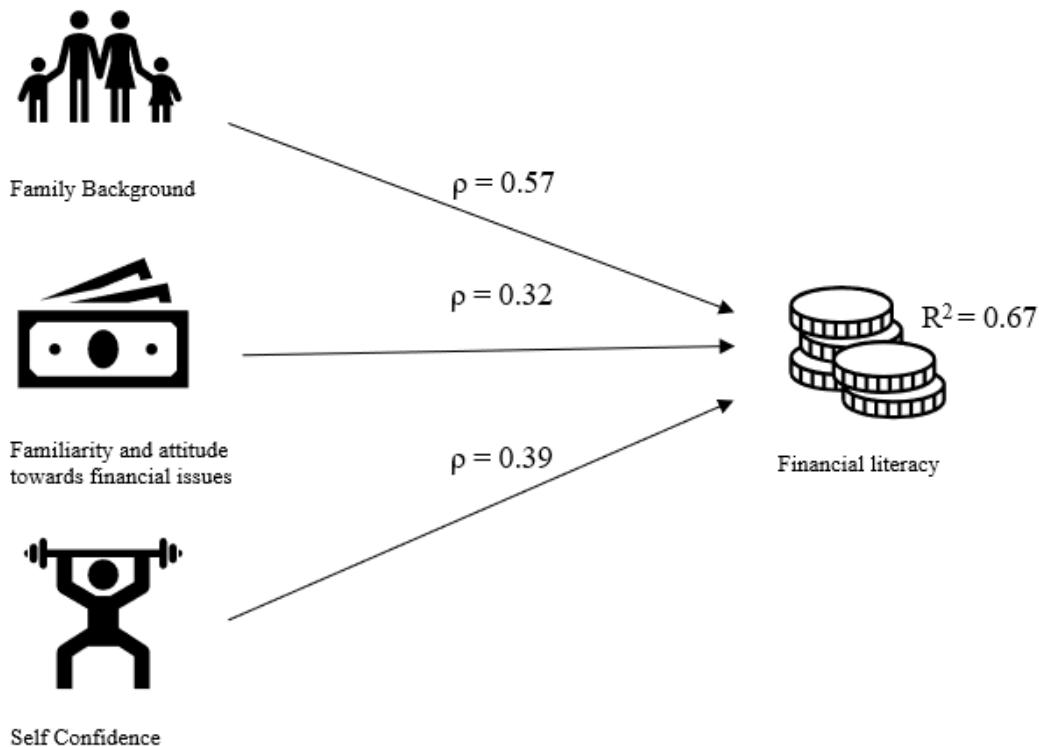
DISCUSSION AND CONCLUSIONS

The three hypotheses were validated for the sample collected. There is a stronger relationship of family background in 15-year-olds, followed by self-confidence, familiarity, and attitude towards savings. The total variance explained by the three factors combined is 67%, corresponding to a total of two thirds of the test result. The MAE of 28.7 suggests that, on average, in a test whose score varies between 0 and 1000, the error will be 28.7 points between that calculated by the algorithm and the real value obtained by the student. If we transpose this to an evaluation with the scale as used in Portugal, which varies between 0 and 20, the difference between the real and the calculated score, on average, would be 0.057 points.

Given the considerable weight of factors in student literacy, as already reviewed in the literature, we suggest that schools be more concerned with students' awareness of financial matters, as well as activities to stimulate more general confidence and skills. On the other hand, warn about the importance of parents in their children's results. It is suggested the creation of programs to access, among other things, computers and tablets, with the aim of stimulating the learning of young people, as well as to aid the focusing on lifelong learning. This in combination will raise the learning of the population, leading to more prudent financial decisions being made.

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Understanding the experience of Iranian women from attending in social networks (case study: Telegram Social Network)

Sara Darabi, Asadolah Mafakheri

darabii.sara@gmail.com

Buali Sina University, Iran

As social networks entered the new world, they brought dramatic changes. Their proliferation to all sections and social groups, and their ease of access and use, have made networks like Telegram popular with all. The aim of this study is to examine the experience of women in Telegram membership and to extract the type of presence, their reasons for participation and their understanding of this participation. For this purpose, a qualitative method has been used and an in-depth interview has been conducted with 20 women. Analysis of interviews shows that women communicate and form virtual communities in this way. New information is obtained. They do not appear in this passive network, but their active participation has enabled them to express themselves. The multiplicity of these networks and their independence from power have pitted them against the official media. Telegram's technical features, such as multimedia, have helped make it popular. With easy access, Telegram has made it possible for countless Iranian women to participate in cyberspace, which means empowering the voices of women whose voices have never been heard before.

Understanding resilience and adaption in European SMEs in times of crisis.

Elke Rosiers,
elke.rosiers@avanoa.se

Susanne Kaesbauer   susanne.kaesbauer@avanoa.se

Avanoa, Sweden

European SMEs represent 99% of all enterprises in the EU, and account for around 85% of jobs and 57% of value added (1). Their growth potential is considered a crucial factor in terms of employment rate and the future of innovation. SMEs are, as such, key to guaranteeing the economic competitiveness of the EU. The EU therefore aims to improve the approach to entrepreneurship. It does so through the overarching

European framework for SMEs, namely the Small Business Act. We aim to investigate the dynamics behind resilience and adaption for SMEs to unexpected crises.

In times of crises, SMEs are more vulnerable than large companies. They are more labor-intensive and therefore more exposed to disruption such as social distancing measures and a rapid decline and increase in supply and demand. In addition, they have thinner liquidity reserves, limited financial alternatives and fewer convertible assets (2). The current covid-19 crisis has had significant impact on European SMEs, and as such on the backbone of the European economy (with expected foreclosure of ca 25-36% of all small and medium-sized businesses) (3). The European governmental financial stimulus package of 750 bn € (4), in response to the pandemic, helps businesses to survive. However, this approach appears to have a limited impact on improving long-term sustainability and resilience. This suggests that SME resiliency is not solely linked to financial factors. Research has shown that resilience in SMEs is linked to the resilience and adaption of the management team to a crisis. We define SME resilience as the ability to (1) identify/recognise and understand threat as an opportunity and not as a crisis alone; and (2) engage in adaptive and effective decision-making in response to the crisis, thereby (3) creating Goal-directed Motived Action, transforming the crisis into an opportunity. We propose that it is this, relatively unexplored, process which can enable individuals and organisations to thrive in the face of adversity. This study seeks to consider the relationship between cognitive and motivational systems, and its impact on resilience and productivity in SMEs. Our research, therefore, using a mixed-methods approach, will aim to focus on understanding the requisites for resilient SME Management Teams in times of crisis.

Virtual Exchanges: Fake Mobility or Unique Experience?

*Irina Karimova, *Head of International Cooperation Department

The Bonch-Bruevich Saint Petersburg State University of Telecommunications, Russia
irina_karimova@mail.ru

Timothy Gwillim
Associate Dean, Arts, Science and Education
Davidson County Community College
timothy_gwillim@davidsonccc.edu

With the advance of COVID-19, many colleges and universities needed to find alternative ways to conduct international exchanges. Many international exchanges and activities were canceled due to the virus. Also, much attention was diverted away from international activities as many focused on changing their classes to online formats. Due to the authors participation in Fulbright programs, cooperation between St. Petersburg State University of Telecommunications (SPbSUT) and Davidson County Community College (DCCC) began. Despite the cancellations and challenges that were occurring, SPbSUT in Russia and DCCC in North Carolina continued to work together to provide international exchanges for their students. Through a series of virtual classes and topic based discussions, students developed cross-cultural awareness and momentum was gained for more collaborations. This study highlights the virtual exchanges that were developed, and gives quantitative and qualitative survey results about the collaboration. The main purpose of this report, based on research conducted by Russian and American colleagues, is to share

the experience in establishing and developing global collaborations, and to involve educational and scientific institutions in international cooperation.

"The Self-Transformations in Writing Outside brackets, reading in the Biography of Said Al-Serihi"

Dr. Latifah Ayidh Albaqami
Taif University, Saudi Arabia

naj-lat009@hotmail.com

This article aims to study the book "Writing Outside brackets", it is an autobiography by Saeed Al-Serihi, it is representing a new phase of cultural, intellectual and social awareness in Saudi Arabia, in addition it is a first study to address this book.This study, which is tagged "The Self-Transformations in Writing Outside brackets, reading in the Biography of Said Al-Serihi", consists of an introduction, two sections and a conclusion. This study was based on using of the descriptive analytical approach, relying on narrative techniques, open to some psychological theories to study the formations of the self, its psychological and ideological struggle within society. The introduction purposes to discover motivations of writing the biography at Al-Serihi and attributed it to several factors, while the two sections came as follows:
1- Self-transformations: I will address in this part the importance of self-awareness as an incentive to write a biography and different stages of formation through:
• Self-prevarication: by making the ego visible and visible from the ego itself.
• The tragedy of self and the sense of community: through the union of the ego with selves- community in the life and destiny.
2- Narrative construction: The biography presents its contents through the construction of a narrative that leans on various narrative techniques, including:
• Language levels: The biography comes with rich language levels including direct language, poetic language, dream language and mythical language.
• Time Movement: Through the author's use of the technique of accelerating the narrative and including deletion and overall and slowing down the narrative and including the dialogue scene and descriptive pause.
This study concluded with a conclusion that summarized the results of this study and its recommendations.

INTRODUCING "RULE OF MINORITY" TO MITIGATE THE PRINCIPLE OF "NON-INTERFERENCE" IS A FAVORABLE OUTCOME OR A MISERABLE FAILURE: A CRITIQUE VIEW WITH REFERENCE TO VARIOUS CASES

Dr. Sandeep Ojha; Ms. Shubha Ojha

College of Applied Sciences, Salalah, Sultanate of Oman

sandeep.sal@cas.edu.om

"Of all tyrannies a country can suffer the worst is the tyranny of the majority"- William Inge

The Act came into force on 12 September 2013 and altered and reshaped the spectrum of the contemporary company law regime entirely. It also filled the several cavities that bedeviled the Companies Act, 1956. Akin to most democracies, the corporate world is also subject to the majority rule. However, this shareholder democracy becomes a curse when it gets transformed into majority tyranny. Many a times, the views and interests of the minority shareholders are overlooked owing to the majority-influenced decision making. This paves way for the suppression of the minority and the "squeezing out" of the minority from the decision-making process and, ultimately, from the company. The Companies Act, 2013 can be perceived as a turning point in the majority-minority strife. A detailed evaluation of the provisions of the Act elucidates that the legislative intent behind this enactment is to safeguard the minority interests thoroughly and exhaustively. These provisions have given rise to the "minority rule" that overcomes the historical tyranny of the "majority rule" and the "principle of non-interference". This research paper cruises through various statutory provisions and judicial pronouncements and finally culminates in the conclusive analysis of how the introduction of minority rule is a promising move in the direction of establishing a corporate governance framework that guarantees equal and fair treatment of all the shareholders.

Preliminary Study on Students' Readiness to Learn Online due to Covid-19 Pandemic at a Pre-University in Malaysia

M. Amirul Mohamad Khairi[1,*], I. Faridah[2], H. Norsiah[2], M.A. Ahmad Zaki[2]

[1]Faculty of Education, University of Malaya, 50603, Kuala Lumpur, Malaysia

[2]Center for Foundation Studies in Science, University of Malaya, 50603, Kuala Lumpur, Malaysia

*Corresponding Author Email: amirulkhairi@um.edu.my

The outbreak of Covid-19 in the early year 2020 has changed the landscape of our educational system. The traditional method of classroom teaching can no longer be implemented due to the Movement Control Order by the government of Malaysia which started on the 17th March 2020. However, the government and educational institutions can no longer afford to close down the school for long and have to gradually re-opened them. On the 10th June 2020, the government announced the Recovery Movement Control Order (RMCO) which ordered all educational institutions to be re-opened by stages. One of the educational institutions that has been re-opened is the Center for Foundation Studies in Science (CFS), University of Malaya. The new students registered for the new intake 2020/2021 session on the 27th June 2020. Due to the RMCO, the management of the university has decided that the students will learn through online until 31st

December 2020. Hence this study has been conducted to investigate the new students' readiness on online learning before they started their online courses. The survey was conducted using Google Form from 24th to 26th June 2020 which focused on four main aspects of readiness. The first aspect is on the students' background which include location and former school. Secondly, is on the hardware readiness which include learning devices, sources of internet and internet stability. Thirdly, is on the software readiness which include on their experience from former school, willingness to online learning and online applications used and lastly on the aspect of behaviour which include experiences, opinions and expectation on online learning. There were 1126 students who participated in this survey which consists of 546 (48.5%) males and 580 (51.5%) females. From the survey, we have found that 1013 (90%) students are ready with the online learning devices. However, action must be taken to assist the remaining 113 (10%) students. Alarmingly, 563 (50%) students have not experienced online learning in their former school. Hence, training must be provided for them to familiarize themselves with the learning tools. On a positive note, 900 (80%) of the students said they are ready to learn online. We hope that this research will provide some insights on the current condition that our students are having, the problems that they are facing and to plan ahead.

Keywords: Online Learning, E-Learning, Readiness Assessment, Covid-19, Coronavirus, Pandemic, Movement Control Order, Pre-University Students

Management education for marginalized students:Opportunities and Challenges (Sociological Analysis) with Government policies and practices in Indian Context.

Ms. Sarika Moon

Department of Social Sciences, Tata Institute of Social Sciences, Hyderabad Campus, India

sarikamoon2014@gmail.com

Literacy is the stepping stone to social and economic empowerment, which India's marginalized community students need desperately. With the education, they can only access the many essential services and rights they are entitled to. Management education is an most valuable education in India , which is not affordable for everyone. In India we have right to education police but the nation still sees students face caste and financial barriers and discrimination.

This study will going to focuses on the difference between quality of understanding of upper caste privileged students and marginalized students along with various challenges and opportunities. The study also focuses on gender discrimination with a marginalized students in India.

The study also explore the government attitude and policy making to-words the students of management. The government system of admission and entrance examination are playing vital role in education for marginalized students.

The Mixed Method Research Approach will be applied for this study as "it involves the use of both qualitative and quantitative approaches in tandem so that the overall strength of a study is greater than either qualitative research or quantitative research (Creswell & Plano Clark, 2007; Creswell, 2009). Used a semi-structured questionnaires is a mix of unstructured and structured questionnaire for online survey. For the purpose of this study the size of the sample is 100 marginalized community students from 12 states with different family, financial and educational background who are willing to take admission for management study in India.

Keywords: Marginalized students, Indian Context, Management Education, and Discrimination.

Task Planning and Language Production Proficiency Level as Evidence

Mr. Jamel Chaaraoui

English Language Institute, Jeddah University, Saudi Arabia

jamelchaaraoui@yahoo.com

The minimum exposure to the Target Language TL, the lack of teacher-learner partnership as a teaching culture, and then the learner language production are constructs that intrinsically depend on one another and end up shaping up a certain TL proficiency level for the English as a foreign language EFL learner. As such, the learner's interlanguage is but a reflection of the workout of those constructs. To investigate those correlations as related to TL proficiency level, the present study makes objective measures of 36 subdimensions of the Complexity, Accuracy, and Fluency CAF of 50 EFL tertiary school learners in a videotaped oral presentation test that consists of two modes of speech, pre-planned monologue and online-planned dialogue. The findings show that in the pre-planned speech mode, complexity and fluency are performed a bit better compared with the online-planned speech mode while accuracy is the same in the two speech modes. In the online-planned speech mode, however, the CAF variables are intrinsically related to language production – AS-unit length and number of words per AS-unit - are meagrely performed. Accuracy wise, the errors in both speech modes are negative transfer-based. The minimum exposure makes the information processing procedures inactive. In that respect, it is recommended, that tasks as part of the syllabus and learner partnership as a teacher culture are the only outlet for language learning and language acquisition.

Key words: TL language proficiency level, task planning, interlanguage, CAF performance, L1 transfer-based errors, information processing procedures

Chicana Feminism: A Sojourn from 'Territorialization' to 'Detteritorialization' in Ana Castillo's The Guardians

Ms. Areej Farooq
areejfarooq13@gmail.com
meesum.alam12@gmail.com
University of Management and Technology, Lahore, Pakistan

This study aims at exploring the "Mexican-Amerindian" identity and racial challenges of the main protagonist, Regina in The Guardians while living on borderlands. The identity deals with the issues of women whose ethnicity is grounded in Mexican descent but they are currently living and adapting the ways of American lifestyle. Borderlands are largely represented as physical territories; however, some are constructed in the human minds. The research is peculiar to the social impact of the border than the geographical one. The theoretical framework being used in this paper is Chicana Feminism as it deals with issues of gender and racial discriminations that affect the progress of women of the Chicana community. The study illustrates the protagonist's movement towards a better future even in the bleakest of times. As living on the borderlands, Regina oscillates between the margins and continuously deconstructs the superior notions through her experiences and stresses on the difference of opinion. Her character further elaborates that a woman can transcend the gender and ethnological stereotypes through continuous struggle and perseverance. The transition of the character aspires at awakening the consciousness among the women who have been restricted by social constraints of their society and allows them to explore the positive character traits that would emancipate in difficult circumstances.
Key Words: Mexican-Amerindian identity, Borderland literature, racial challenges, Gender discrimination, Chicana Feminism