
The Economic Effect of Coronavirus (COVID-19) on Higher Education in Jordan: An Analytical Survey

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Abstract:

Purpose: This study aims at analyzing the possible effects of coronavirus (COVID-19) pandemic on higher education institutions in Jordan. The article also explores how universities and colleges in Jordan cope with the pandemic and manage their functions and staff during the virus outbreak. In addition, the article investigates whether the administration teams of universities in Jordan are prepared to come up with administrative strategies for post-corona crisis.

Approach/Methodology/Design: The methodology used in this study is based on quantitative methods. A 23-item questionnaire was administered to 52 respondents working in universities in Jordan as academicians, decision-makers, administrators, and researchers. The 52 respondents were randomly selected from eight universities public and private.

Findings: The study reveals that there is a growing concern over the transition from lockdown to university normal life. Most of the respondents agree that COVID-19 has considerable effects on the economic activity of higher education institutions. Moreover, the majority believes that universities in Jordan are not well-prepared in terms of strategic management to cope with the COVID-19 consequences.

Practical Implications: The study will contribute positively to the understanding of the effects of COVID-19 on universities in Jordan. It will reflect the perceptions of different stakeholders in Jordan and thus provide a framework for future management strategies and decision making. Nevertheless, further research studies must be conducted in order to better understand the economic impact on universities and also to closely examine the management plans for the re-function of universities after the lockdown.

Originality/value: This study measures the perceptions of different actors involved in higher education in Jordan by using Likert five-point scale. It is the one of the first studies to address the effects of COVID-19 on universities in Jordan. The study draws the attention to the lack of infrastructure in universities in Jordan and also the absence of strategic management to cope with uncertainties.

Keywords: COVID-19 outbreak, higher education in Jordan, effect, crisis, economy.

JEL codes: I10, I12.

Paper Type: Research article.

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1. Introduction

In times of economic crises, higher education institutions are usually hit hard because of the lack of preparedness. It is expected that the outbreak of COVID-19 will have a direct effect on global economy and higher education institutes are more vulnerable to crises than any other institutions. Universities in Jordan function in a complicated manner, and most of them do not have emergency plans to cope with uncertainty and fear. Funding opportunities to universities are also expected to be reduced drastically due to the economic restrictions imposed on state's budget. Private colleges are at a greater loss and academic and non-academic staffs will endure severe consequences. In order to assess the possible impact of the coronavirus outbreak on the higher education institutions in Jordan, it is important not only to focus on the economic downturn but also on the ways that administrators, decision-makers, and government institutions in Jordan respond to it. COVID-19 will most directly shape conventional university teaching, affecting funding opportunities, research projects, and the flow of international students. Based on all this, the article aims at investigating the effect of coronavirus on higher education institution in Jordan, taking into consideration economic, administrative, and academic aspects. The perceptions of different university employees are central to the investigation carried out in this study.

Global health crises often breed uncertainty and fear and Higher Educational institutions rarely take the time to identify and develop potential solutions to problems that may arise and impact them. The problems aggravate when the decision usually comes from a centralized system. Universities in Jordan are not completely independent working on their own, and this means delayed response to the universities' status quo. In mid March 2020, the Ministry of Higher Education in Jordan launched a survey study to measure the effectiveness of online education. This late recognition of the effectiveness of online education clearly reveals the unpreparedness of the stakeholders in higher education in Jordan. The responses of the Arab States to the threat of the new coronavirus, added to the international context that the pandemic is generating, have the potential to aggravate some of the existing problems (Fernández, 2020). Undoubtedly, the impact of coronavirus outbreak will generate a mounting pressure on universities and colleges in Jordan and the only way out is by reshuffling the management and applying the best possible methods for a smooth transition to normality.

Universities were the first government institutions in Jordan to shut down and evacuate campuses. Many academicians have shown their concern and there have been since the beginning of the outbreak a number of articles published online, yet their content remains cautionary and journalistic. There is almost no research-based articles tackling and addressing the possible impact of coronavirus on universities and colleges. Pablo Illanes, Jonathan Law, Ana Mendy, Saurabh Sanghvi, and Jimmy Sarakatsannis in an article titled "*Coronavirus and the campus: How can US higher education organize to respond?*" came up with a model to cope with the

Coronavirus consequences on higher institutions. They called this model ‘integrated nerve center’ and its strength is that it is simple, flexible, multidisciplinary designed to adapt to fast-changing conditions (Illanes *et al.*, 2020). This model is built upon four major steps; discover, decide, design, and deliver. The overall goal of this model is for the institution to be capable of getting ahead of events, and to react skillfully and strategically (Illanes *et al.*, 2020, p. 5). Universities in Jordan have to examine several management models in different countries in order to enable administrative teams to come up with a model suitable to the Jordanian context and to meet the expectations of higher education system in the country.

2. Literature Review

The ongoing spread of the new coronavirus (COVID-19) has become one of the biggest threats to the global economy and financial markets. The virus was first detected in the Chinese city of Wuhan in December 2019, and it has infected more than three million people in at least 110 countries and territories globally, according to the World Health Organization (Novel Coronavirus (2019-nCoV) Situation Report-1, 2020). Of those infected, 221,823 people have died, according to WHO data, from the beginning of the outbreak till 01/05/2020. To contain the COVID-19 outbreak, Chinese authorities have taken robust measures to curb the spread of the deadly virus, most notably a full quarantine on Wuhan, the epicenter of the outbreak, and strong control and preventive measures in such metropolitan areas as Beijing and Shanghai as well as other population centers around China (Chen, Liu, Lu, Zhang, Ye, and Qiang, 2020). Nevertheless, locking down cities, restricting movements of millions and suspending business operations will undoubtedly result in the slowdown of economy. The “critical impact” theory tends to think that it will have serious effect on the already slackening Chinese economy, even causing a slide of its growth rate and handicapping global economy (Chen *et al.*, 2020, p. 8). The impact is globally now and many countries will stumble with the post-corona economic hardships.

In the current scenario of novel coronavirus outbreak, governments across the world are struggling to find ways to prevent the spread of coronavirus (Khan, Siddique, Ali, Xue, and Nabi, 2020). Following China, many countries in Europe and the Middle East imposed total lockdown to prevent and slow down the spread of the virus. The economic consequences of the measures taken in Europe are major, and are felt through both supply and demand-side channels (Demertzis, Sapir, Tagliapietra, and Wolff, 2020). In the Middle East, the measures taken, most notably in Arab countries, are expected to leave scars on the stumbling economies of the countries that already have economic issues. Fernández point out that the COVID-19 pandemic spread at a time when the Arab region is under great pressure of various kinds (Fernández, 2020). Once COVID-19 was regarded pandemic, Jordan was among the first countries to respond and the authorities implemented certain nationwide precautions measures in the hope to curtail the spread of the virus.

Authorities in Jordan announced a total lockdown in 14th March 2020 and called on people to stay at home. The country of Jordan has implemented one of the strictest lockdowns in the world to stop the spread of the coronavirus, forcing most people to stay indoors and temporarily shutting down even grocery stores and pharmacies (Arraf, 2020). However, the precautions and measures will definitely have repercussions on the economy and on the function of several other sectors in the country whether public or private.

The outbreak will definitely aggravate the existing economic problems in Jordan. According to Fernandez, the economic and social cost of the drastic restrictions being imposed by Arab governments can be overwhelming and, ultimately, unbearable (Fernández, 2020). For the moment, the impact of the coronavirus pandemic on the region's economies is already being felt. A first blow was received by the tourism industry, with the massive cancellation of trips and tourist services in some Arab countries that generate wealth and employment. Fernández predicts that the impact that the COVID-19 pandemic will have a high economic cost with numerous social and political spin-offs (Fernández, 2020). Markets have reacted violently and a number of industries have taken a big hit from the COVID-19 shock (Demertzis, Sapir, Tagliapietra, and Wolff, 2020). Clearly, it seems that the longer that measures have to be taken to contain the virus, and the stricter those measures, the greater their impact on the global economy (Demertzis *et al.*, 2020, p. 10). Beyond the immediate crisis response, policymakers and decision-makers in every country hit by the coronavirus outbreak will have to think about sustained measures to revive and boost economies.

Education is unfortunately the last thing that governments consider in times of crises and pandemics. Coping with COVID-19 is particularly complicated for universities, because they serve such a wide variety of functions (Illanes *et al.*, 2020, p. 2). Serving different functions means that universities have a large number of stakeholders and decision-makers involved in managing campuses. In Jordan, the Ministry of Higher Education regulates and monitors the function of universities both public and private. More specifically, universities and colleges in Jordan have complicated revenue model that relies heavily on government grants and tuition fees.

Therefore, confronting COVID-19 is never easy since universities in addition to securing funds to resume have also to plan an exit for the lockdown. The problems caused by COVID-19 outbreak will leave a quite long impact and universities in Jordan have to take bold steps in bringing in and adopting effective management. Employees of private universities, for instance, are vulnerable and under a direct threat of dismissal. The economic downturn will affect families and they will not be able to pay their children's fees. More importantly, the flow of international students will be impeded and even admissions are unsettled till now. All these necessitate adopting an effective management plan either at the ministerial level or individually at the university level.

3. Methodological Procedures

The article aims at examining the effects of coronavirus (COVID-19) on higher education institutions in Jordan. The article also explores how universities and colleges in Jordan cope with the pandemic and manage their functions and staff during the virus outbreak. In addition, the article investigates whether the administration teams of universities in Jordan are prepared to come up with administrative strategies for post-corona crisis.

The methodology used in this study is based on quantitative methods. A 23-item questionnaire was administered to 52 respondents working in universities in Jordan as academicians, decision-makers, administrators, and researchers. The 52 respondents were randomly selected from eight universities public and private: Al al-Bayt University, Yarmouk University, Hashemite University, Irbid National University, Petra University, University of Jordan, Middle East University, and Al-Zaytoonah University of Jordan. Since it is mainly designed to measure attitudes, Likert five-point agreement scale is used in this study. The “strongly disagree” is give 1 point while the “strongly agree” yields 5 points on the scale. The scale allows the respondents to express how much they agree or disagree with the given statements about the effects of COVID-19 pandemic on the higher education institution in Jordan. The data obtained is analyzed using quantitative methods and the findings are interpreted according to the mean, median, and standard deviation. The data was computerized using SPSS statistical system.

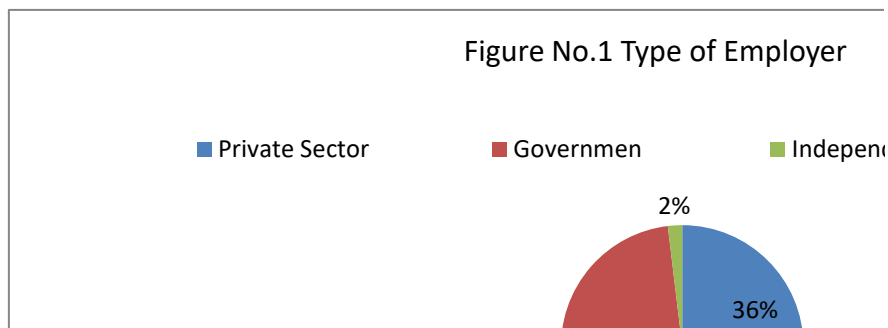
Since the virus outbreak is unprecedented, the research material available to the researcher is insufficient, thereby limiting the study. This study is among the first to address the effects of coronavirus (COVID-19) pandemic on higher education not only in Jordan but in the whole region. Hopefully, the findings will pave the way for more research studies on pandemic and disaster management in higher education institutes.

4. Analysis of Results

The data collected is analyzed depending on likert five-points scale where “strongly disagree” yields one point, number two “disagree” yields two points, choice number 3 “undecided” receives three points, number 4 “agree” gets four points and finally number five “strongly agree” yields five points. Fifty two respondents from eight different universities in Jordan replied to the questionnaire, and the data received is analyzed below.

Most of the respondents are part of government university staff amounting to 62 percent, while 36 percent of the respondents work for private colleges and universities and 2 percent work in research centers.

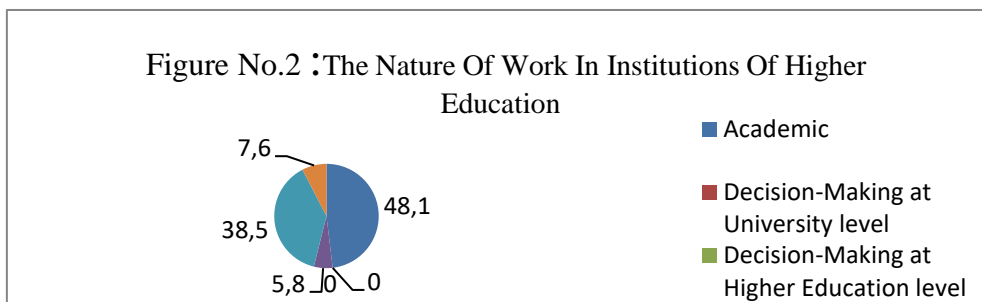
Figure 1. Type of Employer



Source: Author.

The respondents were also asked to indicate the nature of their work in higher education institutes. The results reveal that 48.1 percent are academic and none responded from decision-making at university level as well as from the Ministry of higher education. Administrative staff responding to the questionnaire amounted to 5.8 percent and 7.6 percent was categorized as ‘other’.

Figure 2. The nature of work in institutions of higher education



Source: Author.

The questionnaire comprised twenty three statements in total, and all of them were designed to impart data on the possible effects of COVID-19 on higher education in Jordan. The statements mainly address the economic aspects of the crisis and the administrative effectiveness and strategic planning in Jordanian universities. In response, the majority of the respondents strongly agreed that the coronavirus(COVID-19) outbreak will mainly have economic impact on the function of universities in Jordan. Table 1 and 2 below clearly reflects the statistical analysis of the data obtained in relation to the statements in the questionnaire. The data obtained was computed using SPSS program and statistical measurements were taken using mean, median, standard deviation. The median is quite large as about 20-28 percent of the respondents are unable to identify whether the higher education institutions in Jordan are affected by the pandemic and its economic consequences. This state of undecidability is significant, signaling that it is still early to measure the effects of coronavirus on higher education institutions.

Table 1 shows the statistical analysis of eleven statements, clearly presenting the mean, median, and standard deviation. There is little variation in terms of mean, ranging from 3.6 minimum and 4.8 maximum. The statistics of the responses to the first statement reveal that the median is 4 and the standard deviation is calculated at 1.0725. The valid responses are 52, and there are multiple medians but the smallest value is 3.500. It is shown that 30.8% of the respondents strongly agree with the given statement. Nevertheless, a considerable percentage of the respondents are neither with or against the statement. Their ‘undecided’ position clearly reflects the uncertainty and fear generated by the virus outbreak. Apparently, a small number shows strong disagreement with regard to the possible economic impact on universities in Jordan due to COVID-19 outbreak.

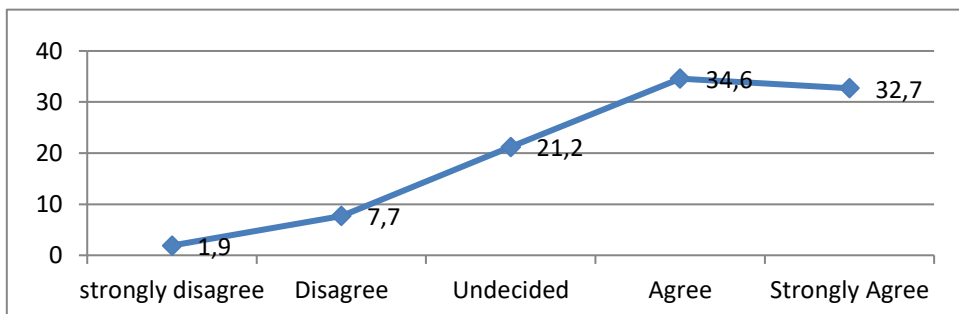
Table 1. Statistical analysis of eleven statements, 1 to 11.

	item1	item2	item3	item4	item5	item6	item7	item8	item9	item10	item11
Mean	3.7885	3.8846	3.5385	3.6538	3.4615	4.8846	4.0385	4.0000	3.8077	3.9231	4.4808
Median	4.0000	4.0000	4.0000	4.0000	3.5000	4.0000	4.0000	4.0000	4.0000	4.0000	5.0000
Std. Dev	1.0725	1.0783	1.2281	1.2026	1.2120	7.1583	1.1195	0.9288	0.9505	0.8596	0.6100

Source: Author.

In Figure 3, it is shown that 32.7 per cent of the respondents strongly agree that funding universities will be reduced due to the state’s budget restrictions. In response to the second statement, most of the respondents express their agreement. The statistics of the responses show median at 4.00 and standard deviation at 1.0783. Obviously, there is no significance in the spread and distribution of data in relation to the effects of coronavirus outbreak on funding universities. Nevertheless, the distribution of data regarding statement no. 6 and statement no. 11 are statistically significant. There is little variation in data distribution, indicating concentration on specific values. Most of the respondents agree that there is a lack of preparedness for crises like the coronavirus outbreak because of decades-long underinvestment both in terms of institutional reform and capacity.

Figure 3. Statement No. 6 Data Variation



Source: Author.

Responses to the eleventh statement are measured and the median is 5. Standard deviation is .6100 which means that it is significant because it is lower in comparison with the previous statistics. Most of the respondents (53.8%), strongly agree that universities in Jordan should form an emergence team(s) to draw immediate and future plans for less problematic exit of the crisis. The majority feel that the universities have to take responsibility for planning a staggered exit of the crisis. Figure No.4 indicates the statistics of the statement No. 11 in the questionnaire.

Figure 4. Statistics of Statement No.11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	undecided	3	5.8	5.8	5.8
	agree	21	40.4	40.4	46.2
	strongly agree	28	53.8	53.8	100.0
	Total	52	100.0	100.0	

Source: Author.

Table 2 below displays the statistics of the items of the questionnaire from 12 to 23. As it can be seen, the standard deviation indicates that the distribution of data is not normal but varies from one statement to another. Item no. 17 yields the highest standard deviation 1.3141 while item 23 shows more concentration of data. These reveal statistical significance that can be interpreted in the analysis below.

Table 2. Statistical analysis of eleven statements, 12 to 23.

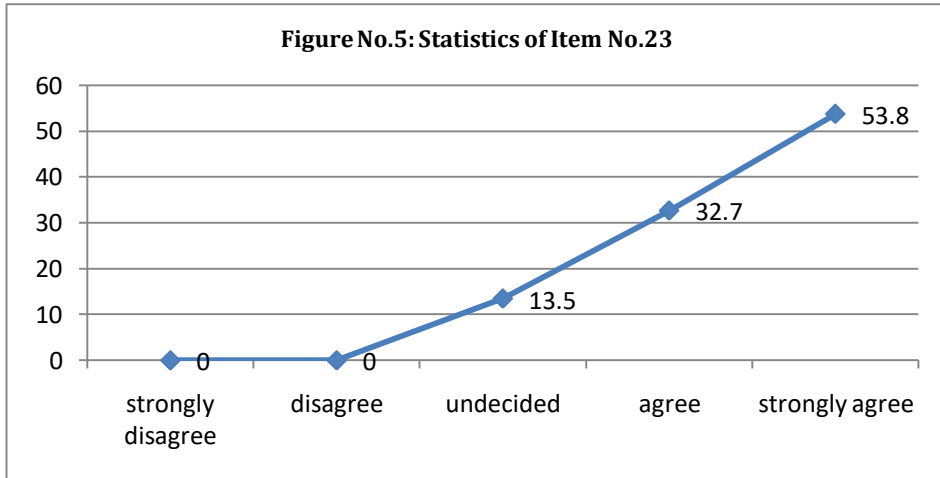
	item12	item13	item14	item15	item16	item17	item18	item19	item20	item21	item22	item23
Mean	4.4231	4.2692	4.3654	4.3269	3.7500	3.1923	4.0385	4.1154	4.0577	3.9615	4.2885	4.4038
Median	5.0000	5.0000	5.0000	5.0000	4.0000	3.0000	4.0000	4.0000	4.0000	4.0000	4.0000	5.0000
Std. Dev	0.8247	1.1222	0.9294	0.8794	1.2660	1.3141	0.9693	0.9832	0.9983	1.0090	0.8479	0.7211

Source: Author.

The statement number 17 in the questionnaire is about whether universities in Jordan have plans for enrollment during and immediately after coronavirus outbreak. The statistics of the statement show mean at 3.1923 and median at 3.0000. As it is shown, standard deviation is 1.3141 which means it is significant. The significance emerge from the responses, where 36.5 % strongly agree that universities in Jordan have plans for enrollment during and immediately after coronavirus outbreak. Variance of standard deviation indicates that the respondents are more concerned about effective management of universities during and after coronavirus outbreak. Similarly, the last statement in the questionnaire is whether the administrators and university emergency management experts should work on a smooth exit plan from the lockdown and post-corona university function and strategies. For this, the statistics obtained indicate a little variation in median and mean. Median is 5 and mean is 4.4038. The spread of data is significant here since standard deviation is recorded at 0.7211 which means that there is a concentration of data.

Figure 5 below charts data variation where 53.8 of the respondents strongly agree that the administrators and university emergency management experts should work on a smooth exit plan from the lockdown and post-corona university function and strategies.

Figure 5. Statistics of item 23



Source: Author.

Most of the respondents expect administrators and university management teams to work on a smooth exit plan from the lockdown and post-corona university function and strategies. This reflects a good amount of trust in the administration of universities in Jordan. However, the respondents' data suggest that universities have to take much responsibility in managing themselves. It is a call for decentralized approach in university management.

Meanwhile, high percentage of the respondents remains neither with nor against the statements of the questionnaire. For instance, 28.8% of the respondents do not know whether the outbreak of COVID-19 will economically affect the function of universities in Jordan. Indeed, it is still early to measure the severity of and determine the type of effects but there is no county in the region that is immune to COVID-19 resultant economic hardships. Similarly, 28.8% of the respondents remain neutral regarding whether effective administration strategies will lessen the economic impact on universities' function. This is a quite significant percentage which can only be interpreted as lack of managerial knowledge. The smallest percentage of the choice 'undecided' is reflected in the response to the statement number 22. It is clearly shown that 7.7% of the respondents expressed their neutrality towards whether employees—from faculty to facilities staff—are worried about their future if universities do not come up with immediate and long-term plans. This clearly reflects the fear and anxiety of respondents due to the spread of the pandemic.

Most of the respondents strongly agreed with statements that are directly related to COVID-19 effects on economy. Specifically, 32.7% strongly agree that the coronavirus crisis is likely to result in a loss of many international students, and that means a financial loss for universities' revenue. In the same vein, 42.3% of the respondents strongly agree that the COVID-19 outbreak creates many uncertainties, and universities are not prepared enough to cope independently with such a crisis. Most of the respondents acknowledge that their universities are not prepared for COVID-19 pandemic. In addition, the analysis reveals a lack of strategic planning in universities in Jordan. More importantly, 53.8% of the respondents strongly agree that universities in Jordan shall form an emergence team(s) to draw immediate and future plans for less problematic exit of the crisis. Most of the respondents expect universities to have a role in managing the crisis and finding ways to return to normalcy. For instance, 59.6% of the respondents strongly agree that each university in Jordan shall have a cell responsible for disasters and unpredicted crisis, such as coronavirus outbreak.

Furthermore, the study also reveals that 44.2% of the respondents strongly agree that the Covid-19 crisis means a huge downturn in universities economic activity. What aggravates the economic problem resulting from COVID-19 outbreak is the fact that most of the universities in Jordan are still dependent on government's funding. This means a slow transition to online learning and a halt to many research projects. The majority of the respondents (59.6%) strongly agree that universities in Jordan need adequate funding to switch to online learning. Meanwhile, 40.4% of the respondents strongly agree that the Covid-19 crisis will leave long-term negative effects on university new recruitment and enrollments. The respondents seem to be aware of the economic problems resulting from the lockdown and the fight against COVID-19. They expect lack of funding opportunities and they also realize that university new recruitment is closely tied to the economic stability in a post-corona Jordan.

On the contrary, there are certain responses that do not consider any effects for COVID-19 outbreak on economy and higher education in Jordan. As indicated, 5.8% of the respondents strongly disagree that funding universities will be reduced due to state's budget restrictions. This percentage is quite significant since it reflects another perspective of understanding the COVID-19 outbreak in the country. Similarly, 7.7% of the respondents do not realize any effects on ongoing and future research projects in the country. In terms of management, 9.6% of the respondents believe that centralized decision-making does not hinder universities from taking action in times of crisis. Contradictorily, 13.5% of the respondents think that universities have no plans for enrollment during and immediately after coronavirus outbreak. This signals the unpreparedness of the higher institution in Jordan, and it seems that higher education is the last matter that the government considers in times of crises. A 13.5% of the respondents strongly disagree that administrators and university emergency management experts should work on a smooth exit plan from the lockdown and post-corona university function and strategies. This

percentage clearly signals the centralized decision making that the universities in Jordan are tied to.

5. Conclusion

The data reveals that there is persisting concern over the transition from lockdown to university normal life. Most of the respondents agree that COVID-19 has considerable effects on the economic activity of higher education institutions. Moreover, the majority believes that universities in Jordan are not well-prepared in terms of strategic management to cope with the COVID-19 consequences. It is realized that online learning/teaching becomes vital not only during coronavirus outbreak but after this outbreak as a future strategy for universities and colleges.

However, the study identifies that there is a lack of infrastructure for this new method of teaching. In Mid-March 2020, the Ministry of Higher Education in Jordan launched a survey on the effectiveness of online learning/teaching. Consequently, it is clear that the authorities of higher education in Jordan are still unsure whether online learning/teaching is effective. This clearly signals the unpreparedness among higher education institutions in Jordan. Switching to online learning is the immediate available option to most universities and colleges, and even more technologically advanced educational systems find difficulties in transitioning to online education. In Jordan, some universities have already started urging professors and seminar leaders to make sure all learning materials are online and easily accessible to all students. Nevertheless, all these efforts remain at the individual level since no plan has been adopted by the ministry of higher education in this regard.

The results of the study indicate an economic downturn that will impact universities' functions. Despite the budgetary restrictions, the respondents believe that the most viable solution is technological - online teaching. Though it is expected to require huge funds, public and private investments have to be incorporated and effectively managed to tackle the educational crisis that looms large ahead. It is recommended that universities in Jordan set up emergency-response teams to prepare for the unexpected. The emergence of the COVID-19 pandemic has revealed limitations in and absence of strategic planning. Although universities in Jordan were among the first institutions to respond and shut down, the transition to a post-corona phase is challenging and many universities and colleges will scramble if no effective management and proper planning are adopted.

Further research studies must be conducted in order to better understand the economic impact on universities and also to closely examine the management plans for the re-function of universities after the lockdown. Indeed, the COVID outbreak affects the flow of international students to universities and colleges across the country. Jordan has long been a destination for foreign students and there are bitter consequences resulting in the loss of thousands of foreign students and

simultaneously loss of a source of revenue for private universities in particular. Moreover, the restrictions on visa and travel are expected to curtail the mobility of researchers and academic staff. Most noticeably, the study points out that developing a robust educational system means huge funds are needed to design and integrate some form of online education. Universities and colleges should implement changes to campuses and analyze the steps already taken by other institutions to better understand what lies ahead in a post-corona phase.

The economic downturn will definitely overshadows universities function for a quite some time. The Ministry of Higher Education along with universities should work closely together to find ways of better management in such turbulent times. The higher education sector has withstood turbulent economic times before, and with proper planning and effective management strategies, universities in Jordan will overcome the economic hardships and withstand the sweeping changes after the lockdown is over.

References:

- Arraf, J. 2020. Jordan Keeps Coronavirus in Check With One of the World's Strictest Lockdowns. Retrieved March 25, 2020, from KALW News: <https://www.kalw.org/post/jordan-keeps-coronavirus-check-one-worlds-strictest-lockdowns>.
- Chen, D., Liu, K., Lu, C., Zhang, H., Ye, J., Qiang, X. 2020. Coronavirus Battle in China: Process and Prospects. Shanghai Institutes for International Studies.
- Demertzis, M., Sapir, A., Tagliapietra, S., Wolff, G. 2020. An effective economic response to the coronavirus in Europe. Policy Contribution (6), 1-10.
- Fernández, H. 2020. Coronavirus in Arab countries: passing storm, opportunity for change or regional catastrophe? Elcano Royal Institute.
- Illanes, P., Law, J., Mendy, A., Sanghvi, S., Sarakatsannis, J. 2020. Coronavirus and the campus: How can US higher education organize to respond? Retrieved March 26, 2020, from McKinsey and Company: <https://www.mckinsey.com/industries/public-ector/our-insights/coronavirus-and-the-campus-how-can-us-higher-education-organize-to-respond#>
- Khan, S., Siddique, R., Ali, A., Xue, M., Nabi, G. 2020. Novel Coronavirus, Poor Quarantine, and the Risk of Pandemic. *Journal of Hospital Infection*, 1-2.
- Novel Coronavirus (2019-nCoV) Situation Report-1. 2020. World Health Organization.