

**“Testing the relationship between Digitalization and Perceived Organizational Sustainability in the Egyptian ICT sector”**

**Ola Adel Imam**

**Graduate School of Business Arab Academy for Science, Technology & Maritime Transport Egypt**

**Prof. Dr. Tareq Hasan Abdeen**

**Professor of HRM and OBDean, College of Management and Technology – Cairo**

**Arab Academy for Science, Technology & Maritime Transport Egypt**

**Abstract:**

Digitalization and Organizational Sustainability are major trends for businesses in today's rapidly changing business environment. Companies that are able to effectively adopt new technologies and adapt to changing market conditions are more likely to be successful in the long term. This study aims to empirically examine the relationship between digitalization and perceived organizational sustainability in the Egyptian Information and Communication Technology (ICT) sector. A quantitative method based on a survey is adopted to measure the impact of digitalization on the different dimensions of perceived organizational sustainability. The validity and reliability of the questionnaire is verified. Correlation and regression analyses are applied to test the research hypotheses. The results support a positive correlation between Digitalization and the different

dimensions of Perceived Organizational Sustainability. The dimensions representing the social aspect of sustainability reported the highest correlations with digitalization whereas the dimensions of perceived environmental sustainability showed the lowest correlations. The findings of this research provide evidence on the significant role of digitalization in promoting organizational sustainability and suggest that the road to achieving organizational sustainability should focus on investing in the right digital infrastructure and technologies, implementing a data-driven approach, emphasizing continuous learning and collaboration within organizations, fostering a culture of innovation and adopting a customer-centric approach using digital technologies. This research adds additional knowledge and insights to the relationship between digitalization and perceived organizational sustainability.

**Keywords** Digitalization, Digital transformation, Organizational Sustainability, Economic Sustainability, Social Sustainability, Environmental Sustainability.

## 1. Introduction

In today’s rapidly changing environment, companies of all sizes are facing tough competition and many challenges. In order to maintain a sustainable growth in this so-called volatile, uncertain, complex, and ambiguous world, firms should innovate, be flexible enough, adopt latest technologies and quickly respond

to these challenges in order to remain competitive and thrive (El Hilali, El Manouar, & Idrissi, 2019; Marhraoui & El Manouar, 2018). Moreover, the COVID-19 pandemic has brought urgency for digitalization and meeting digital transformation goals and forced many organizations to speed up transformation work (Gavrila, 2021). With the increasing global concern for the impacts of businesses on the environment and society and with the growing standards of corporate responsibility, companies are recognizing the need to work on sustainability as well (Vidmar, 2019; Cohen, 2020; Diófási-Kovács, 2021; Miceli, Hagen, Riccardi, Sotti, & Settembre-Blundo, 2021). Nowadays, Digitalization and Organizational Sustainability became top priorities influencing the business world (Marhraoui & El Manouar, 2018; Miceli, Hagen, Riccardi, Sotti, & Settembre-Blundo, 2021). So, it is worth investigating whether there is a link between sustainability and digitalization. Can an organization’s digitalization efforts help foster its sustainability? Can digitalization promote economic growth while preserving environment and promoting social development as well?

Despite the increasing interest by scholars and practitioners on the importance of these concepts for the success and growth of today ‘s organizations, the nature of the relation between digitalization and sustainability has not yet been sufficiently studied. Many efforts are still needed to reduce the knowledge gap between these two concepts as few researchers investigate

this relationship with limited depth and breadth (El Hilali, El Manouar, & Idrissi, 2019; Isensee, Teuteberg, Griese, & Topi, 2020). Many researchers and practitioners highlight the importance of digital transformation and the adoption of up-to-date technologies and innovation in improving process efficiency and proposing value-added products to assure an organization’s sustainable economic growth (Chandola, 2016). However, the link between digitalization and the different aspect of organizational sustainability, especially the environmental and social aspects, require further empirical investigation (Chen, Despeisse, & Johansson, 2020).

Therefore, the main objective of this research is to fill this gap by empirically investigating the impact of Digitalization on the different dimensions of Perceived Organizational Sustainability in the Egyptian ICT sector. The interest in this sector stems from the fact that the ICT sector in Egypt is a highly innovative and dynamic sectors as it is known to be the fastest growing sector in Egypt. This paper is organized as follows: section two is devoted to the theoretical background followed by the research model, the methodology used, discussion of the results and the conclusion.

## **2. Literature Review**

### ***2.1 Digitization, digitalization, and digital transformation***

Today, digital transformation is no longer an option; it became essential for enterprises to escape their comfort zone, reinvent themselves and compete in this world overrun by

technological advances. According to the Gartner 2018 CIO Agenda Industry Insights study, digital transformation became one of the top three priorities for businesses and organizations (Gartner, 2017; Mentsiev, Engel, Tsamaev, Abubakarov, & Yushaeva, 2020).

Digital transformation, however, is quite distinct from digitization and digitalization. Digital transformation goes far beyond just adopting advanced technologies. It is a broader term where digitization and digitalization are parts of it. Several researchers consider digital transformation as a “journey” rather than a project undertaken by businesses and governments (Bloomberg, 2018; El Hilali, El Manouar, & Idrissi, 2019).

**Digitization** refers to the transformation of analogue information into zeroes and ones so that computers can store, process, and transfer it. In other words, digitization is converting information from a physical or analogue format to a digital format (Bloomberg, 2018; Chen, Despeisse, & Johansson, 2020). However, digitization doesn't change business models of organizations, but it involves the adoption of digital technologies to existing business models to make them more efficient and enable faster and easier communication (Raut, 2018; Finch, 2020). El Hilali, El Manouar, & Idrissi (2019) consider digitization as a starting point for organizations in their digital transformation journey.

**Digitalization** on the other hand surpasses digitization as it involves the use of digital technologies to change a business model and provide new revenues and value-producing opportunities. Clerck (2017) defines digitalization as the use of digital technologies to transform traditional business processes, operations, and products or services. It can involve the use of various technologies such as cloud computing, data analytics, artificial intelligence, and the internet of things (IoT) (Nwankpa & Roumani, 2016). El Hilali, El Manouar, & Idrissi (2019) consider digitalization as a stepping-stone toward a fully digital business.

**Digital transformation** is the following step, it focuses on becoming a digital enterprise by reimagining and continuously evolving the use of technology, data, people, and processes searching for new revenue streams and new business models (Boulton, 2021). Therefore, digital transformation is not just about technology, it is characterized by changes and transformation that are driven and built on a foundation of technologies (Nwankpa & Roumani, 2016). A successful digital transformation requires changes at different levels within the organization including change in people, business models, culture, leadership as well as customer engagement (El Hilali, El Manouar, & Idrissi, 2019; Ismail, Khater, & Zaki, 2018).

## ***2.2 Organizational Sustainability***

In the past few years sustainability has become a central issue for companies, regardless of their size or industry because of the brisk industrialization which has severely affected the environment and caused many social problems. These environmental and social problems have led governments, businesses, and organizations to focus on reducing the unsustainable behaviors in their processes and ensuring a balance between economic, social and environmental benefits (Marhraoui & El Manouar, 2018; Diófási-Kovács, 2021). Organizations have begun to move away from usual business models and start adopting and reporting on sustainability standards (United Nations, 2019).

According to the World Commission on Environment and Development, the generic definition of sustainability is the satisfaction of the needs of the present generation without compromising the ability of future generations to meet their own needs (Kuhlman & Farrington, 2010; Miceli, Hagen, Riccardi, Sotti, & Settembre-Blundo, 2021). Sustainable development describes the processes and development strategies for improving both short term and long-term economic well-being and quality of life without depriving future generations from meeting their needs (Maryville, 2021). The concept of sustainable development is recognized with three essential aspects or pillars which are: economic, social, and environmental

sustainability. The three aspects or pillars of sustainable development are also referred to as the Triple bottom line (TBL) or the 3P (profits, people, and planet) framework. The triple bottom line is a framework for sustainability originating within a business context (McKenzie, 2004). This framework implies that companies must prepare three different bottom lines. The first is the traditional profit or loss account. The second is the people account which measures how the organization's operations are socially responsible. Lastly the planet account which measures the extent to which the organization is environmentally responsible (Agnieszka, 2015). There is an agreement between sustainability researchers and practitioners that sustainable development of societies is unlikely without the sustainable development of organizations (Schaltegger, Hansen, & Lüdeke-Freund, 2016).

### ***Perceived Organizational Sustainability:***

Measuring sustainability enables organizations to assert if they are making an improvement in one or more of the three main sustainability domains. Many indicators and sustainability measures have been developed in the last 15 years to evaluate and report a company's economic, social, and environmental sustainability performance (Medel-González, García-Ávila, Acosta-Beltrán, & Hernández, 2013). However, measuring organizational sustainability is difficult and entails many challenges for organizations (Medel-González, García-Ávila,



Acosta-Beltrán, & Hernández, 2013; Cohen, 2020; Balasubramanian & Balaji, 2020). First, because it is a relatively new concept, there is no universal definition assigned to the concept nor a widely agreed or regulated measuring criteria. Secondly, sustainability is a wide concept that encompasses many aspects of the society, economy, and governing institutions in addition to interactions with the natural environment (Medel-González, García-Ávila, Acosta-Beltrán, & Hernández, 2013; Balasubramanian & Balaji, 2020). Additionally, some data concerning some aspects of sustainability are not immediately measurable. They are considered “*latent*”, making organizational sustainability harder to measure (Gallo, 2019). Furthermore, sustainability should be measured across the value chain, not just inside one organization, and should include both upstream and downstream suppliers and customers (Fiksel, McDaniel, & Mendenhall, 1999; Diófási-Kovács, 2021).

Considering the multidisciplinary nature of Organizational Sustainability measures and the many challenges associated with them, this research focuses on measuring employees’ perception regarding organizational sustainability or perceived organizational sustainability to avoid such challenges.

### ***2.3 Digitalization and Organizational Sustainability***

Digitalization and the adoption of intelligent technologies have led to the transformation of businesses and organizations and the development of new business models and leaner

production processes. Moreover, digital technologies are also presenting organizations with solutions to address sustainability issues by increase their financial numbers, their social footprint on communities and reducing their negative impacts on environment (Vidmar, 2019; Diófási-Kovács, 2021).

According to Mrugalska & Ahmed (2021), digitalization is vital in achieving corporate sustainability goals and improving the ability to report successfully from a TBL standpoint. They state that digital technologies are cost-effective because they make production processes more lean and agile allowing businesses to accomplish their economic goals by reducing costs and increasing profits. Additionally, digitalization enhances firms' agility and reduces workloads, which in turn, helps create new economic possibilities, new jobs, innovative products, and services that can benefit society. They also declare that with digitalization, new production techniques and energy saving technologies are being developed and adopted by organizations to improve environmental sustainability while generating minimal harm. These technologies and techniques enable organizations to compete in the market with lower energy consumption levels leading to cost savings and the satisfaction a new type of customer that is environmentally conscious (Mrugalska & Ahmed, 2021).

Chandola (2016) indicates that digital transformation has a substantial impact on organizational sustainability. His study reported several benefits of digital transformation regarding different sustainability aspects which include improvements in process efficiency, faster decision making, improvements in supply chain tracking, reduction in carbon footprint, meeting of regulatory requirements and enhanced employee and worker productivity and safety. Similar benefits of digitalization regarding sustainability were also reported by Chen, Despeisse, & Johansson (2020) and Miceli, Hagen, Riccardi, Sotti, & Settembre-Blundo (2021). The Global e-Sustainability Initiative (GeSI) suggests that digitalization and the use of information communication technologies (ICT) can lead to a 20% reduction in carbon emissions by 2030 (GeSI, 2015).

However, digitalization and technology are not neutral, especially when evaluated from a socio–environmental–economic systems standpoint. Chen, Despeisse, & Johansson (2020) believe that the increased resource and energy use due digitalization, as well as waste and emissions from manufacturing, use, and disposal of the hardware could have a negative impact on the environment. Besides, technological or industry disruption generated or triggered by digitalization could also cause turbulence and rebound effects and can also have negative effects on organizational sustainability. (Chen, Despeisse, & Johansson, 2020; Miceli, Hagen, Riccardi, Sotti, &

Settembre-Blundo, 2021). Therefore, the relationship between digitalization and organizational sustainability needs further investigation.

### ***Digitalization and Sustainability in Egypt***

Egypt has formulated a comprehensive insightful vision for Egypt digitalization that is in line with Egypt Vision 2030 and its commitment towards Sustainable Development Goals (SDGs) 2035. The Egyptian government has taken significant steps towards transforming Egypt into a digital society integrating technology in every aspect of life through promoting and developing the infrastructure of communications and information technology, improving digital services at all ministries and government agencies and raising the efficiency of governmental services (MCIT, ICT Minister Delivers Talk at Parliament Plenary Session, 2021). Egypt is also sincerely committed to the UN Sustainable Development Goals and environmental responsibilities. This is clearly reflected in its efforts in improving the quality of life for its citizens and its recent hosting of the United Nations Climate Change Conference COP27 held in November 2022 (Ramadan, 2022).

## **3. Theoretical framework and Research methodology**

### ***3.1. Theoretical framework***

Given the limited research investigating the relationship between Digitalization and Perceived Organizational Sustainability in literature and the lack of sufficient empirical

studies exploring this relationship, and based on the previous literature review, the following main research hypothesis is formulated:

***H1: Digitalization is positively affecting Perceived Organizational Sustainability.***

Moreover, the limited literature depth examining the impact of digitalization on the different aspects of organizational sustainability encouraged this research to examine the impact of digitalization on different dimensions of perceived organizational sustainability. The impact of digitalization on six factors influencing employees' perception on organizational sustainability is tested. These factors or dimensions are identified by Balasubramanian & Balaji (2020) in their scale measuring employees' perception on sustainability of organizations and are: financial sustainability, governance sustainability, employee-related sustainability, public related sustainability, environment management and pollution control measures. The research model is presented in (figure 1). Financial sustainability and governance sustainability dimensions represent the economic aspect of sustainability. The employee-related sustainability and public related sustainability represent the social sustainability aspect. Lastly, environmental management sustainability and pollution control measures represent the environmental aspect of sustainability. Accordingly, the following sub-hypotheses are formulated:

***H 1.1: Digitalization is positively affecting financial sustainability.***

***H 1.2:***

***Digitalization is positively affecting governance sustainability.***

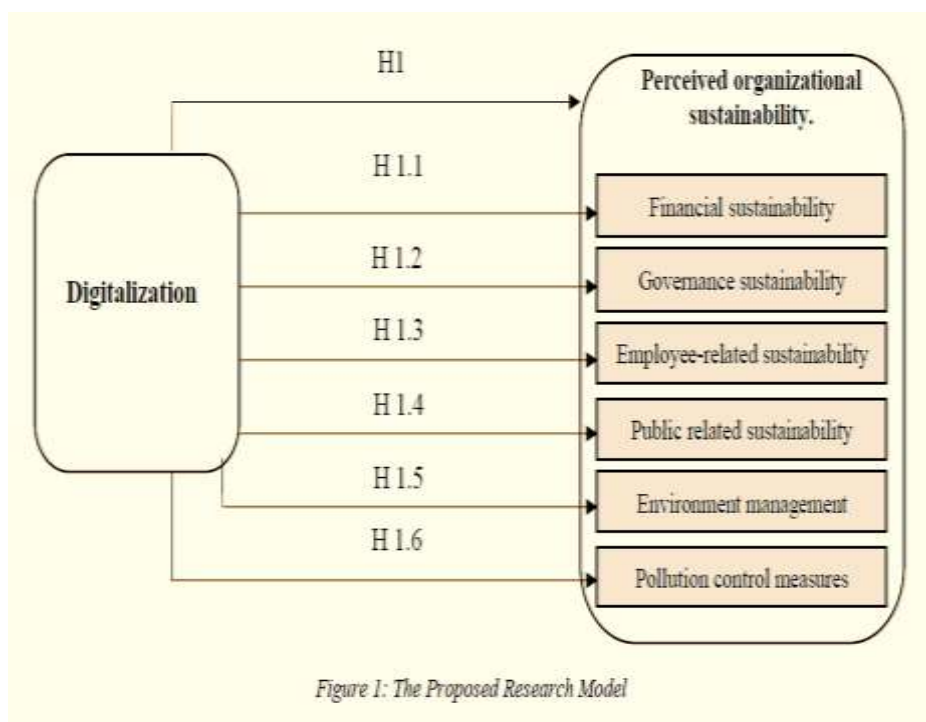
***H 1.3: Digitalization is positively affecting employee-related sustainability.***

***H 1.4: Digitalization is***

***positively affecting public related sustainability.***

***H 1.5: Digitalization is positively affecting environment management.***

***H 1.6: Digitalization is positively affecting pollution control measures.***



**Figure 1: The Proposed Research Model**

### **3.2. Research Methodology**

This is hypothesis testing research in which the quantitative approach is used. Online Self-administered questionnaires are used to collect primary data. The unit of analysis is individuals. The target population of this research consists of all the employees working in the ICT sector in Egypt. The size of the target population is 281,000 employees as reported by the Ministry of Information and Communications Technology in 2021 (MCIT, 2021). The calculated sample size is equal to 384 individuals. Simple random sampling is used in this research as the sampling technique. The questionnaire used in this research is adopted from a combination of sources developed by different researchers. “*The measurement model for digital maturity*” developed by Rossmann (2018) is used to measure digitalization (the independent variable) whereas the dependent variable “Perceived Organizational Sustainability” has been measured using “*The Organizational sustainability scale measuring employees’ perception on sustainability of organization*”, that is developed by Balasubramanian & Balaji (2020). Table (1) summarizes the origin of constructs of the questionnaire. A total of 399 complete responses from employees working in the ICT sector in Egypt is analyzed. Most of the research sample has an age of 36 or more (~ 66%). This is related to the high prevalence of the higher managerial levels in the

studied sample (top management and middle management are presented in 29.8 and 46.6% of the research group, respectively). The dominance of the higher levels of management has also influenced the categories of experience, where most of the study group has more than 10 years of experience (73.2%). A summary of the demographic and professional characteristics of this research group is presented in Table (2).

*Table 1: Origin of constructs of the questionnaires*

Section A		
Information	Items	Adopted From
Demographic profile	5	Developed by the author
Section B		
<b>Digitalization</b>	32	Rossmann (2018)
<b>Perceived Organizational Sustainability</b>	26	Balasubramanian & Balaji (2020)
<ul style="list-style-type: none"> <li>- Financial sustainability (4 items)</li> <li>- Governance sustainability (4 items)</li> <li>- Employee-related sustainability (5 items)</li> <li>- Public related sustainability (4 items)</li> <li>- Environment management (4 items)</li> <li>- Pollution control measures (5 items)</li> </ul>		
<b>Total</b>	63	



**Table 2: Distribution of the study sample based on professional and demographic characteristics.**

<b>Characteristic</b>	<b>Number of responses</b>	<b>Percent of respondents</b>
<b>Gender</b>		
Female	104	26.07
Male	295	73.93
<b>Age</b>		
<25 y	1	0.25
25-35 y	131	32.83
36-45 y	183	45.86
>46 y	84	21.05
<b>Experience</b>		
<2 y	17	4.26
2-5 y	33	8.27
6-10 y	57	14.29
>10 y	292	73.18
<b>Managerial Level</b>		
Middle Management	186	46.62
Supervisor and staff	94	23.56
Top management	119	29.82
<b>Organization's business field</b>		
Applications and outsourcing services	112	28.07
Hardware	55	13.78
IT-enabled services	67	16.79
Networks and infrastructure	98	24.56
Software development	67	16.79

### ***3.2.1 Reliability and Validity***

The reliability of the items used to measure each variable in the questionnaire is assessed using Cronbach alpha. All estimates are greater than 0.7 indicating the adequate reliability of the survey components. Cronbach alpha has reached 0.996 for the digitalization part of this questionnaire, and the estimates of its subdomains range between 0.774 - 0.908. For the perceived organizational sustainability, estimates of Cronbach alpha range between 0.853 - 0.897. The overall estimate of the perceived organizational sustainability part is 0.954. The estimated reliability for all items of the survey is 0.983. The internal consistency of the questionnaire is measured using the Pearson correlation coefficient (r) by comparing the Pearson correlation coefficient of each of the domain's items with the total score for the domain to which it belongs. It is clear from the results presented in Table (3) and Table (4) that all the items of all domains of the questionnaire are statistically significant at a level of significance less than 0.001, and therefore all the items belonging to each subdomain are internally consistent with the subdomain, and accordingly, the components of the questionnaire are characterized by internal consistency, which makes it valid for analyzing the results.

*Table 3: Correlations between individual survey items and the total score of the corresponding study subdomain of Digitalization.*

Domain	Item	Correlation	P	Significance
<b>Strategic Capability</b>	1	0.882	<0.001	Significant
	2	0.888	<0.001	Significant
	3	0.905	<0.001	Significant
	4	0.866	<0.001	Significant
<b>Leadership Capability</b>	1	0.706	<0.001	Significant
	2	0.676	<0.001	Significant
	3	0.821	<0.001	Significant
	4	0.837	<0.001	Significant
<b>Market Capability</b>	1	0.740	<0.001	Significant
	2	0.819	<0.001	Significant
	3	0.828	<0.001	Significant
	4	0.838	<0.001	Significant
<b>Operational Capability</b>	1	0.790	<0.001	Significant
	2	0.853	<0.001	Significant
	3	0.775	<0.001	Significant
	4	0.828	<0.001	Significant
<b>People and Expertise Capability</b>	1	0.715	<0.001	Significant
	2	0.825	<0.001	Significant
	3	0.867	<0.001	Significant
	4	0.793	<0.001	Significant
<b>Cultural Capability</b>	1	0.875	<0.001	Significant
	2	0.802	<0.001	Significant
	3	0.765	<0.001	Significant
	4	0.800	<0.001	Significant
<b>Governance Capability</b>	1	0.821	<0.001	Significant
	2	0.868	<0.001	Significant
	3	0.837	<0.001	Significant
	4	0.837	<0.001	Significant
<b>Technology Capability</b>	1	0.812	<0.001	Significant
	2	0.872	<0.001	Significant
	3	0.862	<0.001	Significant
	4	0.786	<0.001	Significant

*Table 4: Correlations between individual survey items and the total score of the corresponding study subdomain of the perceived organizational sustainability*

Domain	Item	Correlation	P	Significance
<b>Financial sustainability</b>	1	0.823	<0.001	Significant
	2	0.826	<0.001	Significant
	3	0.785	<0.001	Significant
	4	0.856	<0.001	Significant
<b>Governance sustainability</b>	1	0.895	<0.001	Significant
	2	0.889	<0.001	Significant
	3	0.826	<0.001	Significant
	4	0.840	<0.001	Significant
<b>Environmental management sustainability</b>	1	0.753	<0.001	Significant
	2	0.848	<0.001	Significant
	3	0.862	<0.001	Significant
	4	0.849	<0.001	Significant
	5	0.830	<0.001	Significant
<b>Pollution control Measures</b>	1	0.822	<0.001	Significant
	2	0.908	<0.001	Significant
	3	0.730	<0.001	Significant
	4	0.840	<0.001	Significant
<b>Employee related sustainability</b>	1	0.796	<0.001	Significant
	2	0.790	<0.001	Significant
	3	0.812	<0.001	Significant
	4	0.828	<0.001	Significant
	5	0.749	<0.001	Significant
<b>Public related sustainability</b>	1	0.804	<0.001	Significant
	2	0.861	<0.001	Significant
	3	0.863	<0.001	Significant
	4	0.764	<0.001	Significant

## 4. Research results

### 4.1 Correlation Analysis

To test this research hypotheses, correlation analysis is conducted. Pearson's correlation coefficient  $r$  measures the strength of the relationship and provides information on the magnitude and direction of the relationship between the different research variables. Table 5 shows the results of the correlation analysis. The results of testing the main hypothesis of this research, *H1: Digitalization is positively affecting Perceived Organizational Sustainability*, demonstrate the existence of a statistically significant strong direct correlation between digitalization and perceived organizational sustainability ( $r = 0.780$ ,  $P < 0.001$ ) which proves that an organization's digitalization efforts could significantly lead to improvements in its overall perceived sustainability.

Correlation analysis is also conducted to measure the magnitude and direction of the relationship between digitalization and the different dimensions of perceived organizational sustainability to determine which aspect of perceived organizational sustainability is mostly affected by digitalization. The results show a statistically significant direct correlation between digitalization and all the different dimensions of perceived organizational sustainability; accordingly, the sub-hypotheses of this research are all accepted (Table 5). However, the dimensions representing perceived

environmental sustainability (Environment management and pollution control measures) show the lowest correlation coefficient values,  $r = 0.482$  and  $0.518$  respectively. The results demonstrate moderate to high direct correlation between digitalization and the dimensions representing the economic aspect of perceived sustainability (Financial and Governance sustainability) with correlation coefficients equal to  $0.536$  and  $0.731$  respectively. Lastly, the relationship between digitalization and the dimensions representing perceived social sustainability (Employee related sustainability and Public related sustainability) reveals the existence of moderate to high direct correlation with the highest correlation coefficients of  $0.670$  and  $0.736$  respectively. Table (5) summarizes the correlation analysis results.

**Table 5: Correlation analysis results**

Hypothesis	Relationship	Correlation coefficient (r)	P-value	Significance
<b>H1</b>	Digitalization→ Perceived Organizational Sustainability	0.780	<0.001	Significant
<b>H1.1</b>	Digitalization→ Financial sustainability	0.536	<0.001	Significant
<b>H1.2</b>	Digitalization→ Governance sustainability	0.731	<0.001	Significant
<b>H1.3</b>	Digitalization→ Employee related sustainability	0.670	<0.001	Significant
<b>H1.4</b>	Digitalization→ Public related sustainability	0.736	<0.001	Significant
<b>H1.5</b>	Digitalization→ Environment management sustainability	0.482	<0.001	Significant
<b>H1.6</b>	Digitalization→ Pollution control measures	0.518	<0.001	Significant

## 4.2 Regression Analysis

Based on the findings of the correlation analysis, we conclude that there is a direct statistically significant relationship between digitalization (independent variable) and perceived organizational sustainability (dependent variable). Therefore, in this part of the analysis, the aim is to quantify this relationship through analyzing the linear regression model that could be used to predict perceived organizational sustainability based on digitalization (independent variable). The results presented in Table (7) demonstrates the significance of the regression model and indicate that the proposed model show a statistical significance at a level less than 0.001, which indicates the validity of its use to predict the dependent variable “Perceived organizational sustainability”. Table (6) shows that the coefficient of determination  $R^2$  for the independent variables (digitalization) can explain 60% of the variation in the dependent variable (perceived organizational sustainability), which is a good explanatory power that expresses the validity of implementing this model to estimate the degree of perceived organizational sustainability.

**Table 6: Summary of the regression model for predicting Perceived organizational sustainability based on digitalization.**

Model	R	R Square	Adjusted R <sup>2</sup>	Std. Error of the Estimate
Digitalization	.780	.609	.608	11.31900

**Table 7: Results of ANOVA regression of the perceived organizational sustainability based on digitalization.**

Model	Sum of Squares	DF	Mean Square	F	Sig.
<b>Regression</b>	79192.814	1	79192.814	618.116	<0.001
<b>Residual</b>	50863.517	397	128.120		
<b>Total</b>	130056.331	398			

Based on the validity of the proposed model and on the information shown in table (8), the following equation is formulated to predict the degree of perceived organizational sustainability using digitalization as follows:

$$\text{Total (predicted) Perceived organizational sustainability} = 24.38 + 0.59 * (\text{Digitalization}).$$

This equation shows that a change of one unit in digitalization leads to a change of 0.59 unit in perceived organizational sustainability.

**Table 8: The final multivariate model for the perceived organizational sustainability based on digitalization**

Model	Coefficients	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	24.380	2.752		8.860	<0.001
	Digitalization	.590	.024	.780	24.862	<0.001

a. Dependent Variable: Perceived organizational sustainability

Table (9) shows the results of a univariate regression analysis examining the relationship between the total domain of digitalization and individual dimensions of perceived



organizational sustainability. The adjusted R-squared values range from 0.26 to 0.57, indicating that the individual dimensions of perceived organizational sustainability are moderately to strongly associated with digitalization. All regression coefficients are positive and statistically significant at  $p < 0.001$ , indicating that as the level of digitalization increases, the perceived sustainability across all domains also increases. The results suggest that digitalization has a positive impact on perceived organizational sustainability, including financial, governance, environmental management, pollution control measures, employee, and public-related sustainability.

**Table 9: Univariate regression of the total domain of digitalization vs the individual domains of perceived organizational sustainability**

Variable	Adjusted R <sup>2</sup>	Unstandardized B (regression coefficient)	SE	t-value	P-value
Financial sustainability	0.34	0.08	0.006	14.2	<0.001
Governance sustainability	0.56	0.11	0.005	22.64	<0.001
Environmental management sustainability	0.26	0.1	0.009	11.66	<0.001
Pollution control measures	0.29	0.079	0.006	12.68	<0.001
Employee sustainability	0.502	0.12	0.006	20.04	<0.001
Public related sustainability	0.57	0.11	0.005	23.08	<0.001

## 5. Discussion

Based on the statistical analysis results of the data collected from 399 valid questionnaires from employees of ICT companies based in Egypt, all hypotheses of this current research are supported, demonstrating that digitalization is positively impacting Perceived Organizational Sustainability and all its six dimensions. However, Digitalization reports the highest effect on the dimensions representing the social aspect of sustainability then on dimensions of perceived economic sustainability. The effect of digitalization on dimensions of perceived environmental sustainability is the lowest. These results fully support the results of Diófási-Kovács (2021) who examines the effects of digitalization projects on the sustainability performance of logistics service providers. The findings of his study indicate that digitalization projects have a beneficial impact on both economic and social sustainable performance while environmental sustainability isn't influenced considerably. These results are also in line with the results reported by Marhraoui & El Manouar (2018) who confirm that IT innovation has a positive direct effect on all three dimensions of organizational sustainability (social, environmental, and economic). It also agrees with the results of El Hilali, El Manouar and Idrissi (2019) as their empirical study reveals that digital transformation factors (the customers, data and innovation) have a significant positive impact on enhancing organizational sustainability. However, only one of the digital

transformation factors (competition) doesn't show a significant influence in raising sustainability. This result may be related to the different nature of the Moroccan economy in which the study was conducted as well as the different tools used in measuring the research variables. The research results of Kayikci (2018) partly support the results of this research as it shows that the use of digital technologies and applications in logistics and transport service providers have a huge impact on organizational sustainability especially on economic sustainability (in terms of logistics cost, delivery time, delay, inventory, reliability, and flexibility issues) as well as on environmental sustainability (like reducing waste, pollution and gas emissions). However, the results regarding social implications of digitization had generally poor impact. This result might be related to the different nature of the logistics industry.

The preliminary research model proposed by Vidmar (2019) also supports this research results and suggests that IT has an effect in changing business models (BM) which in turn positively influence sustainability. Other theoretical evidence that supports the result of this research includes Chandola (2016) who reports significant impacts and benefits of digital transformation regarding different sustainability aspects in addition to the theoretical contribution of both Chen, Despeisse, & Johansson (2020) and Miceli et al. (2021), however, they propose that

digitalization could also have rebound effects that could negatively influence organizational sustainability.

## **6. Managerial Implications**

Based on the findings of this research, organizations are recommended to develop a clear and well-defined digital strategy that is aligned with their sustainability goals to ensure a successful digital transformation and enhanced organizational sustainability. Organizations should also establish clear goals and metrics to measure progress regarding digital transformation and sustainability goals. This will help organizations stay on track and make necessary adjustments along the way. They are also advised to adopt a customer-centric approach where they should prioritize understanding the needs and preferences of their customers, use digital technology to create solutions that meet those needs and deliver a seamless, personalized experience to customers across all channels to foster economic sustainability. Organizations also need to invest in the right digital infrastructure like robust networks, cloud-based systems, and modern hardware and software that can help track, optimize resource use and promote a culture of sustainability within the organization. This can help organizations improve their operations, enable new ways of working and collaboration, reduce their environmental impact and improve sustainability. Lastly, digitalization is a continuous process, so organizations are

advised to ensure that employees have the skills and knowledge they need to keep up with the rapid pace of change, stay up to date with the latest technologies and practices of sustainability.

## **7. Limitations and Future work**

This research clearly has some limitations that need to be considered. First, this research is limited to the Egyptian ICT sector. This somehow limits the generalization of the research results beyond this context. Future researchers may consider broadening the scope of this research to cover other industries or sectors and more regions and countries to increase generalizability. Secondly, the measures used in this research reflect respondents’ perceptions and opinions rather than objective facts. Furthermore, this research is a cross-sectional study in which data is only collected at a point of time. Hence, the results should also be tested using longitudinal research setting to provide better understanding and follow up for any change or development in the characteristics of the target population (Serkaran & Bougie, 2016).

## **8. Conclusion**

This research tries to examine how organizations can exploit the potential of digitalization in enhancing sustainability and realising a balance between economic, social and environmental goals. Findings of this research proves the existance of a positive relationship between digitalization and different dimensions of perceived organizational sustainability. Overall, digitalization

can help organizations become more sustainable by enabling them to operate more efficiently, improve transparency, serve their customers better, achieve greater innovation and create value for all stakeholders. However, it is important for organizations to carefully consider the potential risks and unintended consequences of digitalization and ensure that it is implemented in a responsible and sustainable manner.

## 9. References:

- Agnieszka, Z. (2015). The tripple bottom line concept in theory and pactice. In M. Rojek-Nowosielska, *Social Responsibility of Organizations Directions of Changes* (pp. 251-263). Cracow: Publishing House of Wrocław University of Economics.
- Balasubramanian, N., & Balaji, M. (2020). Organisational sustainability scale-measuring employees' perception on sustainability of organisation. *Mesuring Business Excellence*.
- Bloomberg, J. (2018, March 29). *Digitization, Digitalization, And Digital Transformation: Confuse Them At Your Peril*. Retrieved from Forbes:  
<https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/?sh=36528f972f2c>
- Boulton, C. (2021, June 24). *What is digital transformation? A necessary disruption*. Retrieved 8 4, 2021, from cio.com:  
<https://www.cio.com/middle-east/>
- Chandola, V. (2016). *Digital Transformation and Sustainability*. Harvard University, Extension Studies in candidacy for the degree of Master

- of Liberal Arts (ALM) in Sustainability. Cambridge, Massachusetts: <https://www.researchgate.net/publication/292983072>.
- Chen, X., Despeisse, M., & Johansson, B. (2020). Environmental Sustainability of Digitalization in Manufacturing: A Review. *Sustainability*, 12, 1-31.
- Clerck. (2017). *Digitization, digitalization and digital transformation: the differences*. Retrieved August 4, 2021, from i-scoop: <https://www.i-scoop.eu/digital-transformation/digitization-digitalization-digital-transformation-disruption/>
- Cohen, S. (2020, October 19). *Defining and Measuring Sustainability*. Retrieved from The Columbia Climate School: <https://news.climate.columbia.edu/2020/10/19/definingmeasuring-sustainability-2/>
- Diófási-Kovács, O. (2021). Exploring Effects of Digitalization on Sustainability in the Logistics Service Industry. In S. H. Park, M. A. Gonzalez-Perez, & D. Floriani, *The Palgrave Handbook of Corporate Sustainability in the Digital Era* (pp. 455-478). Palgrave Macmillan.
- El Hilali, W., El Manouar, A., & Idrissi, M. A. (2019). Reaching sustainability during a digital transformation: a PLS approach. *International Journal of Innovation Science*, 12(1), 52-79.
- El Hilali, W., El Manouar, A., & Idrissi, M. A. (2019, 1). Reaching sustainability during a digital transformation: a PLS approach. *International Journal of Innovation Science*, 12(1), 52-79.
- Fiksel, J., McDaniel, J., & Mendenhall, C. (1999). Measuring progress towards Sustainability Principles, Process and best practices . *Greening of Industry Network Conference* (pp. 424-5730). Columbus, Ohio: Battelle Memorial Institute Life Cycle Management Group.

- Finch, S. (2020, 9 13). *Digitising vs Digitalising – What’s the difference?* Retrieved from foundry4.com: <https://foundry4.com/digitising-vs-digitalising-your-business-whats-the-difference>
- Gallo, A. (2019, October 22). *5 indicators for measuring your company’s sustainability and for avoiding Greenwashing* . Retrieved from ecobnb.com: 5 indicators for measuring your company’s sustainability and for avoiding Greenwashing
- Gartner. (2017). *Gartner, October 02,2017 The Gartner 2018 CIO Agenda Industry Insights l Gartner, Inc.* Gartner, Inc.
- Gavrila, S. G. (2021). COVID-19 as an entrepreneurship, innovation, digitization and digitalization accelerator: Spanish Internet domains registration analysis. *British Food Journal*, 132(10), 3358-3390.
- GeSI, G. e.-S. (2015, June 9). *ICT Solutions for 21st Century Challenges*. Retrieved from smarter 2030: <http://smarter2030.gesi.org>
- Isensee, C., Teuteberg, F., Griese, K.-M., & Topi, C. (2020). The relationship between organizational culture, sustainability, and digitalization in SMEs: A systematic review. *Journal of Cleaner Production*, 275, 1-18.
- Ismail, M. H., Khater, M., & Zaki, M. (2018). *Digital Business Transformation and Strategy: What Do We Know So Far?* Univerity of Cambridge. [https://cambridgeservicealliance.eng.cam.ac.uk/system/files/documents/2017NovPaper\\_Mariam.pdf](https://cambridgeservicealliance.eng.cam.ac.uk/system/files/documents/2017NovPaper_Mariam.pdf).
- Kayikci, Y. (2018). Sustainability impact of digitization in logistics. *Procedia Manufacturing*. 21, pp. 782–789. 15th Global Conference on Sustainable Manufacturing.
- Kuhlman, T., & Farrington, J. (2010). What is Sustainability? *Sustainability*, 2(11), 3436-3448.



- Marhraoui, M. A., & El Manouar, A. (2018). IT Innovation and Firm's Sustainable Performance: The Intermediary Role of Organizational Agility – An Empirical Study. *I.J. Information Engineering and Electronic Business*, 3, 1-7.
- Maryville. (2021). *Sustainability vs. Sustainable Development: Examining Two Important Concepts*. Retrieved from online.maryville.edu: <https://online.maryville.edu/blog/sustainability-vs-sustainable-development/>
- MCIT. (2021, February 7). *ICT Minister Delivers Talk at Parliament Plenary Session*. Retrieved from Ministry of Communication and Information Technology: [https://mcit.gov.eg/en/Media\\_Center/Press\\_Room/Press\\_Releases/57168](https://mcit.gov.eg/en/Media_Center/Press_Room/Press_Releases/57168)
- MCIT. (2021, Feb 7). *ICT Minister Delivers Talk at Parliament Plenary Session*. Retrieved from The Ministry of Communications and Information Technology: [https://mcit.gov.eg/en/Media\\_Center/Press\\_Room/Press\\_Releases/57168](https://mcit.gov.eg/en/Media_Center/Press_Room/Press_Releases/57168)
- McKenzie, S. (2004). *Social Sustainability: Towards some definitions*. University of South Australia. Magill, South Australia: Hawke Research Institute. Retrieved from University of Cambridge, Cambridge Service Alliance.
- Medel-González, F., García-Ávila, L., Acosta-Beltrán, A., & Hernández, C. (2013). Measuring and Evaluating Business Sustainability: Development and Application of Corporate Index of Sustainability Performance. *Sustainability Appraisal: Quantitative Methods and Mathematical Techniques for Environmental Performance Evaluation*, 33-61.
- Mentsiev, A. U., Engel, M. V., Tsamaev, A. M., Abubakarov, M. V., & Yushaeva, R. S.-E. (2020). The Concept of Digitalization and Its Impact

- on the Modern Economy. *International Scientific Conference "Far East Con" (ISCFEC 2020)* (pp. 2960-2964). Atlantis Press SARL.
- Miceli, A., Hagen, B., Riccardi, M., Sotti, F., & Settembre-Blundo, D. (2021). Thriving, Not Just Surviving in Changing Times: How Sustainability, Agility and Digitalization Intertwine with Organizational Resilience. *Sustainability, 13*, 1-17.
- Mrugalska, B., & Ahmed, J. (2021). Organizational Agility in Industry 4.0: A Systematic Literature Review. *Sustainability, 13*, 1-23.
- Nwankpa, J. K., & Roumani, Y. (2016). IT Capability and Digital Transformation: A Firm Performance Perspective. *Thirty Seventh International Conference on Information Systems*. Dublin: AIS electronic library.
- Ramadan, R. (2022). The state of the Sustainable Development Goals in Egypt: focus on poverty and inequality. In M. Mohieldin, *Financing Sustainable Development in Egypt Report* (pp. 4-21). Cairo: League of Arab States.
- Raut, S. (2018, 8 29). *The Difference between Digitization and Digital Transformation*. Retrieved from thedigitaltransformationpeople.com: <https://www.thedigitaltransformationpeople.com/channels/the-case-for-digital-transformation/difference-digitization-and-digital-transformation/>
- Rossmann, A. (2019). Digital Maturity: Conceptualization and Measurement Model. *Thirty Ninth International Conference on Information Systems*, 2, pp. 1-9. San Francisco, California.
- Schaltegger, S., Hansen, E. G., & Lüdeke-Freund, F. (2016). Business Models for Sustainability: Origins, Present Research, and Future Avenues. *Organization & Environment, 29*(1), 3-10.
- Serkaran, U., & Bougie, R. (2016). *Research Method for Business: A skill building approach* (Vol. 7th edition). Chichester, West Sussex, United Kingdom: John Wiley & Sons.

United Nations. (2019). *The Future is Now: Science for Achieving Sustainable Development Global Sustainable Development Report 2019*. New York: United Nations publication issued by the Department of Economic and Social Affairs.

Vidmar, D. (2019). Effects of digital technologies on sustainability performance: business model perspective. *Humanizing Technology for a Sustainable Society* (pp. 1231-1244). Bled, Slovenia: 32nd Bled E-Conference.