Digital transformation of accounting practices and behavior during COVID-19: MENA evidence

Khalil Feghali [1,a], Joëlle Matta [b] and Samir Moussa[a]

[a] *Faculty of Economics and Business Administration, Lebanese University, Lebanon*
[b] *Doctoral School of Law, Political, Administrative and Economic Sciences, Lebanese University, Lebanon*

Abstract

Research Question: What are the impacts of digital transformation of accounting practices and behavior following the COVID-19 pandemic?

Motivation: The outbreak of the health crisis linked to COVID-19 pandemic has turned massively the companies to adopt digital platforms for accounting function in order to keep concurrent pace with the emergent crisis at all levels (Begum, 2019). Many tools have emerged in terms of accounting procedures such as Artificial Intelligence, Big Data, e-accounting, and its adoption impacted accountant's behavior (Damerji & Salimi, 2021). Key stakeholders of this study include accountants and companies.

Idea: We examine the impact of level of digitalization and changes caused by COVID-19 on accountant's behavior throughout multiple items. The independent variables utilized were, firm size, sector and position within companies.

Data: We surveyed and analyzed a sample of 568 accountants operating in private companies in the MENA region, between February and April 2021, using SPSS software.

Tools: A quantitative approach is adopted through a questionnaire-based survey. A sample of accountants in the MENA region was surveyed.

Findings: Results show that changes caused by COVID-19 have a negative effect on accountant's behavior in terms of attitude, effort, expectancy, and adaptation. Otherwise, the level of digitalization, position occupied by the accountant and firm size have a positive effect on accountant's behavior in MENA region.

---

[1] *Corresponding author:* Khalil Feghali, Faculty of Economics and Business Administration, Lebanese University, Lebanon, Tel. (+961) 3 925862, email address: khalilfeghali@yahoo.fr

Contribution: This paper contributes to literature by finding a concept foundation in order to help accounting profession in MENA region to digital transformation many processes. This paper helps accountants to adapt to changes engendered by COVID-19.

Keywords: digital transformation, accounting practices, behavior, COVID-19.

JEL codes: M40, M41, O30, O31, O32, O33

1. Introduction

The health crisis has reigned the world and has unexpected effects. According to the World Economic Forum, COVID-19 pandemic gives a very strong boost to the digitalization of the world of business: more robots and Artificial Intelligence, fewer manual tasks. Around 77% of companies, projects related to digital transformation had to be overhauled because of the COVID-19 health crisis (Narisetti, 2020). In fact, all business entities are now concerned and must digitize their accounting, at the same time, adapt their manual processes for more agility, fluidity, efficiency, and simplicity. As well, companies, especially their accounting department have to improve their customer relation management system in terms of turnover and margins. They have to dematerialize to improve performance and productivity, and redesign human resources management to develop necessary digital skills (Mazurchenko & Maršíková, 2019). In the sequence of ideas, digitalization affects several accounting practices through innovative digital tools (Bampoky, 2017). In a world increasingly dominated by data, the digitalization of accountant processes must be acquired as quickly as possible in order to reach better decision-making process. In fact, accountants are on the front line of data acquisition and processing and in heart of data control (Bhimani & Willcocks, 2014).

The main objective of this paper is to investigate the level of digital transformation of accounting practices following COVID-19 pandemic in the MENA region and its impact on an accountant's behavior. The most recent used technologies in business are chosen to represent the level of digitalization in those companies in light of the emerging pandemic of COVID-19. This paper will examine the accountant's behavior in response to those sudden changes in organization and accounting practices.

This study will provide significant data about the level of digital transformation of accounting practices following the COVID-19 in MENA region and simplified explication of accountant's behavior following this forced digitalization. The approach of digital transformation/employees' behavior can assist accountants within companies to familiarize with the future of accounting profession and new technologies' effects on accounting practices within the region. Digital

transformation leads to radical modifications in businesses' operations and on individual's perceptions and behaviors. Moreover, Digital transformation leads to radical modifications in businesses operations and on individual's perceptions and behaviors.

This paper concluded to a concept foundation which helps organizations ease and facilitate the process of digital transformation of accounting processes following COVID-19. in addition, this paper offers a unique perspective, based on the existent circumstances, and explore its effect on accountant's behavior. This paper will assist upper management to refer and have scientific data and resources regarding accounting's digital transformation and accountant's behavior.

This research added to the growing body of literature by investigating the changes that occur in the accounting profession in the MENA region in light of digital transformation. By focusing on practice, we seek to shed the light on contributions to the professional accounting literature. We commenced by a perspective of the stage of accounting profession in MENA countries (Aburous & Kamla, 2021), then we focused on digital transformation techniques that could be deployed by accountants. We extend this literature by studying the digital transformation under the COVID-19 situation and by revealing the accountant's interaction and behaviors in this case.

In this context, the question arises: What are the impacts of digital transformation of accounting practices and behavior following COVID-19 pandemic? Specifically, this involves answering the following questions: Is the digitalization of accounting forced by COVID-19? How are traditional accounting procedures and practices effected by the digitalization and what are the new technologies involved in these processes? What are the effects of this transformation on an accountant's behavior?

The paper outline is as follows: section 2 includes a literature review and concept foundations regarding digital transformation of accounting practices. Section 2 also includes highlights on technologies, processes and accountant's behavior during the pandemic. Section 3 includes the methodology of the current study followed by findings and discussion of the outcomes. The final section includes a conclusion and recommendations.

2. Literature review and hypotheses development

Companies are going through an unprecedented health crisis, which is affecting their survival and organization. COVID-19 obliges companies to go for technology watch themselves and to move toward new technologies. The existing literature review on digital transformation and existing research on crises and related behaviors will be discussed in the following section.

2.1 Digital transformation through the dematerialization of accounting processes

Dematerialization is not simply a matter of regulatory compliance or an information system project. Above all, it is a managerial, organizational, and human approach (Gulin *et al.*, 2019). Dematerialization the accounting processes makes it possible to create a digital organization appreciating the development of modern means of payment, dematerialization the tax procedures, and lawsuits. Moreover, it helps optimizing work processes and thus generates numerous qualitative and financial gains (Bîlcan *et al.*, 2019). Dematerialization the accounting processes also allows classification and facilitates access to consultation and research of accounting documents at the time of the review (Moudud-Ul-Huq *et al.*, 2020). The prospects of dematerialization do not end there; ultimately, it will make it possible to create new business processes and new accounting practices.

Accounting processing is based on the organization and recording of economic data necessary for the establishment of summary statements which are the balance sheet and the income statement. They are obviously linked to the operating activities of the company, but also to relationships with stakeholders such as employees, creditors, banks, tax authorities, and social organizations. Dematerialization of accounting consists of the transformation of multiple type of hard copies, invoices, taxes and bank documents, pay slips, etc. to a soft copy format ready to be incorporated into the digital processing of financial information (Begum, 2019). At the same point of view, dematerialization produces a sequence of computer processing linked to accounting processing and it refers to automated processing in the digital forms (Khan *et al.*, 2018).

Dematerialization includes new IT techniques and brings new methods for carrying out accounting tasks, recording and preparation of financial statements. This digitalization of accounting processing is related to a technological change causes upheavals in the execution of work by accountants and tends to affect their behavior towards an unusual and new accounting processing methods. Compared to the organizational changes that can be encountered by resistance to changes by employees, digitalization and improved accounting processes attempt to affect the behavior of accountants through changes in work modalities.

In order to deal with the repercussions of COVID-19, most companies have embarked on a process of dematerialization by adopting new information and communication technologies. Digital transformation corresponds to the electronic management of documents, which includes digitizing documents, having them analyzed by character recognition software, archiving them, and finally allowing their transmission via workflow-type tools, with automatic processing if possible (Zadorozhnyi *et al.*, 2018, Kersten *et al.*, 2017). The replacement of accounting

documents and papers by digital format documents facilitates day-to-day management (Lavault & Benyakhlef, 2005). Automation, secure exchanges, secure storage, and archiving are the most remarkable advantages of dematerialization. Automation, invoices' processing including digitalization, registrations and imputations, automatic recognition, electronic validation circuit, export of entries to accounting software, and finally electronic payment led to significant gains in terms of time and costs (Teru *et al.*, 2019). Hence, accounting dematerialization makes it possible to simplify the exchange of documents, save time and secure accounting procedures. What will be the technological and technical platforms used in the dematerialization process? This subject will be explored in the following section.

2.2 Stages of accounting profession in MENA countries and digitalization of its practices

Accounting profession in MENA countries has considerably marked development of accounting practices and adoption of IFRS. Moreover, investments, franchising and new ventures with international partners have also developed the business environments, and levels of professional accounting practices (Boolaky *et al.*, 2018).

Multiple countries in MENA region focuse on the macro level processes of Westernization concerning accounting profession, such as Jordan, United Arab Emirates, Qatar, Egypt... (Aburous, 2019). Meanwhile, the use of English language has been also influential in the opening of the accounting practices of these countries to International Standards (Aburous & Kamla, 2021). Many researchers studied the impact of cultural factor on accounting development and practice on MENA countries (Hofstede, 2011; Aburous, 2016). Hence, cultural aspect is composed from a wide combination of « language, attitude, morals, values, law, education, politics, social organization, and technology » (Eldarragi, 2008). Therefore, this section will be conducting an in-depth analysis concerning the digital transformation in accounting practices in MENA countries.

Digital transformation overly influences accounting practices that align with pervasive technology systems that assist with business procedures and operations. In this context, understanding the attitudes and behaviors of accountants is crucial, as their resistance or negativity can waste resources via ambivalence, and affect the development of accounting practices (Alamin *et al.*, 2020).

So, the digital shift creates new technological possibilities to be exploited: emerging technologies will spark innovation, drive changes, and influence organization processes including accounting profession. Digital transformation encompasses a wide range of technologies with varying degrees of diffusion in e-accounting. In this paper, Blockchain, Big Data, Artificial Intelligence will be discussed.

Blockchain

In a business which heavily depends on the transfer and exchange of strategic data, the Blockchain certifies the authenticity and integrity of a digital coin without trusted third parties and heralds a real revolution. Similar to all digital innovations, accountants seem determined not to be left behind. It seems appropriate to highlight the characteristics and the implications of Blockchain technology for the accounting profession (Carlozo, 2017).

Blockchain is characterized by three principles: transparency, data protection and decentralization (Desplebin *et al.*, 2018). This technology has essential characteristics that will enhance the functionality to continuous accounting and provoke fruitful digitizing of the accounting profession. Indeed, financial or non-financial information which is approved by the consensus protocol of the Blockchain, then downloaded and integrated into the Blockchain platform, cannot be modified without an easily visible and verifiable trace (Casino *et al.*, 2019); It is all about the immutability characteristic of the Blockchain platform. The Block chain platform, which is constituted as a decentralized construction, provides a more extensive communication of information (Bonsón & Bednárová, 2019). Likewise, information charged to specific data blocks is encrypted and can only be unlocked using a specific combination of public and private keys (Leloup, 2017). Furthermore, this control solution proposed by the Blockchain admits the possibility of defining degrees of transparency, which make it possible to have both a definable register and ledger, public, or private. Thus, Blockchain ensures data protection by inhibiting falsification and data erasure through promoting verification of information by network nodes and securing anonymization (Desplebin, *et al.*, 2019).

The Blockchain is a database that could constitute the next generalized evolution of accounting supports (Alarcon, 2018). The main and most interesting difference between the traditional databases which currently serve as accounting support and Blockchain is the data control solution. In fact, to modify a previous transaction, it would require reprocessing all following blocks in the chain. However, this sequence is impossible since it will exceed the speed of adding new blocks. Consequently, Blockchain is considered immune to modifications and subsequently compatible with accounting as a transaction ledger. The Blockchain would be the only solution that offers such data security in terms of reliability and inviolability (Coyne & McMickle, 2017).

These cited characteristics would allow the Blockchain to assert itself as a particularly relevant support for the keeping of a Journal and a Ledger at the intra-organizational level, as well as with external users such as shareholders or external auditors (Dai & Vasarhelyi, 2017; Desplebin, *et al.*, 2019; Rückeshäuser 2017).

Artificial intelligence

The emergence of Artificial Intelligence in accounting practices is accelerated with COVID-19 (Yoon, 2020). Moreover, Artificial Intelligence is considered to be an important lever for the growth of companies.

The transmission of information and dematerialized documents can significantly speed up processes; even automate them when accountants are able to define systematic rules. Thus, Artificial Intelligence is a decisive contribution because it makes it possible to identify, from different sources, the elements on which the management rules are based (Davenport *et al.*, 2020). This is what allows, for example, a robot to process invoices regardless of their formats and presentations. However, the ability of Artificial Intelligence to see faster and further than the human eye can also allow it to detect errors, gaps, or similarities in accounting documents. It is not a question of replacing accountants, but rather of strengthening their skills and capacities.

From a practical point of view, Artificial Intelligence also refers to machines, algorithms, or programs that draw inspiration from or imitate human skills like understanding natural language, identifying visual objects or reasoning in its various forms (Zouinar, 2020). Thus, Artificial Intelligence is a sophisticated tool capable of learning through training protocols.

Technically, accounting procedures begin with the analysis, quantification and reporting of large quantities of accounting documents such as payment slips, invoices, etc. Artificial Intelligence consists of automating some of this accounting work, and subsequently reducing the workload of accountants. Intelligent automation solutions for document processing are based on algorithms. Indeed, algorithms are able to handle repetitive and long tasks, thus leaving more time for accountants to focus on tasks with greater added value for companies (Wieringa, 2020). These algorithms are becoming more reliable, flexible, adaptable, allowing solutions to adapt naturally to files with variable structure, such as invoices (Ionescu, 2020). Thus, the data is recognized automatically, exhaustively and reliably, without any prior configuration required by a user. This technological tool constitutes a competitive advantage for the accounting department as well as for the company, due to its unprecedented capacity in continuous production of internal and external data (Iansiti & Lakhani, 2020).

Today, Artificial Intelligence has entered the world of accounting and can already be used in many accounting missions. It will imply significant changes in the areas of accounting practices and transfer some practices, including consulting, certification, and tax reporting to a virtual level. Artificial Intelligence focuses on the "logical part" of the tasks while the professional accountant focuses more on the "emotional part." Indeed, the robotization and automation of certain accounting tasks

should not be considered as a risk but as an opportunity to develop real expertise and a high added value service for companies (Damerji & Salimi, 2021).

Big Data

At a conference hosted by US magazine, Fortune, Ginni Rometty, CEO of the IBM Group, said data analytics will radically change the way businesses operate and make decisions. Those who choose to ignore Big Data will not survive. Big Data is characterized by massive processing of enormous heterogeneous data. The development of technologies is capable of analyzing them in a given context in order to extort valid information from it (Zouhri, 2019; Vasarhelyi *et al.*, 2015). In the last decade, the terminology of Big Data has taken on its real and present meaning as a technological challenge to analyze large sets of data collected by various technical means. The notion of Big Data covers four important dimensions: Volume, Variety, Speed, and Velocity (Favaretto *et al.*, 2020).

Using this data often enhances the decision-making process. This digital upheaval, marked especially by Big Data, can upgrade the pertinence of the accounting process (Warren *et al.*, 2015). Hence, in the accounting field, Big Data can help maintain highly updated new challenges for the organization through the treatment of all the data available in order to support the budget process and evaluate the organization's performance. Recently, very often companies collect enormous volumes of data without using it. With the purpose to optimize data usage, connections and objectives should be clearly defined. An accountant's knowledge and expertise is considered vital to find these links and guide the company in creating them. In fact, accountants understand the whole process of the organization and can assist in the identification of connections between data to extract its interpretation. This digital revolution can enhance the pertinence of accounting work (Donald *et al.*, 2015).

Digital technology has already transformed the way in which accounting departments operate, in particular due to the emergence of innovative solutions such as increasing efficient software and automation of recurring and complex tasks (IAASB, 2016). Big Data has brought a new philosophy by renovating the analysis and pooling of data. Indeed, no other department in the company holds as much statistical and strategic information; Assets, turnover, net income, customer portfolio, solvency, debts, volume of orders, amount of investments, salaries, depreciation, etc. are all valuable information to use to optimize the management of the company (Russell & Cockcroft, 2018).

Hence, it is essential to computerize the entire accounting system in order to achieve more specialized solutions. Thus, this transition to e-accounting will increase transparency of financial statements (Huseynov *et al.*, 2020).

Thus, to limit agency problems and signal the quality of the company and its intellectual capital, we assume that business leaders are encouraged to incorporate socially responsible practices into the information disclosure strategy, such as the adoption of a voluntary IC disclosure policy. Therefore, our second assumption is formulated as follows:

2.3 Difficulties and threats engendered by COVID-19

COVID-19 crisis is a sudden, but also brutal and global crisis, which interferes permanently in the public sphere. On a business level, COVID-19 pandemic is causing organizational, social, and societal changes which are forcing companies to urgently rebuild their organizations. The general management and entire chain found themselves in a situation of permanent tension (Ruel & El Baz, 2021). Companies have had to find their marks, and to match between the economic situation and security conditions, for the sake of business continuity. Faced with this crisis, the companies take up several challenges. One of the first challenges is to enable company employees, not just managers, to acquire high-performance computer hardware and digital tools (e.g., optical fiber, reliable and resistant computers, large screens, tablets, mobile phone, headsets with a microphone and a webcam etc.) necessary for structural and continuous teleworking (Faraj *et al.*, 2021). Indeed, with this crisis, the nature of teleworking tends to evolve, passing from a punctual and quasi-playful form to a permanent and "binding" mode of organization (Abubakar, 2020). Williamson *et al.* (2020) stipulate that Home-Based Work will be the post-pandemic new nominal standard. This change in status in terms of practice introduces an adaptation of digital equipment and tools at home in terms of performance and energy and technological efficiency.

2.4 Accountant's behavior during the pandemic

The roots of accountant's behavior during the pandemic can be explained by the "Conservation of resources theory." This theory is intended to understand the responses of individuals or groups faced with situations of general or traumatic stress (Monnier *et al.*, 2002). The pandemic and the lockdown have brought new circumstances and engendered many changes which influence the work routine and job behavior. In his structural classification of attitudes and behaviors, Hobfoll (2001) distinguishes four main categories closely linked to the survival of social actors in a given social system:
(1)   Their personal resources including both personal skills (e.g., leadership capacity, assertiveness, etc.) and personal traits (e.g., self-esteem, locus of control, etc.),
(2)   Their objects or possessions characterized by materiality and directly linked to socio-economic status ("object resources" - e.g. car, house, etc.)

(3) Their acquired or inherited living conditions ("condition resources") which allow them to have other resources or facilitate their access to them (e.g. financial security, professional and family stability, etc.)

(4) Energy resources which derive their value from their ability to exchange resources in the other three categories (e.g. money, knowledge, social support, involvement in organizations, etc.).

It can be easily understood that changes in the professional field can affect the job performance up to varying degrees, to the different categories proposed by Hobfoll which cover a fairly wide spectrum. This theory explains the best the organizational stress and employees' behaviors toward it (Westman, 2004).

The confinement situation imposes new working methods with major impacts. Individually, the ability to adapt to COVID-19 situation is not the same for everyone. Thus, a pessimistic or optimistic vision of the future constitutes the basis of the attitude and behavior of employees and undoubtedly contributes to the construction of post-COVID-19 society. De Becdelièvre and Grima (2020) suggested that this crisis created a "career shock" and has affected employees' behavior. These expectations can be generalized through varied and stable situations over time.

The impact of digitalization forced by COVID-19 is particularly large on occupation and behavior and it is also useful to take this into account during a period of confinement. The level of changes engendered by COVID19 has pushed the virtualization in all aspects of life, which increased ipso facto the level of digitalization. Indeed, the long period of lockdown has forced the community to rebound on digitalization to maintain the economic cycle, the business entities and their functions. It is important to understand that COVID-19 is not directly responsible for employee's stress. The brain's interpretation of an act or situation determines the level of control of anxiety and job stress (Grenon, 2000) and puts the psychosocial well-being of employees under pressure. This stress can be explained by a wide variety of reasons: (a) the combination of work and childcare, (b) increased professional pressure, (c) uncertainty about the future of the job, and (d) the fear of being infected by COVID-19. The last element plays a notable role on people who have no choice other than to go to their place of work. Hence, between "forced telework," "delayed projects," and "lack of supervision" a number of employees have been victims of disengagement or a degraded social bond within their organization.

Along the same lines, employees believe that there is a connection between the efforts they put in at work, the results they get from that effort, and the benefits of the results obtained. If all these results are positive, the employees can be seen as highly motivated. Expectancy theory suggests that "Employees will be motivated if they think their efforts will support performance and expected results" (Alraja, 2016).

The concept of attitude has occupied a central place in social psychology since the 1930s and still maintains this position today. The attitude is more or less favorable assessment of a given object. As attitudes are not easily accessible objects, they are most generally apprehended in a declarative manner using a measurement scale: the individual gives an assessment of the object in writing by positioning themselves on a scale of 'intervals at several points ranging from "totally agree or like" to "totally disagree or dislike" (Ajzen & Fishbein, 1977).

The first challenge in attitude studies has been to predict behavior from a simple statement. The original studies seeking to prove this relationship between attitude and behavior encountered an obstacle: it was difficult to match a behavior to its corresponding attitude (Vaidis, 2006). One of the most obvious applications of the link between attitude and behavior is in manipulating attitude to bring about desired behavior. Hence, changes in an individual's attitude are associated with behavior changes (Petty & Cacioppo, 1996).

Figure 1: Relationship between attitude and behavior
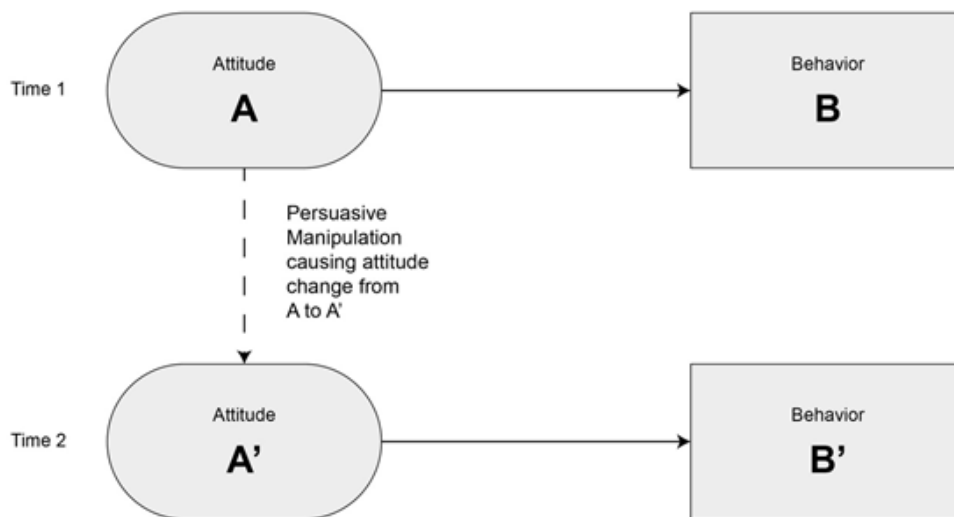
Source: (Vaidis, 2006)

Returning to Figure 1, the attitude towards a process, object, idea or change in environment (Attitude A) underlies the behavior (Behavior B). A change in this attitude will cause a change in the associated behavior. If persuasive manipulation or leading assessment on a modification is implemented, it ultimately modifies this attitude (Attitude A') and will cause a change in behavior (Behavior B'). From this perspective, if companies initiate the training necessary for technological and digital transformations and if action plans are prepared for dissemination as crisis

management, employees will have more controllable and anticipated attitudes and thus behaviors will be more suitable.

One of the main challenges is the transition of the profession of the chartered accountant which must adapt to the technological innovations that mark the profession (Moussaid, 2020). It is not a question of countering this technological change but rather, of showing adaptation and flexibility in behavior. Hence, development conditions the sustainability of the profession. Digital technology requires adapting and developing new skills.

In the current context, "Human Adaptation Institute" studies the cognitive and social impacts of the management of COVID-19 crisis and the short-term and long-term adaptations on the behavior of individuals. A consequent paroxysmal event due to COVID-19 is that it has upset daily procedures in a lapse of time without leaving room for individuals to adapt, act, or prepare for it (Liaw, 2021).

2.5 Hypothesis and conceptual framework

COVID-19 has disrupted the practices and organization of many business functions, more specifically accounting practices, the subject of this study. The challenge now is to acquire knowledge about the individual behavior toward the digitalization, in order to assess all the required actions that need to be installed. Based on literature review and previous studies, this study seeks to clarify how the forced digital transformation of accounting practices by COVID-19 influences the behavior of accountants in MENA region. The technological devices forming the platform for digital transformation imply a great diversity of accounting processes and activities, and new tools to be integrated into them. This technological upheaval is suddenly accelerating with the arrival of COVID-19.

The present survey examines the casual impact of Changes due to COVID-19 and level of digitalization on Accountant's behavior. In fact, current and expected changes which may affect accountant profession provoke an augmentation in the stress level at work and affect negatively their behavior. The conservation of resource theory, including threatened resource loss, explicates the behavior's outcomes.

H1: *The level of digitalization impacted accountant's behavior.*

H2: *Changes engendered by COVID19 influenced accountant's behavior.*

H3: *Changes engendered by COVID19 increased the level of digitalization.*

The activity can be analyzed with regard to the gap between a real task and a prescribed task (Leplat, 1997). The transformation of the activity leads to an imbalance between an initial situation and a new situation that requires adaption and assimilation of new patterns. Thus, this imbalance arise a situation of cognitive progress and a potential development. In addition, activity in the workplace is understood to be doubly regulated since the activity acts as a coupling between the characteristics of a subject and those of a situation, there are results and effects on the actor (Piaget, 1997).

The below figure illustrates the conceptual framework of this study and encompasses all the variables and items in this model.

Figure 2: Conceptual Framework of the study
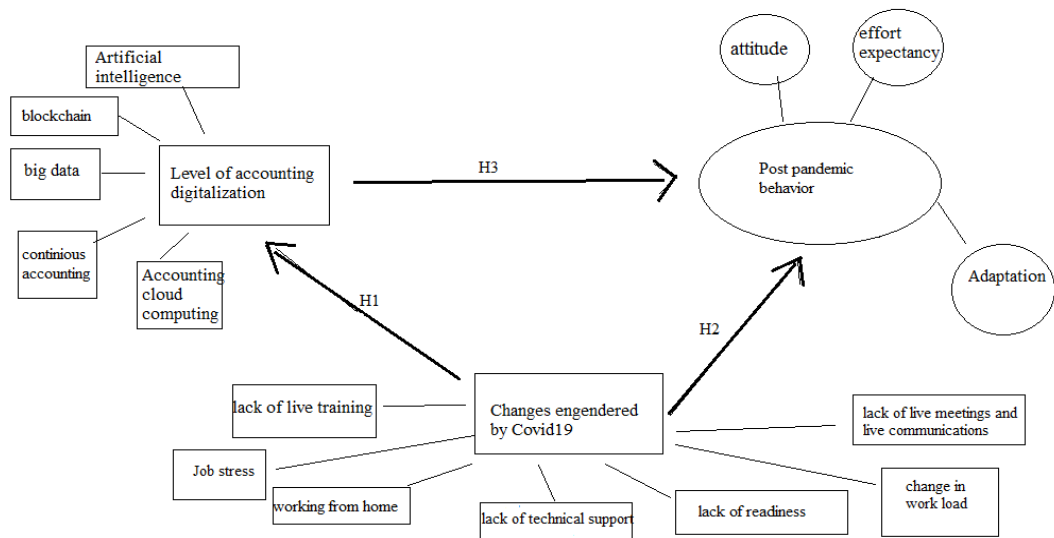
In this context, methodological choices, subject of the section to follow, must allow this specificity to be taken into account in order to respond to our research question.

3. Research methodology

3.1 Population and sampling

The sample development process began by determining the population to be studied. The target of this research was all accountants operating in the MENA region in all industries and positions. A non-probabilistic technique was chosen for this study, through the snowball sampling method. It consists of a gradual construction of the sample using references obtained from first responders (Malhotra & Dash, 2011).

The questionnaire-based survey was distributed through the connections of professionals in thousands of companies in the MENA region, through "LinkedIn" then the initial contacts opened new connections to send the questionnaire to their colleagues. It is important to mention that a respondent could not fill more than one questionnaire.

The sample size for this study is approximately 4000 selected individuals spread throughout the MENA region. Each person had a choice to accept or refuse to participate in this study. The prepared questionnaire-based survey had a total of 32 items. For the first 11 items, respondents were asked to assess the frequency of completion of digital transformation techniques of accounting practices, in their company, using a five-point Likert scale. The remaining 21 items measured the exposure of accountants to changes engendered by COVID-19 in their workplace and their behavior in terms of attitude, effort, expectancy, and adaptation.

The required sample for a population of 4,000 individuals is 383 at 95% confidence level and 5% standard error margin. Meanwhile, the sample of this study is formed by 568 participants, which exceeds the required limit. This enhances the credibility of the results and minimizes potential bias (Hazra, 2017).

3.2 Data collection and sample description

The data collection was carried out from the month of February 2021 till the end of April 2021. The questionnaire was prepared in three languages: Arabic, English and French, and three links were generated online with the platform Google forms. In total 591 responses were received. Then, 10 questionnaires were removed because the respondents did not belong to the target population. Next, 13 questionnaires were eliminated and deemed unusable due to lack of answers. Finally 568 questionnaires are exploitable

Table 1: Responses screening

Responses status	Reponses
Total of responses received	594
Incomplete responses	10
Out the targeted population	13
Total responses deleted from Libya	3
Total of remaining usable questionnaires	**568**

The questionnaire-based survey was conducted with inter-subject and intra-subject participation. In other words, the same participants measured the effect of the

independent and dependent variables, and then the same elements were measured between groups and divided based on their region. The following table of variables summarizes the variables used, its construction and a brief explanation.

Table 2: List of variables

Variables	Items	Explanation
Behavior	Attitude	It is measured by the perceptions of the respondents toward the easiness of acceptance and its behavior toward digital transformation of accounting.
	Adaptation	This item is measured by the respondent's ability of adaption to changes in practices
	Effort expectancy	Effort expectancy is measured by the participant's perceptions towards the difficulty of process learning and the employed resources in accounting digitalization .
Level of digitalization	E-commerce	Each of these techniques related to digital transformation were used to measure the level of digitalization
	Artificial intelligence	
	Block chain	
	Continuous auditing	
	Big data	
	e-invoices	
	e-signatures	
	Online transfers	
	Digital taxation	
	Digital payroll	
	Digital bookkeeping	
Changes caused by COVID-19	Telework	To what extent Covid-19 has forced the company to perform the accounting

Variables	Items	Explanation
		activities from home (Working from home / remotely)
	Lack of contact	To what extent Covid-19 engendered a lack of face-to-face meetings and communication
	Lack of Technical support	To what extent Covid-19 caused a lack of technical support
	Cost increase	To what extent Covid-19 caused an increase in cost
	Work load increase	To what extent Covid-19 caused an increase in work load
	Job stress	To what extent Covid-19 caused job stress
	Lack of training	To what extent Accounting department lacks readiness to face new modifications
	Lack of readiness	To what extent Covid-19 engendered a lack of face-to-face training

The division of the research sample took into consideration the geographical distribution of countries and existing cultural similarities while respecting the acceptable statistical limit of the repartition of groups, whereas number of responses collected from each are is shown below.

Table 3: Responses distribution by countries

Countries	Responses
Lebanon	131
Syria and Jordan	51
Iraq and Kuwait	56
UAE and Oman	57
Bahrain and Qatar	58
Saudi Arabia and Yemen	62
Egypt	69
Tunisia, Algeria, and Morocco	84
Total	*568*

In addition, 3 responses were received from Libya and were eliminated due to the lack of representability for this region.

The below table will illustrates the sample description of this study.

Table 4: Descriptive table of respondents profils

Sample characteristics		Frequency
Position	Junior Accountant	45
	Accountant	171
	Deputy Chief Accountant	39
	Chief Accountant	85
	Accounting manager	99
	Financial manager	73
	Financial and administrative director	56
Experience	Less than 5 years	190
	5-15 years	249
	More than 15 years	129
Education Level	High School or equivalent	7
	Bachelor degree	294
	MBA/ Masters	258
	PhD	9
Toal sample		568

This table illustrates the sample distribution and characteristics concerning their position, experience and education level. This descriptive table shows that around 66.7 % of the respondents have an experience over 5 years in accounting field which clearly indicates they have a good knowledge in this domain and have good practice throughout multiple financial years. Also, it has been revealed that over 75% of the sample are professionals at managerial level such as (chief accountant/managers…), 30% fulfill the position of accountant and 8% occupy the position of junior accountant. Concerning the academic level of the participants, 52% have bachelor

degree, 46% have a master degree 1.5 % hold a PhD. Also, 10% out of the total sample have accomplished a professional certificate such as CPA/ CMA/ ACCA.

3.3 Validity and reliability of the survey

For the results to be considered accurate, the results of a measuring instrument must be constant from one use to another (Churchill, 1979). Thus, to measure the reliability of a scale, it is necessary to determine the proportion of systematic variation. In the case of multiple scales measuring a variable, several items were used to assess different aspects of that variable. It is worth mentioning that items had internal consistency. This homogeneity is measured from the Cronbach alpha also called the alpha coefficient (Cronbach, 1951).

Validity is particularly concerned with the internal consistency of the tool, which indicates the ability of items to measure the same dimension or the same construct. The validity is evaluated by calculating the Cronbach's alpha coefficient, carried out on each of the dimensions, sometimes on the whole. The higher the alpha coefficient is, the more the items are considered homogeneous among themselves. Internal consistency is satisfactory if the alpha coefficient is greater than or equal to 0.70, then the test items can be considered to be similar in content (i.e. homogeneous) (Terwee *et al.*, 2012).

Table 3 shows the alpha coefficient for each of the variables measured in the study: Behavior, Changes engendered by COVID-19 and level of digitalization. This coefficient is measured based on the total sample of 568 respondents.

Table 5: Reliability Results

Scales	Cronbach Alpha
Behavior	0.843
Changes engendered by COVID-19	0.769
Level of digitalization	0.918

Table 3 shows that the Alpha coefficients for the 3 variables are above 0.6 and therefore considered to be faithful with satisfactory internal consistency.

Statistical analyzes of the survey

A factorial analysis in principal components according to the Varimax method was carried out for the survey in order to restrict the number of items per variable for the final questionnaire.
The principal component factorial analysis measures the validity of the results according to the correlation between the items of the same variable, called

convergent validity, and the absence of correlation between the items of the same variable, called discriminant validity, and those of another variable (Finch, *et al.*, 2017). To do this, the use of Cronbach's alpha (α) made it possible to verify the fidelity of the scale.

The correlation matrix must not be equal to the identity matrix. The test must be significant (p <0.050) to reject the null hypothesis that it is an identity matrix and that the items are totally independent of each other (Stewart, 1981). This test justifies the use of factor analysis given that without correlation, it would be difficult to indicate the effect of each factor. Then, to measure the quality of the correlations between the items, the Kaiser-Meyer-Olkin sample fit index (KMO), varying from 0 to 1, gives additional information to the correlation matrix. It is preferable that the result is higher than 0.5 to be considered satisfactory. A high adequacy index means that the factor analysis is relevant (Mvududu & Sink, 2013).

Table 6: Validity of scales

Variables	Items	Cronbach Alpha	Bartlett signification	KMO value	% of Cumulative variance
Behavior	13	0.843	0.000	0.765	82.124
Changes caused by COVID-19	8	0.769	0.000	0.702	80.413
Level of digitalization	11	0.918	0.000	0.727	84.351

For the dependent variable "Behavior," alpha (α) is 0.843. Bartlett's test is significant (p <0.050), therefore the correlation matrix is not an identity matrix and the items are correlated with each other. The KMO is 0.765 which demonstrates the quality of the correlation between the items. The cumulative percentage indicates that 82.12 % of the items explain the variance of the variable. For the independent variable "Changes caused by COVID-19," α is 0.769. Bartlett's test is significant (p <0.050), and The KMO is 0.702, and 80.41% of the items explain the variance of the variable. Concerning independent variable "Level of digitalization," α is 0.918. Bartlett's test is significant (p <0.050), and The KMO is 0.727, and 84.35% of the items explain the variance of the variable.

Figure 3: Confirmatory factor analysis result
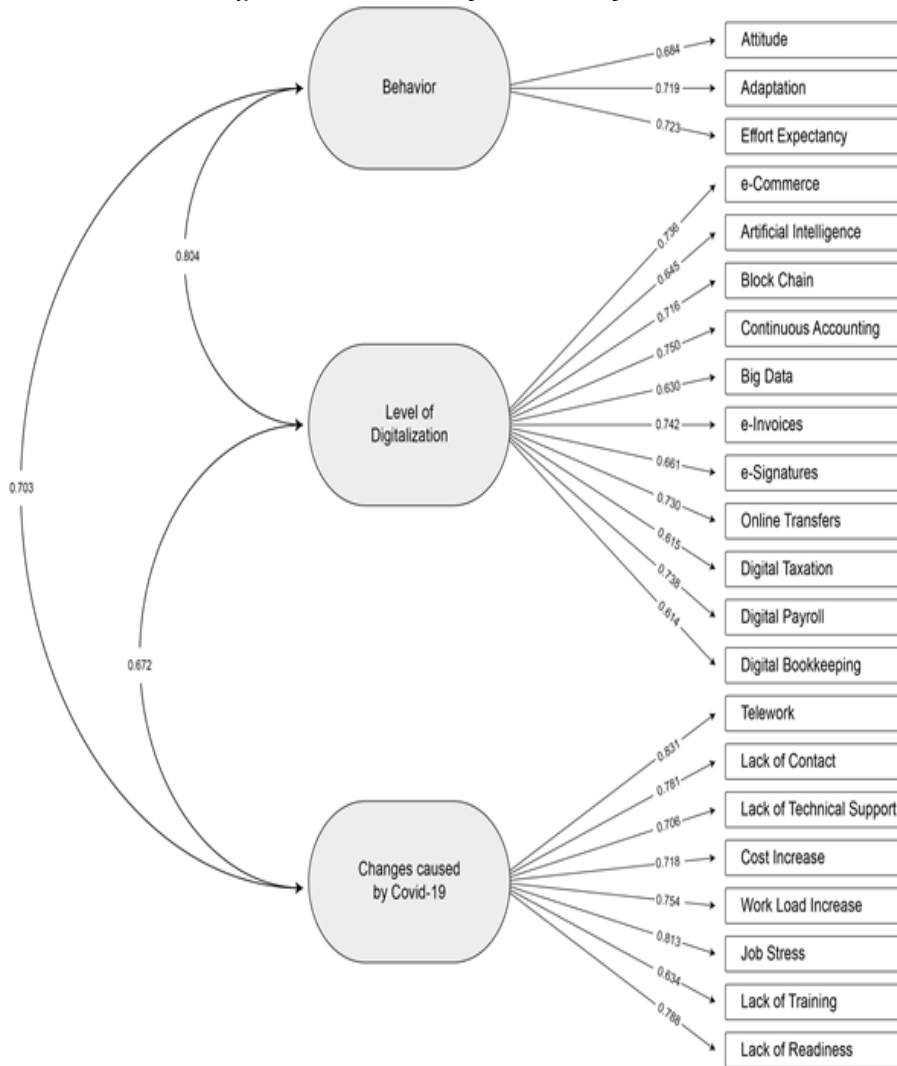
The objective of the present study was to examine the construct validity of this survey within the total sample of 568 participants. Hence, an exploratory structural equation allowed validating a 3-factor structure ("Behavior", "Changes caused by COVID-19" and "level of digitalization"). The factors "attitude" and "adaptation" and "effort expectancy" show a satisfactory internal consistency, illustrated in figure 3. However, several nuances must be emphasized in order to guide future analysis.

4. Findings and Discussions

4.1 Results

Accountants forming our sample were distributed among 12 sectors. The five sectors with the highest proportion of responses were: Retail Business (16.4%) and Gross Business (16.7%) then the Construction sector (13.2%), Manufacturing (10.6%) and Banking sector (10.4%) (See appendices A).

These sectors constitute the basic angles of every economy and realize millions of transactions each day, and contain the largest proportions of accountants operating in these sectors. Likewise, the descriptive analysis of the sample reveals that 51.6% of accountants did their work from home, 43.9% stayed in their company premises, and 4.6% stated that business was closed due to the pandemic.

Most of the accountants forming this sample operate in large and medium-sized enterprises with 37.5% and 30.8% respectively. 46.7% of respondents have at least a bachelor degree, 38.6% have at least a master's degree and 10.7% have professional certificates, with 44% of respondents having an average experience between five and 15 years (See appendices B).

The illustration below shows mean, and variance of the sample for each of these descriptive variables. The graph below makes it possible to use the regions and countries most affected by changes in COVID-19 according to the opinions of the accountants questioned.

Figure 4: Impact of changes caused by COVID-19 by region
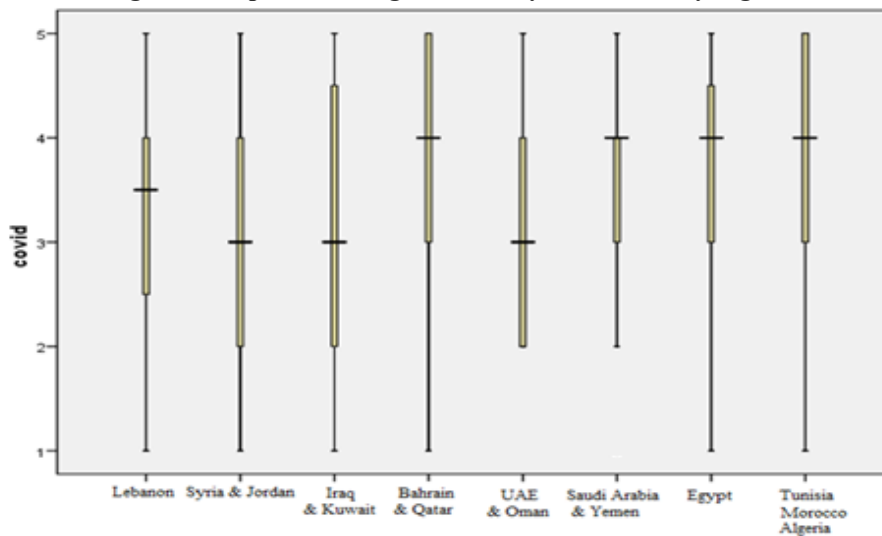
It arose that Bahrain and Qatar and Tunisia, Morocco, and Algeria have the largest proportion impacted by the repercussions of COVID19 with overall mean of 4 over 5, followed by Egypt, Saudi Arabia and Yemen with an average of 4. Lebanese accountants scored an average of 3.5 for their exposure to the effects of COVID-19, and finally Syria, Jordan, Iraq. Kuwait, UAE and Oman registered a mean of 3, and reported being less impacted by COVID-19 changes.

In the same sequence of ideas, table 7 illustrates the correlations between the different variables of the study. Accountant's behavior, as the dependent variable studied, is correlated with the independent variables of the study and the control variables referring to the circumstances present in the environment. The independent variables are represented by changes caused by COVID-19 and Level of digitalization, while control variables refer to firm size, region and position occupied by accountants.

Table 7: Matrix correlation between dependent and independent variables

Correlations

		Behavior	Changes caused by COVID-19	Digital transformation	Region	Position	Firm size
Behavior	Pearson Correlation	1	-.625	.598	.312	.603	.512
	Sig. (2-tailed)		.000	.001	.441	.000	0.000
	N	568	568	568	568	568	568
Changes caused by COVID-19	Pearson Correlation	-.625	1	.588	0.637	.455	.626
	Sig. (2-tailed)	.000		.000	0.000	.352	.000
	N	568	568	568	568	568	568
Digital transformation	Pearson Correlation	.598	.588	1	.704	.516	.608
	Sig. (2-tailed)	.001	.000		.000	.002	.000
	N	568	568	568	568	568	568
Region	Pearson Correlation	.312	.637	.704	1	.129	.201

Correlations

		Behavior	Changes caused by COVID-19	Digital transformation	Region	Position	Firm size
	Sig. (2-tailed)	.441	.000	.000		.564	.523
	N	568	568	568	568	568	568
Position	Pearson Correlation	.603	.455	.516	.129	1	.157
	Sig. (2-tailed)	.000	.352	.002	.564		0.501
	N	568	568	568	568	568	568
Firm size	Pearson Correlation	-.020	.626	.608	.201	.157	1
	Sig. (2-tailed)	.641	.000	.000	.523	.601	
	N	568	568	568	568	568	568

The correlation matrix shows that the changes due to COVID-19 have a negative impact on the behavior of accountants in the MENA region (-0.625), while the level of digitalization is positively correlated in the same direction as the behavior, therefore if the level of digitalization is high, the behavior will be more favorable (0.598). The region of the participants does not appear to affect the behavior of the participants (0.312). However, the position of accountants affects their behavior (0.603) and the size of the firm in which they operate also influences their behavior (0.512) and this refers to the company's ability to digitize.

In the following, we performed the analysis of variance with the use of ANOVA for each of the variables. Averages per class allow the interpretation to be carried out. The Fisher Test indicates that there is at least one difference between two groups. Subsequently, it is necessary to look at the meaning. If the latter is greater than 0.05, there is no difference at the 5% error threshold. On the contrary, if the significance is less than 0.05, there is at least one difference between two groups. In this case, the "descriptive" table and the table of multiple comparisons should be analyzed. It is then possible to identify the groups where there is a significant difference.

The ANOVA test shows that there are significant differences in behavior towards the digital transformation of accounting and between groups with regard to regions

and positions. This is emphasized by significant values less than 0.05. To this end, we carried out multiple comparisons—post hoc to detect the modalities of differences between the groups.

Table 8: ANOVA test Results

ANOVA

		Sum of Squares	Df	Mean Square	F	Sig.
Attitude	Between Groups	4.811	4	1.203	2.072	.003
	Within Groups	309.979	568	.580		
	Total	314.790	568			
Effort expectancy	Between Groups	4.367	4	1.092	2.878	.022
	Within Groups	201.408	568	.379		
	Total	205.774	568			
Adaptation	Between Groups	8.113	4	14.528	6.413	.000
	Within Groups	332.023	568	1.170		
	Total	390.136	568			
Region	Between Groups	4.272	4	3.068	3.243	.012
	Within Groups	304.309	568	.946		
	Total	316.582	568			
Position	Between Groups	4.394	4	3.528	2.413	.027
	Within Groups	285.472	568	.776		
	Total	290.113	568			

Table 9: Robust Tests of Equality of Means

Robust Tests of Equality of Means

		Statistic [a]	df1	df2	Sig.
Attitude	Welch	1.996	4	176.403	.017
Effort expectancy	Welch	2.439	4	176.770	.029
Adaptation	Welch	1.908	4	180.734	.002
Region	Welch	1.862	4	174.809	.013
Position	Welch	1.324	4	184.366	.019

[a.] Asymptotically F distributed.

Table 10: Post Hoc-Multiple Comparisons

Dependent Variable		(I) level digital	(J) level digital	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Attitude	LSD	N/A	under study	.093	.091	.107	-.09	.27
			difficult transition	.254*	.106	.217	.05	.46
			in transition	.250	.128	.052	.00	.50
			fully achieved	.143	.088	.004	-.03	.32
		under study	N/A	-.093	.091	.107	-.27	.09
			difficult transition	.160	.117	.243	-.07	.39
			in transition	.156	.137	.036	-.11	.43
			fully achieved	.050	.101	.020	-.15	.25
		difficult transition	N/A	-.254*	.106	.217	-.46	-.05
			under study	-.160	.117	.243	-.39	.07
			in transition	-.004	.148	.078	-.29	.29
			fully achieved	-.110	.114	.036	-.34	.11
		in transition	N/A	-.250	.128	.052	-.50	.00
			under study	-.156	.137	.036	-.43	.11
			difficult transition	.004	.148	.078	-.29	.29
			fully achieved	-.106	.135	.032	-.37	.16
		fully achieved	N/A	-.143	.088	.004	-.32	.03
			under study	-.050	.101	.020	-.25	.15
			difficult transition	.110	.114	.036	-.11	.34
			in transition	.106	.135	.032	-.16	.37
Adaptation	LSD	N/A	under study	.100	.074	.016	-.05	.25
			difficult transition	.165	.086	.026	.00	.33
			in transition	.321*	.104	.002	.12	.52
			fully achieved	.055	.071	.044	-.09	.19
		under study	N/A	-.100	.074	.016	-.25	.05
			difficult transition	.065	.095	.022	-.12	.25
			in transition	.221*	.111	.047	.00	.44
			fully achieved	-.045	.082	.027	-.21	.11
		difficult transition	N/A	-.165	.086	.036	-.33	.00
			under study	-.065	.095	.042	-.25	.12
			in transition	.156	.120	.004	-.08	.39
			fully achieved	-.111	.093	.034	-.29	.07
		in transition	N/A	-.321*	.104	.012	-.52	-.12
			under study	-.221*	.111	.027	-.44	.00

Dependent Variable		(I) level digital	(J) level digital	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
			difficult transition	-.156	.120	.024	-.39	.08
			fully achieved	-.266*	.109	.015	-.48	-.05
		fully achieved	N/A	-.055	.071	.044	-.19	.09
			under study	.045	.082	.077	-.11	.21
			difficult transition	.111	.093	.034	-.07	.29
			in transition	.266*	.109	.015	.05	.48
Effort expectancy	LSD	N/A	under study	.109	.083	.018	-.05	.27
			difficult transition	.085	.097	.030	-.11	.28
			in transition	.192	.117	.001	-.04	.42
			fully achieved	-.082	.080	.009	-.24	.08
		under study	N/A	-.109	.083	.017	-.27	.05
			difficult transition	-.024	.107	.022	-.23	.19
			in transition	.083	.125	.009	-.16	.33
			fully achieved	-.191*	.092	.038	-.37	-.01
		difficult transition	N/A	-.085	.097	.080	-.28	.11
			under study	.024	.107	.022	-.19	.23
			in transition	.107	.135	.029	-.16	.37
			fully achieved	-.167	.105	.012	-.37	.04
		in transition	N/A	-.192	.117	.001	-.42	.04
			under study	-.083	.125	.009	-.33	.16
			difficult transition	-.107	.135	.029	-.37	.16
			fully achieved	-.274*	.123	.027	-.52	-.03
		fully achieved	N/A	.082	.080	.009	-.08	.24
			under study	.191*	.092	.038	.01	.37
			difficult transition	.167	.105	.012	-.04	.37
			in transition	.274*	.123	.027	.03	.52
*. The mean difference is significant at the 0.05 level.								

There is no difference between the behaviors of accountants and the levels of digitalization N/A, under study and difficult transition. However, there are differences in behavior for the groups that have a level of digitalization "in transition" and "fully achieved". Likewise, the groups which have fully achieved their digitalization have vastly different behaviors from those in the process of transition or have a non-completed digitalization.

4.2 Hypothesis validation and discussions

To understand the factors that explain the behavior of accountants in the MENA region during the pandemic, correlations and analytical tests were carried out. The explanatory variables that we have retained for the explanation of the dependent variables are region, position, experience, firm size, level of digitalization and technologies, and the degree of impact by the changes engendered by COVID-19. The summary results are given in the table below, which specifies whether or not the variable has a significant effect on the behavior. Digital natives are therefore more adept at teleworking than their elders.

The following table represents the effects of the major variables studied on the behavior of accountants:

Table 11. Effect of explanatory factor on accountant's behavior

Explanatory factors	Effect
Changes caused by COVID-19	Negative
Level of digitalization	positive
Position	Positive
Firm size	Positive
Sector	Effect

Thus, research hypothesis are validated:
H1: *The level of digitalization impacted accountant's behavior.*
H2: *Changes engendered by COVID19 influenced the accountant's behavior.*

The level of digitalization was measured through a list of digital tools specialized in accounting. As for the use of "Big Data," although it has gradually increased, it continues to vary considerably between countries, sectors, company size. Areas in which the pandemic has acted as a catalyst are teleworking, e-commerce, online transfers and payments and e-invoices. The pressure therefore remains strong on two fronts: deploying quality connectivity and developing the capacity of accountants. These two challenges have forced companies to use increasingly sophisticated digital tools. Likewise, it was noted that the accountants in the MENA region experienced a lack of live contact communication and technical assistance due to COVID-19.
On the other hand, as the tests previously demonstrated, changes brought by COVID-19 have accelerated the pace of digitalization transformation. Hence, the third hypothesis is validated.

H3: *Changes engendered by COVID19 increased the level of digitalization.*

5. Conclusion

The initial objective of this study was to explore the relationships between digitalization forced by COVID-19 and the behavior of accountants in the MENA region. It is also necessary to take into consideration other external factors that could affect this relationship. The study outlines the profound upheavals brought in by the adoption of digital transformation which are imposed on those involved in accounting sector.

This crisis underlines the obligation to accelerate in the field. Paradoxically, this crisis has brought both complementary industries to a halt and for others, it has brought years of technological progress. It also brought to the forefront the difficulties of sectors that are struggling to adapt to the new needs of companies. Some of the current trends will continue and inevitably will lead to a change in operating methods and digital transformation.

The positive or negative behavior appears to be a matter of subjectivity. What is favorably appreciated by one is not necessarily appreciated by the other. Digitalization is now emerging as an inescapable reality. Hence the need to make the necessary effort to understand and adapt and above all, protect the disclosure of financial information against the danger of forced digitalization.

Some strains of the study must be raised. First, data collection through the snowball technique was difficult due to social media restrictions such as limited number of new connections and messages to send. Second, this sample is only representative of accountants. Future research should extend the sampling to other type of populations to test whether the level of digitalization and changes caused by COVID-19 affect their jobs and positions. Finally, the validity of content should also be assessed using a panel of experts.

It is necessary to underline the important role played by the digitalization of the accounting function but also to shed light on future research around the crucial interest given to the issue of the security of accounting and financial information in the digital age where threats of cybercrime constantly weigh on the digital world. Finally, we recognize the need to acknowledge that this work is far from being exhaustive regarding the digitalization of the accounting functions. Other themes, such as the digital future of the accounting functions or the question of the future requirements of accounting training in terms of human resources, can be addressed to provide more clarification regarding the digitalization of the accountant functions.

References

Abubakar, A. (2020) "Coronavirus (COVID-19): Effect and survival strategy for businesses", *Journal of Economics and Business,* vol.3, no.2: 661-671.

Aburous, D. (2016) "Understanding cultural capital and habitus in corporate accounting: A postcolonial context", *Spanish Journal of Finance and Accounting/Revista Española de Financiación y Contabilidad*, vol. 45, no. 2:154-179.

Aburous, D. (2019) "IFRS and institutional work in the accounting domain", *Critical Perspectives on Accounting,* vol. 62: 1-15.

Aburous, D., & Kamla, R. (2021) "Linguistic Tensions in the Professional Accounting Field: English Linguistic Capital, Hierarchy, Prestige, and Distinction among Accountants", *Contemporary Research Accounting*: 1-57.

Ajzen, I., & Fishbein, M. (1977) "Attitude-behavior relations: A theoretical analysis and review of empirical research", *Psychological Bulletin*, vol. 84, no. 5: 888-918.

Alamin, A., Wilkin, C., Yeoh, W., & Warren, M. (2020) "The impact of self-efficacy on accountants' behavioral intention to adopt and use accounting information systems", *Journal of Information Systems,* vol.34, no. 3: 31-46.

Alarcon J. L., N. C. (2018) "Blockchain and the future of accounting Pennsylvania", *CPA Journal,* vol.88, no. 4: 3-7.

Alraja, M. (2016) "The influence of effort and performance expectancy on employees to adopt e-government: Evidence from Oman", *International Review of Management and Marketing*, vol. 6: 930-934.

Bampoky, B. (2017) "Les fondamentaux d'une transformation digitale pour les entreprises africaines", *Question(s) de management*, vol. 3, no. 18: 39-45.

Begum, D. (2019) "Digital transformation of accounting in India", *Emperor International Journal of Finance and Management Research*, vol. 5, no. 10: 7-12.

Bhimani, A., & Willcocks, L. (2014) "Digitisation, 'Big Data' and the transformation of accounting information", *Accounting and Business Research*, vol. 44. no. 4: 469-490.

Bîlcan, F., Oncioiu, I., Stoica, D., & Stanciu, A. (2019) "Digital transformation of managerial accounting - trends in the new economic environment", *The 14th edition of the international conference -European Integration - Realities and Perspectives,* Proceedings. Romania.

Bonsón, E., & Bednárová, M. (2019) "Blockchain and its implications for accounting and auditing", *Meditari Accountancy Research,* vol. 27, no. 5: 725-740.

Çaliskan, H. (2015) "Technological change and economic growth", *Procedia - Social and Behavioral Sciences,* vol.195: 649 – 654.

Carver, C., & Scheier, M. (2011) "Self-regulation of action and affect", *In Handbook of self-regulation. Research, Theory, and Applications*, pp. 3-21.

Casino, F., Dasaklis, T., & Patsakis, C. (2019) "A systematic literature review of blockchain-based applications: Current status, classification and open issues", *Telematics and Informatics*, vol. 39: 55-81.

Churchill, G. (1979) "A paradigm for developing better measures of marketing constructs", *Journal of Marketing Research*, vol. 16: 64-73.

Coyne, J., & McMickle, P. (2017) "Can Blockchains Serve an Accounting Purpose?", *Journal of Emerging Technologies in Accounting*, vol. 14, no. 2: 101-111.

Cronbach, L. J. (1951) "Coefficient alpha and the internal structure of tests", *Psychometrika,* vol.16: 297-334.

Dai, J., & Vasarhelyi, M. (2017) "Toward blockchain-based accounting and assurance", *Journal of Information Systems,* vol.31, no.3: 5-21.

Damerji, H., & Salimi, A. (2021) "Mediating effect of use perceptions on technology readiness and adoption of artificial intelligence in accounting", *Accounting Education*: 1-21.

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020) "How artificial intelligence will change the future of marketing", *Journal of the Academy of Marketing Science*, vol.48: 24-42.

De Becdelièvre, P. G. (2020) "La Covid-19, un choc de carrière restructurant le sens du travail", *Revue française de gestion, Lavoisier*, vol. 8: 151-160.

Desplebin O., L. G. (2018) "L'évolution de la comptabilité, du contrôle, de l'audit et de leurs métiers au prisme de la Blockchain: une réflexion prospective", *Management Avenir,* vol. 5 :137-157.

Desplebin, O., Lux, G., & Petit, N. (2019) "Comprendre la blockchain : quels impacts pour la comptabilité et ses métiers ? ", *Audit, Comptabilité, Contrôle: Recherches Appliquées*, vol.19, no. 5: 5-23.

Donald, W., Moffitt, K., & Byrnes, P. (2015) "How big data will change accounting", *Accounting Horizons,* vol. 29, no. 2: 397-407.

Eldarragi, A. (2008) "An investigation into the audit expectation gap in Libya" *Unpublished PhD Thesis*, University of Wollongong.

Faraj, S., Renno, W., & Bhardwaj, A. (2021) "Unto the breach: What the COVID-19 pandemic exposes about digitalization", *Information and Organization,* vol. 31, no. 1: 1-7.

Favaretto, M., Clercq, E., Schneble, C., & Elger, B. (2020) "What is your definition of Big Data? Researchers' understanding of the phenomenon of the decade", *PLoS One,* vol. 15, no. 2,

Finch, A., Brazier, J., Mukuria, C., & Bjorner, J. (2017) "An exploratory study on using principal-component analysis and confirmatory factor analysis to identify bolt-on dimensions: The EQ-5D case study", *Value in Health,* vol. 20, no. 10: 1362-1375.

Grenon, M. (2016) "Posttraumatic stress disorder is associated with worse endothelial function among veterans", *Journal of the American Heart Association,* vol. 5, no. 3: 28-46.

Gulin, D., Hladika, M., & Valenta, I. (2019) "Digitalization and the challenges for the accounting profession", *Proceedings of the ENTRENOVA -Enterprise Research Innovation Conference*: 502-511

Hamad, K., & Kaya, M. (2016) "A detailed analysis of optical character recognition technology", *International Journal of Applied Mathematics Electronics and Computers*, vol. 4, no. 1: 244-249.

Hazra A. (2017) "Using the confidence interval confidently", *Journal of Thoracic Disease*, vol.9, no.10: 4125-4130.

Hobfoll, S. (2001) "The influence of culture, community, and the nested-self in the stress process: advancing conservation of resources theory ", *Applied Psychology: An International Review,* vol. 50, no. 3: 337-421.

Hofstede, G. (2011) "Dimensionalizing cultures: The Hofstede model in context", *Online Readings in Psychology and Culture,* vol.2, no. 1: 2-26.

Huseynov, T., Mammadova, U., Aliyev, E., & Nagiyev, F. (2020) "The impact of the transition to electronic audit on accounting behavior", *55th International Scientific Conference on Economic and Social Development*, pp. 378-384

IAASB (2016) "Exploring the Growing Use of Technology in the Audit, with a Focus on Data Analytics", IAASB - IFAC.

Iansiti, M., & Lakhani, K. (2020) "Competing in the Age of AI", *Harvard Business Review.*

Ionescu, L. (2020) "Robotic Process Automation, deep learning, and natural language processing in algorithmic data-driven accounting information systems", *Analysis and Metaphysics*, vol. 9: 59-65.

Karanasios, S. (2018) "Toward a unified view of technology and activity: the contribution of activity theory to information systems research", *Information Technology & People*, vol.31, no.1: 134-155.

Kersten, W., Blecker, T., & Ringle, C. (2017) "Digitalization in supply chain management and logistics: smart and digital solutions for an Industry 4.0 Environment. Proceedings of the Hamburg International Conference of Logistics (HICL), No. 23. Berlin.

Khan, A., Al Aboud, O., & Faisal, S. (2018) "An empirical study of technological innovations in the field of accounting - boon or bane", *Business and Management Studies*, vol. 4, no.1: 51-58.

Leloup, L. (2017) "Blockchain, La révolution de la confiance", Paris: Eyrolles.

Leplat, J. (1997) *Regards sur l'activité en situation de travail : contribution à la psychologie ergonomique*, Paris: Presses universitaires de France.

Liaw, S. T., Kuziemsky, C., Schreiber, R., Jonnagaddala, J., Liyanage, H., Chittalia, A., Bahniwal, R., He, J. W., Ryan, B. L., Lizotte, D. J., Kueper, J. K., Terry, A. L., & de Lusignan, S. (2021) "Primary care informatics response to covid-19 pandemic: adaptation, progress, and lessons from four countries with high ICT Development", *Yearbook of Medical Informatics*, vol. 30, no. 1: 44-55.

Malhotra, N., & Dash, S. (2011) *Marketing research an applied orientation*, London: Pearson Publishing.

Mazurchenko, A., & Maršíková, K. (2019) "Digitally-powered human resource management: skills and roles in the digital era", *Acta Informatica Pragensia*, vol. 8, no.2: 72-87.

Monnier, J., R.P., C., S.E., H., & Gribble, J. (2002) "The impact of resource loss and critical incitends on psychological functioning in fire-emergency workers: a pilot study", *International Journal of Stress Management*, vol. 9, no.1: 11-29.

Moudud-Ul-Huq, S., Asaduzzaman, M., & Biswas, T. (2020) "Role of cloud computing in global accounting information systems", *The Bottom Line*, vol. 33, no.3: 231-250.

Moussaid, S. (2020) "L'intelligence artificielle au service du métier des experts comptables", Paris: Comité de transition numérique du conseil supérieur de l'ordre des experts comptables.

Mvududu, N., & C., S. (2013) "Factor analysis in counseling research and practice", *Counseling Outcome Research & Evaluation*, vol. 4: 75-98.

Narisetti, R. (2020) *The Next Normal, the recovery will be digital*, McKinsey Global Publishing.

Petty, R., & Cacioppo, J. (1996) *Attitudes and Persuasion: Classic and Contemporary Approaches*, Colorado, Westview Press.

Piaget, J. (1997) *La naissance de l'intelligence chez l'enfant*, Paris: Delachaux et Niestlé.

Ruel, S., & El Baz, J. (2021) "Can supply chain risk management practices mitigate the disruption impacts on supply chains' resilience and robustness? Evidence from an empirical survey in a COVID-19 outbreak era", *International Journal of Production Economics*, no. 223.

Russell, M., & Cockcroft, S. (2018) "Big Data opportunities for accounting and finance practice and research", *Australian Accounting Review*, vol. 28, no.3: 323-333.

Teru, P., Idoko, I., & Bello, L. (2019) "the impact of e-accounting in modern businesses", *Journal of Accounting & Finance Review*, vol. 4, no. 2: 1-4.

Terwee, C. (2012) "Rating the methodological quality in systematic reviews of studies on measurement properties: a scoring system for the COSMIN checklist", *Quality of Life Research*, vol.21, no. 4: 651-657.

Vaidis, D. (2006) "Attitude et comportement dans le rapport cause-effet : quand l'attitude détermine l'acte et quand l'acte détermine l'attitude", *Linx*, vol. 54: 103-111.

Vasarhelyi, M., Kogan, A., & Tuttle, B. (2015) "Big data in accounting: An overview", *Accounting Horizons*, vol.29, no.2: 381-396.

W. D., Moffitt, K., & et Byrnes, P. (2015) "How big data will change accounting", *Accounting Horizons*, vol. 29, no. 2: 397-407.

Westman, M. H. (2004) "Organizational stress through the lens of conservation of resources (COR) theory", *Research in Occupational Stress and Well Being*, vol.4: 167-220.

Wieringa, M. (2020) "What to account for when accounting for algorithms: a systematic literature review on algorithmic accountability", *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, NY: Association for computing Machinery, 1-18

Williamson, S., Colley, L., & Hanna-Osborne, S. (2020) "Will working from home become the 'new normal' in the public sector? ", *Australian Journal of Public Administration*, vol. 79, no. 4: 601-607.

Yoon, S. (2020) "A Study on the transformation of accounting based on new technologies: Evidence from Korea", *Sustainability*, vol. 12, no. 20: 2-22.

Zadorozhnyi, M., Muravskyi, V., & Shevchuk, O. (2018) "Management accounting of electronic transactions with the use of cryptocurrencies", *Financial and Credit Activity: Problems of Theory and Practice*, vol. 2: 103-112.

Zouhri, A. (2019) "Big data, intelligence artificielle et la performance des entreprises de demain", *Revue du Contrôle de la Comptabilité et de l'Audit*, no. 11: 916-931.

Zouinar, M. (2020). "Évolutions de l'Intelligence Artificielle : quels enjeux pour l'activité humaine et la relation Humain Machine au travail ?", *OpenEdition Journal*, vol. 17, no. 1: 1-39.

Appendix A: Distribution of the sample by Sector

Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Educational institutions	27	4.6	4.6	4.6
	Banking and finance	59	10.4	10.4	15
	Insurance	15	2.6	2.6	17.6
	Retail Business	93	16.4	16.4	34
	Gross Business	95	16.7	16.7	50.7
	Arts, Entertainment	31	5.5	5.5	56.2
	Hotels, restaurants	33	5.8	5.8	62
	Foods services	24	4.2	4.2	66.2
	Manufacturing	60	10.6	10.6	76.8
	Constructions	75	13.2	13.2	90
	Telecommunications	12	2.1	2.1	92.1
	NGO	33	5.8	5.8	97.9
	Others	11	1.9	1.9	100.0
	Total	568	100	100.0	
Total		592	100.0		

Appendix B: Distribution of the sample by firm size

Firm size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Micro	43	7.6	7.6	7.6
	Small	137	24.1	24.1	31.7
	Medium	175	30.8	30.8	62.5
	Large	213	37.5	37.5	100.0
	Total	568	100.0	100.0	
Total		568	100.0		