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Summary

The effects of organizational justice on innovative work behavior: A multilevel analysis

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***Abstract*— In this research, we examine the effect of team interpersonal justice climate (defined as common perceptions of fair interpersonal treatment among colleagues) on individuals' innovative behaviors. Precisely, we test a serial mediation model so that team interpersonal justice climate causes team identification, which in turn causes a collective work engagement, ultimately leading to individual innovative work behavior. Thereby, we examine the role played by the group engagement model and the Job Demands-Resources model of this mediation mechanism. Survey data collected from 220 employees nested in 24 teams from different Tunisian companies were tested using a multilevel modeling by structural equation approach. The results show the impact of the team's interpersonal justice climate on individuals' innovative behaviors through team identification and collective work engagement. A discussion of the theoretical and practical implications will be set up.**

***Keywords*— Team Interpersonal Justice Climate, Team Identification, Collective Work Engagement, Individual Innovative Work Behavior**

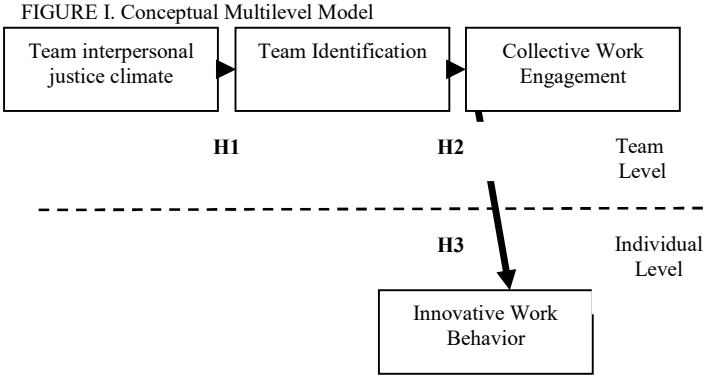
I. INTRODUCTION

Innovation plays an essential role in organizational competitiveness [1]. Organizations depend heavily on their employees who are at the origin of all innovative initiatives [2]. Researchers have increasingly recognized the importance of individual innovative behaviours defined as an intentional attempt to introduce and implement new ideas, products, processes or procedures within the framework of the work, group or organization [3]. For decades, they have studied the antecedents of these behaviors [4].Taking the example of organizational justice.

A minority of previous research has examined the effects of perceptions of justice at higher levels of analysis ([5], [6]). Indeed, the members of the team share their common appreciations of justice [7]. As shared information and organizational experiences arise from common interactions, team members potentially share perceptions of fairness regarding their organization as well as their supervisor. They can form a shared climate defined as a justice climate if their perceptions converge [8]. Justice climate refers to "*a shared cognition at the team level regarding how a working team as a whole is treated*" [9]. Although justice climate predicts the attitudes and behaviors of employees at work [10], a few studies to our knowledge have examined the effects of justice climate on individual innovative behaviors. Very little attention has been paid to the mechanisms underlying such effects.

Unraveling the impact of justice climate on individual innovative behaviors allows us to understand the interaction of individuals with their proximal work team in order to innovate [11].However, few empirical studies show improvement in individual innovative behavior in a team context [12]. Yet teams represent a pervasive social context in which individual innovation is implemented [13]. Our research will therefore expand previous research on the team-individual interaction in the context of innovation by trying to clear up how the interface between the team and the individual works by impacting the innovation of those individuals who, due to a justice climate, will participate at innovative actions. As such, our research will suggest a multi-level approach to study the impact of team-level variables on the individual innovative behavior of employees. Based on the group engagement model [14] and the Job Demands-Resources Model [15], an examination of the serial mediating role of group identification and collective work engagement at the team level will be established. Figure 1 illustrates the proposed model.

FIGURE I. Conceptual Multilevel Model



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II. THEORY AND HYPOTHESIS DEVELOPMENT

A. Team interpersonal justice climate and Team identification

On the rise to the popularity of teamwork structures in organizations, teams have seen a progressively large presence in organizational research [16]. Researchers have studied the influence of team's interpersonal justice climate, or a common perception of equitable interpersonal treatment among colleagues [7]. One explanation for the team's interpersonal justice climate effects lies in social identity theory [17], which suggests that respectful treatment of individuals by their colleagues as well as a non-use of inappropriate language and gestures by the latter in their interactions, will develop a sense of shared identity within the team. Additionally, they will be most probably to act as a cohesive unit and derive a collective sense of self-worth as a team member [5]. Thus, the process of social identity should occur at the team level and serve as a mechanism linking justice climate to the results of the team [18], such as team identification at the team level, defined as "*a shared feeling of attachment and belonging of members to their teams*" [19].

Empirically, the relationship between organizational justice and social identity has been often shown at individual level. Reference [20] shows that procedural justice climate predicts team identification, independently of the individual perception of procedural justice. These results confirmed the link between organizational justice and identification at the individual level as well as at the team level of analysis. Even a few studies to date show the link between team interpersonal justice climate and team identification at team level, we can assume that:

H1: At the team level, team interpersonal justice climate will be positively related to team identification

B. Team identification and Collective work engagement

Collective work engagement is defined as a state of mind, positive, fulfilling, work-related and shared, characterized by team vigor (willingness of team members to display high levels of energy and mental resilience at work), team dedication (strong involvement at work and feelings of enthusiasm, pride and significance), and team absorption (being fully focused and happily engrossed in work) ([21], [22]).

The group engagement model [23] offers better insight into the potential link between team identification and collective work engagement. According to this model, employees who are strongly identified with their team are willing to be more engaged at work. They have high levels of energy and mental resilience, and will be willing to invest effort and persevere in their work (Vigor). In addition, they will experience a high level of enthusiasm (Dedication) and they will be absorbed in their work (Absorption) [24]. For these reasons, at the team level, team identification is likely to lead to collective work engagement.

Empirical studies confirm the link between team identification and collective work engagement at individual level. Reference [25] shows that organizational identification has a positive and indirect effect on work engagement while team identification has a positive and direct effect on work engagement. We can therefore assume that:

H2: At the team level, team identification will be positively related to collective work engagement

C. Collective work engagement and Individual innovative behavior

Innovative work behavior refers to the intentional generation and implementation of new ideas at work in order to benefit role performance, group performance or the organisation in general [26].

Job Demands-Resources model [15] offers a better insight into the potential link between collective work engagement and the individual innovative behavior of employees. Job demands refer to "*physical, psychological, social and organizational aspects which require sustained physical and mental effort and are therefore associated with certain physiological and psychological costs*". In addition, job resources refer to "*the physical, psychological, social or organizational aspects of the job that (1) lead to the achievement of job goals, (2) reduce job demands and physiological and psychological costs associates and (3) stimulate learning and the development of personal growth* " [15]. The Job Demands-Resources model proposes that job demands and resources examine two different psychological processes namely a harmful process of depleting available energy due to excessive job demands and a motivational process that encourages engagement to work in the event of excessive job resources [27]. Job resources therefore play a role of extrinsic motivation and contribute to the achievement of work objectives. In addition, they play an intrinsic motivational role since they satisfy basic human needs. This motivational process leads to the collective work engagement, and consequently, to individual innovative behavior. In fact, collectively engaged employees are likely to go beyond the demands and expectations of their role in order to collaborate with their colleagues, make suggestions to improve the organization and seek new innovative ideas since they "liberate" resources through accomplishing their objectives, as well as performing their tasks effectively.

Several studies empirically confirm a potential link between work engagement and innovative behavior at the individual level of analysis. Reference [28] shows that work engagement have a positive and indirect effect on innovation. We can therefore assume that:

H3: Collective work engagement will be positively related to individual innovative behavior

III. METHOD

A. Participants and Procedure

The hypotheses were tested with a sample of 220 employees working in four companies operating in two sectors (manufacturing and information technology services) in

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Tunisia. The four companies that participated in the study showed an innovation orientation, which is reflected in the extent to which innovation-related demands are placed on employee jobs [29]. In the manufacturing and information technology industries, exposure of team members to a continuous demand for innovation in products, procedures and techniques was reported. They were mainly called upon to design and implement engineering products or software tailored to customer's needs.

To implement the study, employees were invited to participate by email from the head of each department. A structured paper questionnaire was given to groups of 15-25 participants at a time during working hours. Participation to the study was voluntary and respondents were assured of the anonymity of their responses. All the filled-out questionnaires were returned in a locked box. Of the 250 responses obtained, 220 responses were usable, which represents a response rate of 88%. The 220 respondents belong to 24 teams. Eighteen teams belonged to information technology services and six belonged to manufacturing industries. Of these 220 participants, 150 (68.18%) were male and 70 (31.81%) were female. Additionally, 20% of respondents were aged between 36 and 45 years. With respect to the education levels, 20.45 % of participants had a graduate degree. Regarding the work year, 16.36% of respondents had worked in their current organizations between 3 and 10 years. Sample Characteristics are summarized in Table I.

TABLE I. SAMPLE CHARACTERISTICS

Characteristics	*N=220*
Industry	
Manufacturing	180(81.81%)
Information technology services	40(18.18%)
Gender	
Female	70 (31.81%)
Male	150(68.18%)
Age (Years)	
< 25	12 (5.45%)
26-35	100(45.45%)
36-45	44 (20%)
46-55	14(6.36%)
>56	50(22.72%)
Education Level	
Primary school	5 (2.27%)
Secondary school	15(6.81%)
Undergraduate	35(15. 9%)
Graduate	45(20.45%)
Master	70(31.81%)
Other	50(22.72%)
Organizational tenure (years)	
<1	58 (26.36%)
1-3	75(34.09%)
3-10	36(16.36%)
>10	51(23.18%)
Tenure with team (years)	
<1	23(10.45%)
1-3	85(38.63%)
3-10	37(16.81%)
>10	75(34.09%)

B. Measures

Surveys were written in French. Following Brislin's (1980) translation-back-translation procedure, two bilinguals in English and French performed two way translations to ensure equivalency of meaning. All ratings on this questionnaire were on a 5 point scale, 1= strongly disagree to 5= strongly agree.

Team Interpersonal justice: Four items developed by [30] were applied to the team and used to measure team interpersonal justice. A sample item states "My team members treat me with kindness and consideration". Cronbach alpha of this scale equals 0.87.

Team Identification: Five items developed by [31] were used to measure team identification. A sample item included "when someone criticizes my team, I take it as a personal insult". Cronbach alpha equals 0.87.

Collective work engagement: Collective work engagement was assessed using [32] nine items measure. A sample item is "During the task, my team feels full of energy".

Innovative work behavior: Innovative Work Behavior was measured using [33] five items scale. An example of an item is "Within the framework of this work, I am looking for new technologies, processes, techniques or ideas". Cronbach alpha equals to 0.80.

C. Data Analysis

Given the nested nature of our data, we used multilevel structural equation modelling with Mplus [34] to test our hypotheses. The model has two levels: individuals (level 1) and team (level 2). One approach to data processing would be to aggregate all of the individual variables in order to improve a team-level analysis. However, this approach reduces statistical power and does not address all of the available information regarding variance at the individual level [35]. In contrast, multilevel modelling allows us to process information from multiple levels at the same time.

D. Data Aggregation

In order to explain the aggregation of variables at the team level, we calculated the next statistics: rwg(j) index [36], which "compares the observed within-group variability to the expected within-unit variability from a hypothetical distribution, that is to say an expected variance " [37]; ICC(1), which estimates the proportion of variance between participants, can be explained by belonging to a team [38]; and ICC (2), which estimates the aggregate scores of these variables [39]. The mean values of rwg (j) were as follows: team interpersonal justice climate, 0.75; team identification, 0.80; and collective work engagement, 0.85. These values are greater than 0.70 indicating good agreement between team members [40]. In addition, the values of ICC (1) were: team interpersonal justice climate, 0.30; team identification, 0.14

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and collective work engagement, 0.25. These values are above the recommended level of 0.12 [39]. ICC (2) values were as follows: team interpersonal justice climate, 0.50; team identification, 0.48 and collective work engagement, 0.55. These values are greater than the recommended limit value of 0.47 [41]. Based on these results, we have aggregated all the measures.

IV. RESULTS

Table II presents the descriptive statistics, and the inter-construct correlations between all the variables of our research.

TABLE II. DESCRIPTIVE STATISTICS AND INTER CORRELATIONS BETWEEN VARIABLES

Variables	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1.Industry											
2.Gender											
3.Education											
4.Organizational tenure											
5.Tenure with team											
Level 2											
6.Team interpersonal justice climate	3.60	.95							.88**		
7.Team identification	3.86	.85								.89**	
8.Collective Work Engagement	3.17	.89									
Level 1											
9.Innovative Work Behavior	3.15	.85								.92**	

Notes: n = 220,*p < .05, **p < .01

In order to assess the fit of the model, a confirmatory factor analysis was performed. We used the following adjustment indices: **RMSEA** which should be less than 0.08 [42] and **CFI** which is recommended to be 0.90 or higher [43]. The results of this analysis demonstrate that our hypothetical model presents a good adaptation to the collected data **(X2 = 400.2, CFI= 0.91, RMSEA = 0.07)**, because all indices were within the recommended field.

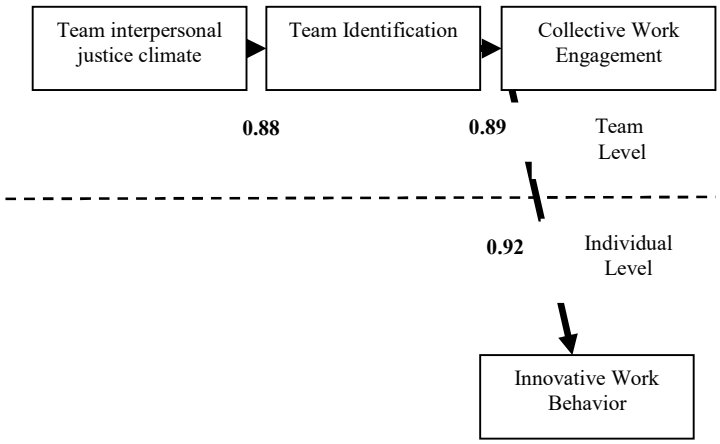
TABLE III: ADJUSTMENT INDICES

Model Test	
X2	400.2
RMSEA	0.07
CFI	0.91

Notes: n = 220, Root-Mean-Square Error of Approximation (RMSEA) and Comparative Fit Index (CFI).

Our model includes direct effects of (a) team interpersonal justice climate on team identification at the team level; (b) team identification on collective work engagement at the team level; (c) collective work engagement on individual innovative work behavior (Figure II). Team's interpersonal justice climate is positively linked to team identification at the team level (ρ = 0.88, SE = 0.090, p<0.01) which confirms hypothesis 1. The more employees are treated with respect and dignity within their teams, the more likely they are to develop a sense of shared identity, act as a cohesive unit and derive a collective sense of self-worth. Team Identification is positively linked to collective work engagement at the team level (ρ = 0.89, SE = 0.022, p <0.01) thus confirming hypothesis 2. The more employees are identified with their team, the more they will have high levels of energy and mental resilience, they will be ready to invest effort and persevere in their work, will experience a high level of enthusiasm, and will be absorbed in their work . These employees will therefore be inclined to be more engaged at work. Collective work engagement is also positively linked to individual innovative behavior (ρ = 0.92, SE = 0.12, p <0.01). Given these results, hypothesis 3 is confirmed. The more collectively employees are engaged, the more resources they "free up", the more likely they are to go beyond the demands and expectations of their role to seek out new and innovative ideas.

FIGURE II. RESULTS OF THE MSE FOR THE MEDIATION MODEL



In addition, we observed significant indirect effects of team interpersonal justice climate on individual innovative behavior at work mediated by team identification and collective work engagement (ρ = 0.68, SE = 0.04, p <0.01) (Table IV). Furthermore, the relationship between team interpersonal justice climate and collective work engagement was mediated by team identification at the team level (ρ = 0.76, SE = 0.05, p <0.01).

TABLE IV. INDIRECT EFFECTS

Indirect Effects	*ρ*	*SE*	*P-Value*
Team interpersonal justice climate – Team identification-Collective Work Engagement-Innovative Work Behavior (Niveau 1)	0.68	0.04	p <0.01

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Team interpersonal justice climate – Team identification-Collective Work Engagement (Niveau 2)	0.76	0.05	p <0.01

V. CONCLUSION

On the theoretical level, our results make several contributions to organizational justice and innovative behavior research. First, our research offers a new perspective on the effects of justice climate on attitudes and behaviors of employees at work. It expands our knowledge of the effects of collective perceptions of justice at the team level. Second, it shows the role of working groups in justice research. Third, it provides additional empirical validation for the antecedents of individual innovative behaviors at the team level. The latter therefore allows us to better understand how justice climate affects individual innovative behavior. Finally, our research explains the serial mediating role of team identification and collective work engagement in the mechanism that links the justice climate to various outcomes.

On the managerial level, managers should be trained to promote a sense of justice among employees, as this reinforces their innovative behavior. Training programs must go beyond the individual context to take into account the influence of colleagues at work and introduce the notion of justice climate.

Despite the important implications described above, our research has some limitations that might indicate future research. First, our empirical research is limited to employees in Tunisia. Future research should go beyond the current context and re-examine our results in various countries. Second, the data were obtained from a single source at a single measurement time, which may lead to a common method bias [44]. Future research can complement the data obtained by including supervisors as a source of innovative behavior. Third, the transversal nature of the data does not allow for causal relationships between team interpersonal justice climate, team identification, collective work engagement and innovative behavior. Future research should seek to use longitudinal data designed to test cause-and-effect relationships more accurately and track perceptions of justice over time.

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Is COVID-19 an opportunity to boost the Arab Maghreb Union?

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Abstract-Today's world is more complex, more dynamic and more connected than ever before. Numerous unforeseeable events are throwing societies off balance, triggering disasters, breaki ng points that might threaten to consume all.

The Covid-19 pandemic is going to be very damaging to all economies. Although its socio- economic impacts are very difficult to quantify at this point, it is clear that they will trigger a brutal economic slowdown of uncertain duration. In view of this situation, it is time to consider the potential relations between the global and regional integration of the Maghreb countries and how to leverage the complementarity of the Maghreb countries in the economic area in order to deal with the adverse effects of this pandemic.

Key words: Covid-19, AMU, Monetary zone

I- Introduction

The economic literature on the formation of an optimal currency zone is vast and rich and could go back at least to Mundell in the 1960s, who first developed the concept of the Optimal Monetary Zone (OMZ) based on the effective choice between the advantages and disadvantages of fixed and floating exchange rate regimes. The Monetary Zone is defined as the geographical area that adopts the fixed exchange rate regime between the different currencies in the zone, while maintaining a flexible exchange rate regime with the rest of the world. This definition differs from the Monetary Union (MU) in that the member countries definitively adopt a common currency managed in all these countries by a single Central Bank. Thus, Mundell has defined the MBA as the area in which the opportunity costs of the floating exchange rate as an instrument of domestic adjustment are outweighed by the benefits of maintaining the single currency or the fixed exchange rate regime (Ricci (2008)).

Bayoumi and Eichengreen (1992) were the first to apply the SVAR method to determine the nature of macroeconomic shocks in order to assess the capacity of European countries to establish the European Monetary Union. The study is based on a bivariate SVAR (2) model composed of real GDP and the implicit GDP deflator indicating respectively the real growth rate and the inflation rate. The period runs from 1963 to 1988 for the eleven countries of the European Economic Community (EEC), divided into the "core of the EEC" and the "periphery of the EEC". The first division is made up of Germany, the Netherlands, Belgium, Denmark and France, while the second is made up of Italy, the United Kingdom, Ireland, Spain and Portugal. The same period is chosen for the six countries of the European Free Trade Association (EFTA) composed of Sweden, Switzerland, Austria, Finland, Norway and Iceland. There are also the countries of the control groups such as the United States of America (USA), Japan, Canada, Australia and New Zealand. Similarly, the United States of America (USA) is divided into the "heart of the USA", which includes "The Mid-East, New England, Great Lakes, Plains, South East and Far West" and the "periphery of the USA", which includes "the Mid-East, Plains, South East, South West, Rocky Mountains and Far West"[1]studied for the period 1966-1986. The study was unable to distinguish between countries according to the criteria they characterize. Thus, using the SVAR model, Bayoumi and Eichengreen (1992) differentiated countries within the EEC between the core and the periphery on the basis of the difference in correlations, amplitudes and adjustment speeds of supply and demand shocks. In short, the EEC countries cannot establish a Monetary Union because there are two different speeds, but they can establish it in the core of the EEC.

Zhang, Sato and McAleer (2004) followed the same methodology in deciding on the establishment of Monetary Union in East Asian countries. The study is based on ten East Asian countries, composed of Japan, Korea, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, Philippines, Thailand and China compared with the United States of America (USA) on quarterly data for the period 1980-2000 divided between before and after the financial crisis of 1997. The model uses the multivariate SVAR method of the following three variables: real GDP, the consumer price index (CPI), and the bilateral real exchange rate of

[1] The same number of countries is used to maintain consistency in the comparison between the EEC and the USA.

East Asian countries with the dollar. According to

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Zhang, Sato, and McAleer (2004), East Asian countries cannot be good candidates for monetary integration, but they have found that sub regions can do so on the basis that the shocks affecting them are more correlated, small in magnitude, and have the capacity to adjust quickly.

Given the importance of revenues from oil resources in the GCC countries, the authors did not insist on the propagation of non-oil shocks on these economies and the choice of the anchor unit as an adjustment tool. Over a period from 1970 to 2006, Rosmy, Balli and Osman (2008) analyzed a SVAR model of non-oil GDP at constant prices and the implicit deflator at the 1990 base year for the six GCC countries, the United States of America (USA) and the core European countries. The latter is composed of France, Italy and Germany. The SVAR model is used to test the feasibility of Monetary Union in the GCC countries, but this time with more specification at the variable levels and with the introduction of other countries for comparison. Thus, Rosmy, Balli and Osman (2008) found that the GCC countries are on average subject to similar shocks and are the best candidates for Monetary Union.

Believing in the strong ties based on the community of history, religion and language uniting the peoples of the Arab Maghreb, Responding to the deep and constant aspirations of these peoples and their leaders for the establishment among them of a Union that would strengthen their mutual relations and provide them with the appropriate means to gradually achieve an even more complete fusion among them, Aware of all that such a merger would imply as an opportunity for the Arab Maghreb Union in February 17, 1989 to acquire a qualitative weight enabling it to actively participate in the world balance, consolidate peaceful relations within the international community and maintain security and stability in the world, Bearing in mind that the creation of the Arab Maghreb Union will require concrete achievements and the establishment of common bases concretizing the effective solidarity among its members and guaranteeing their economic and social development .

II-Impact of covid-19 on the economies of the member countries of the Arab Maghreb Union

The coronavirus pandemic has shown us that everyone's fate depends on their own behavior. However, this maxim has gained moment in regions such as the Maghreb, where countries face some pre-pandemic problems with COVID-19. The consequences of this health crisis have highlighted the crisis of legitimacy experienced by some Maghreb countries, a region composed of the territories of Mauritania, Morocco, Algeria, Libya, Tunisia and Western Sahara. The Foundation for Strategic Research (FRS) has conducted a study entitled "The Maghreb and COVID-19", in which it analyzes the repercussions that this pandemic could have on the political, economic and social systems of the countries that make up this region. The governments of the countries that make up the Maghreb have taken a series of measures in recent weeks to reduce the economic and social impact of this pandemic. In addition, it must be taken into account that the health infrastructure of some Maghreb countries are not prepared to face a health crisis of these characteristics. This means that those with higher purchasing power are more likely to survive than those living in the informal economy. The research conducted by the FRS considers it necessary to ask whether the historical and exceptional relationship between Europe and the Maghreb countries could be replaced by a new global center led by China.

The Tunisian economic crisis, the unstable situation in Libya, caused by a war that seems never to end, and the ongoing protests in Algeria, among other events, have brought out the spirit of the Arab Spring. However, the study conducted by the FRS considers that the post-pandemic period will be marked by a disarticulation of the Maghreb scenario in a world that has become multipolar and in which China has proclaimed itself the winner, making health diplomacy the main actor of its foreign policy.

-The political, economic and social crisis has become a constant in recent months in Algeria**.** Instability continues to be the undisputed protagonist of the country, one year after protests forced the former president to resign. To this situation must be added the collapse of oil prices or the fragility that defines the new government. In addition, the health crisis caused by the coronavirus has raised the food shortages. Commodities such as flour or milk are subject to price speculation. The cost of masks fluctuates according to stocks, and illegal tax collectors take advantage of the partial stoppage of public transport. Faced with this situation, the current Algerian president has tried to restore the credibility of his regime by imposing several health and social measures**.** These measures were taken in a country that has 1.9 hospital beds per 1,000 inhabitants, compared to 13.4 in Japan.

- The Moroccan monarchy has faced several challenges over the past decade, such as the Arab Spring in 2011, the Al-Hoceima demonstrations in 2017, and the health crisis caused by the COVID-19 virus. Rabat leads a diplomacy based on the notion of exemplarity. Rabat is conducting a diplomacy based on the notion of exemplarity. It is moving northwards, trying to establish itself as a credible regional interlocutor, and southwards, consolidating its strategic presence on the African continent. This is why Morocco has been one of the countries on the African continent that has been able to act the fastest on the coronavirus. First of all, Mohamed VI was able to exercise his authority to force the country's society to respect the rules of containment. And second, the Moroccan leader was able to transform the health threat into a national cause. The fact that civil society was involved in this process and decided to help the most vulnerable led the International Monetary Fund (IMF) to grant a $3 billion loan to Rabat. According to the report prepared by the FRS, this loan is considered by the Chinese official media as a commitment of the international organizations in favor of the Kingdom.

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-Political uncertainty and the leadership of the Tunisian President have brought Tunisia to the brink of the abyss. According to research conducted by the FRS, there are three ridges that constitute the cornerstone of the fight against COVID-19. This triangle of power is formed by the President himself, the Prime Minister and the country's civil society. While the Prime Minister took it upon himself to reorganize the state apparatus and correct the mistakes made in the first few weeks, during which groups such as pensioners were condemned to oblivion, the fear of poverty led civil society to take to the streets. The epidemic is reawakening the social divide in Tunisia and shows the weakness of a state that is struggling to organize the distribution of emergency aid, some 50 million euros. The endless lines to obtain subsidies are often used by people bearing a pathogen who, without a means of survival, join the crowd to survive.

-Nearly nine years after the death of Muammar Gaddafi, uncertainty and instability remain the main protagonists of the Libyan conflict. Since then, the country has been divided between the internationally recognized and Turkish-supported Government of National Accord (GNA) and the Libyan National Army (LNA), based in the east of the country and supported by Egypt and the United Arab Emirates. The UN Secretary General urged the parties involved in the conflict to agree to a cessation of hostilities to address the COVID-19 pandemic. Although both parties initially agreed to this ceasefire, it was never respected. The attacks between the two sides continue to be the stars of the Libyan sky and land. All this has brought the medical sector to the brink. "Patients with COVID-19 had to be evacuated from Independence Hospital because of the bombing. Water and electricity cuts continue to deteriorate the living conditions of the population, especially the elderly," warns the FRS report. Researchers and representatives of Libyan society fear that the population will pay dearly for the fratricidal struggle between East and West, authorities whose ability to respond to the virus was based on the idea that containment was unnecessary because they were already confined in Libya.

- The coronavirus pandemic took Mauritania by surprise. The country's government made some mistakes at the beginning of the crisis, according to the FRS survey. However, the president announced the mobilization of more than $64 million for the purchase of essential drugs and equipment to address this health crisis. In addition, a support plan was launched to sustain pastoralism; the main livelihood of hundreds of the country's citizens. Nouakchott is taking simple and pragmatic steps to anticipate the global crisis. At the same time, the Mauritanian army has stepped up surveillance along the river that runs through the country to prevent illegal activities, such as the transport of illegal migrants who are trying to reach their homes. In the cities, the implementation of containment measures is causing impatience among economic actors, including informal actors who are eager to resume their activities. Some are desperate, believing that the state is exaggerating health standards in view of the number of cases observed. Mauritanians confined to a hotel in Nouakchott are on hunger strike to protest quarantine.

2- Turning crisis into opportunity thanks to the UMA?

Some economists conclude that the recession is not an opportunity in terms of health. Since a country's health problem is being handled at national level. We see it all over the world, even in political units. There has never been a popular health policy and a similar crisis management in Europe. The countries acted according to their health situation, then there were attempts at coordination, but they were very difficult, because in fact each country defends its own interests.

From a political and economic point of view, the crisis is an excellent opportunity, as one of its implications would be the willingness of States, especially Western States, to migrate to a number of sectors that are currently very dependent on China and Asia.

The president of the "Policy Center for the New South" claims that this crisis is an interesting moment for the building of the Maghreb. The opportunities are numerous and can increase the variety of interactions between the student population and entrepreneurs. This Maghreb fragmented somewhere refers to the notion of our relationship with the outside world, the African continent and the Mediterranean to which we are fundamentally related, especially the central Maghreb, but also with other regional blocs. We must not forget that the Maghreb is, in the field of international affairs, a strategic bloc that makes sense. We must multiply the channels of dialog and strengthen the exchanges in order to create the Maghreb together.

According to the experts, the urgency is economic and financial. The three governments, which have different circumstances but shared interests, need to be able to come together to discuss with foreign donors the rescheduling of their debts in one way or another and the prospect of getting additional debts to fund and invest in the manufacturing and service sectors.

On the other hand, they propose that actors in the health sector or in research and development work together to set up a center of expertise that can be set up in one of the three Maghreb countries. The Maghreb area has a very active population which could play a key role in the growth of the health sector. There is no lack of sectors or expertise for them. It is the position of the State and public policy that must necessarily be rethought and redefined.

III-Conclusion

In fact, there is a difficult relation between Algeria and Morocco (nearly 73 million inhabitants, or 2 / 3 of the population of the region). The border has been closed between the two countries since 1994 and the two countries are categorically and energetically opposed about a never-ending conflict: that of the Sahara. The situation that Libya is going through, in the context of the so-called Arab Spring of 2011, does not make things any easier. The country is torn by civil war, with two opposing governments and militias wreaking havoc taking

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advantage of the chaos. These challenging security and economic circumstances prevailing in the Maghreb have forced the countries of the region to close themselves.

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Dynamic effect of financial ratios on Islamic bank's profitability: An empirical Application to the banking sector in gulf countries

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Abstract-The aim of this paper is to study the determinants of performance in the Gulf countries during the period of study from 2009 à 2016. Then, we utilize two models in which we adopted the variable ROA and ROE as a dependent variable. Empirical evidence supports the significance of country-level characteristics and firm-level characteristics. In reality, a number of internal and external banking characteristics have been used to expect profitability. Controlling the macroeconomic climate and industry-specific variables, the findings show that high capital-to - asset and loan-to-asset ratios contribute to higher profitability. In general, there is no major difference between interest-based banking and the free interest bank in terms of profitability, and there is a difference in leverage and size.

Keywords: Performance . Dynamic effects . Panel Data

Jel classification: G15 . G21 . G24

I- Introduction

Islamic and conventional banks are two profitable institutions. Performance is an important issue for evaluation.

However, Islamic and conventional banks have differences in financing and structural activity. Islamic banks and conventional banks have neither the same principles nor the same regulatory structure as conventional banks.

In the first hand, the activity of Islamic banks should be in accordance with sharia law. The main difference between Islamic and conventional banks is the second hand, there are the specificities of the Islamic bank in terms of solvency. In the third hand, Islamic banks are younger and enjoy fewer experiences compared to conventional experiments.

Islamic banks are based on the sharing of losses and profits (PLS) (moucharaka, moudharaba) and on the commercial margin between buying and selling (mourabaha, salam). On the one hand, due to the specific Islamic activity, the performance of the Islamic bank would not be determined by the same factors held in conventional banks. Several authors have been interested in studying the performance of Islamic banks. It enriches the literature in this regard to identify the determinants of profitability.The purpose of this research is to empirically access the performance of 22 Islamic banks operating in the Golf region over the period 2009-2016. We try to answer the following question: what are the determinants of performance in Islamic banks?

The rest of this article is organized as follows: Section 2 gives a review of the literature on the performance of Islamic banks. Then we will present the methodology in Section 3. Section 4 presents the results and discussion. Finally, synthesis and policy recommendations are presented.

II- Literature review

Several authors have studied the performance of Islamic and conventional banks. Tamimi (2010) examined the performance of Islamic and

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conventional UAE banks for the period Sehrish, Saleem, Yasir, Shehzad and Ahmed (2012) analyzed and compared the performance of 4 Islamic and 4 conventional banks in Pakistan during the period 2007-2012. They found that during the first 3 years of the performance of Islamic banks were better, while conventional banks were the best in terms of performance, they also concluded that Islamic banks have improved performance in the near future and there There is not much difference between the two banks from 1996 to 2008. He measured the performance of the return on assets (ROA) and return on equity (ROE). The independent variables are the GDP, the size of the bank, the concentration, the liquidity, indicator of financial development. He found that both the liquidity and the concentration variables have a significant impact on the banks' performance.

Other writers have been interested in studying the performance of Islamic banks only.
Hassan and Bashir (2003) examined the performance of Islamic banks for the period 1994 to 2001. They found that internal variables (overheads, liquidity, leverage ratios, earnings, management expense ratio) and external variables (GDP by capital, taxation, financial indicators and real interest rates) have a significant impact on the performance and efficiency of banks. They concluded that banks' performance increases with capital and loan-to-asset ratios. They have provided evidence that this conclusion is maintained even after controlling the different circumstance, such as taxation, market structures, and economic conditions. They also found that macroeconomic indicators have positive effects, while taxes have a negative impact on bank performance during the study period.

Similarly, Akhtar, Ali and Sadaqat (2011) measured the performance of Islamic banks in Pakistan from 2006 to 2009. They used ROA and ROE as performance indicators and took different variables such as the size of bank, ratio (total debt / equity), asset management, non-performing loan ratio, operating efficiency and capital adequacy. They used multivariate regression to analyze the impact of these variables on performance indicators. They found that the capital adequacy ratio has a significant positive effect while the size of the bank has a negative and insignificant impact with ROA and ROE.

Mohammad Kamrul Ahsan (2016) analyzed the performance of the three Islamic banks in Bangladesh over an eight-year period (2007-2014). This study uses an analysis of the CAMEL approach. He found that Islamic banks in Bangladesh are satisfactory in all respects namely: capital adequacy, quality of assets, quality of management.

III-. Data and methodology

A. Data

Empirically, the number of work focused on measuring the performance of Islamic banks is continually increasing.

The general interest of ratio analysis is to explain the level of performance of a bank. The financial ratios are the indicators of the financial performance of the bank.

The data was collected from 22 Islamic banks located in different countries (Saudi Arabia, United Arab Emirates, Qatar and Oman) covering the period 2009 to 2016. These countries were chosen because of the importance of Islamic banks in their banking system and their availability of data.

In fact, the financial ratios were estimated from the annual reports and the financial statements, namely the profit and loss accounts and the balance sheet for the period from 2009 to 2016. Finally, our study uses eleven financial ratios for the measurement of financial ratios of performance of Islamic banks.

we discuss the main categories of variables We use performance, banking characteristics and variables at the country level.

Profitability ratios measure the profitability of the banks. These ratios use the analysis of margins and also show the return on assets, deposits, investments and equity. If the profitability ratio is a higher indicator, there will be a good performance. Salah Ben Yousef et al (2015) used two profitability ratios to evaluate the performance of Islamic banking and conventional banking in CCM. These ratios were derived from Return On Assets (ROA) and Return On Equity (ROE). These two proxies are widely used in the empirical banking literature (eg, Iqbal 2001,

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Olson and Zoubi 2008, Abedifar et al 2013, Beck et al 2013, Bourkhis and Nabi 2013).

1) Return on Assets = Net Income / Total Assets

2) Return on equity = Net income / Equity

The use of different financial ratios such as profitability ratios are fairly common literature (Sabi, 1996, Samad and Hassan, 2000, Samad, 2004). The crucial ratio advantage The method consists in eliminating disparities in the sample and in showing positive aspects. We consider the following variables to be often used as an approximation of performance

- Return on Assets (ROA): it measures the total profitability as a percentage of total assets. It is a ratio of a bank's net after-tax income divided by its total assets and shows the ability of the bank to use its assets to generate income.

- Return on Equity (ROE): It is the ratio of a bank's net after-tax income divided by its total equity capital. It measures total profitability as a percentage of total equity and indicates the bank's ability to use its equity financing to generate profits. Higher ratios of ROA and ROE indicate better performance.

Our study uses the same measure of profitability to analyze the performance of banks in the Gulf countries.

Bank-specific variables are overheads, reserves, bank size, operating efficiency, and deposits. Financial indicators are market capitalization and market concentration, and macroeconomic indicators are gross domestic product and the real interest rate.

The bank specific variables used in this study are overheads, bank size, deposits, reserves and operational efficiency. We explain each variable in detail below and present empirical data on its effect on bank performance.

- Overheads

This ratio determines the variation in operating costs in the banking sector. A low ratio affects performance positively according to studies by Hassan and Bashir (2003) and Kunt and Huizinga (1998). Efficient banks operate in low cost. It is calculated as follows:

Overhead ratio= overheads/ total assets.

-Reserves

This variable is calculated by taking the natural log of reserves value, which is taken from the balance sheet of particular bank for particular year.

Reserves (RSRV)=[ln(reserves)]

In developing countries, if reserves are high, interest rate and profit decline, which also increases the remuneration rates. It is also argued that banks can absorb unexpected shocks by maintaining the desired reserves. Hassan and Bashir (2003) indicated that reserves have no impact on bank performance.

-Size

Most of previous studies have defined bank size as the log of total assets. Therefore, in this study, we also define bank size by taking log (ln) of total banks' assets as follows:

Bank Size=[ln(total bank assets)]

Previous studies have shown both the positive and negative effects of bank size on bank performance. For example, Goddard, Molyneux and Wilson (2004) and Akhtar et al. (2011) found that the size of the bank has an insignificant impact on performance, whereas Smirlock (1985) found a significant and positive impact of bank size on bank performance.

- Deposits

Deposits are the main source of financing for banks. The deposit / equity ratio has a significant effect on the banks' performance. In this study, we will use this variable as a specific determinant of bank performance. It is defined as follows:

Deposit Ratio = [Deposit / Equity]

A high deposit leads to better results because deposits increase investments, which increases the banks' income. On the other hand, a high level of capital is also considered necessary for a bank's financial strength and performance.

-Market Capitalization

Market capitalization describes the net worth of banks. It is calculated as Market capitalization

=[shareprice× No of outstanding shares]

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Bourke (1989) and Hassan and Bashir (2003) showed that market capitalization has a positive relation with the performance of banks.

-Gross Domestic Product (GDP)

Gross domestic product (GDP) refers to the market value of producing goods and services in a country within a specified period. GDP at constant factor cost is calculated as follows:
GDP = [value of all produces + product taxes − subsidy (which is not included in product value)]

Previous studies, Demirgüç-Kunt and Huizinga (1998) and Bikker and Hu (2002), have presented a positive relationship between GDP and the performance of banks.

B. econometric methodology

We will use the method of the data of panel and the method of estimate is that of least square ordinary (MCO).

For estimation purpose, we write the equation as follows:

ROA= βo+β1OVHDit+β2RSVit+β3SIZEit+β4DPSTit+β6Mktcapit+β7GDPt +εit

ROE= βo+β1OVHDit+β2RSVit+β3SIZEit+β4DPSTit+β6Mktcapit+β7GDPt +εit

IV- Empirical results

A. Summary statistics

We begin our empirical parity by presenting descriptive statistics of the different variables. Table 1 presents the mean values, standard deviation, maximum and minimum values of the variables for all the banks included in the sample. These statistics provide information about the variables.

All variables have positive averages ranging from 0.8306124 to 2170.483 over the study period. The average value of ROA and ROE is 1.915511 and 9.494318, while its standard deviation is 3.467646 and 23.37807. However, the maximum and minimum values of ROA and ROE are 30.5, 263.95, -11.88, -119.81, respectively. The average overhead value is 46.01784 and the standard deviation is 41.07977. The minimum value indicates that some banks have negative overhead ratio.

For all period used in this paper, we can show that all variables have a high kurtosis and much higher than 3 expect for SIZE. This ratio varies from a minimum of 2.683812 and a maximum for 86.16999. He tells us about the high probability of extreme values and we can reject the hypothesis for the normal distribution in our study. Additionally, the coefficient of asymmetry (Skeweness) is varies between -4.128686 for the overhead and 6.470236 for the ROE variable. We can conclude that the distribution of returns is not normally distributed. Based on the two statistics of Kurtosis and Skeweness, we can reject the hypothesis of normality of all variables used in this study.

The correlation matrix between all used variables is summarized in Table 2. From this Table, we can find that no coefficient exceeds the tolerance limit (0.7) unless the correlation coefficients between variables, which does not cause problems when estimating two models.

B. Empirical results and conclusion

The results of the estimate by MCO of the two models used are shown in Tables 4 and 5. Then, we conduct other tests to demonstrate the validity of our models and justify the significance of all estimations. We test the correlation between the explanatory variables
and residue. This test is based on the value of (Prob> chi2). If the probability is less than 5%, so we accept H0 which verifies the absence of correlation between the residues and variables. If the probability is greater than 5%, in this case there is a problem of correlation between the residuals and the explanatory variables we should fix it. In all estimated models, the probability values (Prob> chi2) are all less than 5%. So we do not have the problems of correlation between the explanatory variables and residue. For model (1), the probability value (Prob> Chi2) is less than 5%. In this context, there is not a problem of correlation between the explanatory variables and residue. This value is shown in Table 3 that summarizes the estimation performed for four periods. Also, for the model (2), the probability values (Prob> Chi2) are less than 5%. In this context, there is not a problem of correlation between the explanatory variables and residue. These values are presented in Table 4 which summarizes the estimation performed for the 4 selected periods.

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The dependent variable, which measures the degree of obstinacy of profitability calculated by ROA and ROE , is statistically significant through the majority of models , suggesting a high degree of obstinacy of banking performance and justifying the use of a dynamic model. In addition, the Sargan test does not show any indication that the shortcomings have been established in most cases. There's no autocorrelation, either. The main goal of our research is to analyze the profitability of Islamic and Traditional Banks and to decide which factors have the greatest impact on the profitability of a bank between bank characteristics and macro-economic / industry-specific environmental variables. Our research uses many banking ratios to estimate the relationship between profitability and the internal characteristics of banks. In our report, we noted that leverage has a important and positive impact on all profitability ratios in traditional banks. This positive relationship between the capital ratio and the asset return is the same for both banks. Strongly capitalized banks have more resources to take advantage of funding opportunities. In addition, highly capitalized banks are less vulnerable to the possibility of bankruptcy, so the costs of bankruptcy are lower. This positive sign is due to a variety of factors related to Islamic banks, such as lower bankruptcy costs due to the tangibility of bank transactions; transaction and information costs are minimized by diversification of trades and activities in Islamic banks, etc. Previous research on the profitability determinants of the bank in the United States has shown a clear positive and statistically relevant relationship between leverage and profitability. Indeed, this ratio, considered as a measure of the probability of insolvency, allows the expense of the borrowed funds to be reduced. The positive sign of the coefficient was seen in the invaluable searches which studied the profitability of the banks to be known, Athanasoglou et al (2008), Pasiouras and Kosmidou (2007), Kosmidou (2006), Goddard et al (2004), Claessens, Demirguc-Kunt and Huizinga (2001) and Demirguc-Kunt and Huizinga (1999,2000). Regulations are one of the most significant characteristics of the sector and can have an effect on the profitability of a commercial bank. If regulators reduce the restrictions placed on banks, banks can start more risky operations (Hassan and Bashir, 2005). If banks take a high level of risk, depositors and shareholders would benefit. In the other side, if the bank’s collapse, the depositors would lose. Islamic banks' funding agreements are typically arranged in such a way as to involve multiple transfers of ownership (the bank or its subsidiary purchases assets that it resells with a margin or leases with a call option), each transfer of ownership assuming the right of transfer. In addition, the regulator obliges the most volatile Islamic banks to hold more equity. In the majority of countries where Islamic banks are located (Qatar, Malaysia, United Kingdom, Tunisia, etc.), regulators claim that Islamic banks should not cause depositors in participating investment accounts to experience losses in their invested capital or a substantial reduction in the return on their deposits. Islamic banks therefore have an implied duty to ensure and guarantee investment by the depositor. Thus, instead of being optional, the exercise becomes obligatory and the participating investment accounts are deemed to be essentially certain resources (Fiennes 2007). So we waited for the lack of specific prudential regulation for Islamic banks to have a positive effect on the profitability of Islamic banks. Although the disparity between Islamic and traditional banks does not minimize the need for regulation and supervision, regulation does not affect their profitability and competitiveness relative to conventional banks (Chapra and Khan, 2000; Hassan and Dicle, 2005).

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Appendix

Table 1. Summary statistics

stat	No. Of obs	Mean	Max	Min	Std.dev	Skewnss	Kurtosis
ROA	**176**	**1.915511**	**30.5**	**-11.88**	**3.467646**	**3.864826**	**32.27924**
ROE	**176**	**9.494318**	**263.95**	**-119.81**	**23.37807**	**6.470236**	**86.16999**
Ovrhea	**176**	**46.01784**	**207.14**	**-283.05**	**41.07977**	**-4.128686**	**37.21802**
Reservs	**176**	**5.186875**	**23.47**	**0.38**	**4.035328**	**1.988445**	**7.390395**
Taille	**176**	**9.909301**	**11.27443**	**8.43489**	**0.613071**	**-0.0913954**	**2.683812**
Deposit	**176**	**0.830612**	**0.924292**	**0.61045**	**0.051286**	**-1.353003**	**5.69665**
Marcap	**176**	**2170.483**	**7906**	**351**	**1302.026**	**1.581676**	**6.10416**
GDP	**176**	**5.644318**	**18.8**	**-2.7**	**3.95952**	**0.9003793**	**5.57904**

Table 2 the correlation matrix

	ROA	ROE	overhead	reserves	taille	deposits	marcap	GDP
ROA	1.0000							
ROE	0.1768	1.0000						
Overhear	-0.1062	0.0267	1.0000					
Reserves	0.0424	-0.0705	-0.0453	1.0000				
Taille	0.2659	0.1106	-0.1185	-0.0797	1.0000			
Deposits	0.1009	-0.0219	0.2415	0.2025	0.2371	1.0000		
Marcap	0.1655	0.0511	0.0172	-0.2759	0.6964	-0.1477	1.0000	
GDP	-0.0055	0.0048	-0.0428	0.1117	-0.0659	-0.0443	-0.0237	1.0000

Table 3

	Coefficients
Dependent variable: ROA	
Overhear	-0.005617
	(-0.89)
Reserves	0.1579863
	(2.03)**
Taille	-0.3375427
	(-0.38)
deposits	5.560505
	(0.65)
marcap	0.0006888
	(1.91)***
GDP	-0.0110073
	(-0.17)
Cons	-1.352201
	(-0.13)
Number of banks	22
Adjusted R^2	0.0456
F	8.57
Prob>F	0.000

Table 4

	Coefficients
Dependent variable: ROE	
Overhear	0.0321583
	(0.57)
Reserves	0.8109684
	(1.15)***
Taille	23.13633
	(2.85)**
deposits	139.179
	(1.80)*
marcap	.0010828
	(0.33)
GDP	-.1764077
	(-0.31)
Cons	-342.4151
	(-3.72)***
Number of banks	22
Adjusted R^2	0.1034
F	2.84
Prob>F	0.0119

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Covid-19 Crisis: What Impacts on the Purchasing Behavior of Tunisian Consumers and on Retailers' Strategies? Case of Supermarkets.

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Abstract-The study has identified a set of assumptions that have led us to focus on the major issues for operators in the sector. It has been revealed that the Covid-19 crisis could encourage the development of new trends among Tunisians, such as simplifying the purchasing process, reducing consumption, using online shopping for most of the products. Accordingly, a number of effects might take place such as the increase in online purchases of everyday consumer goods and groceries or the use of short and local channels. Then, how should large retail outlets keep up with these changes and benefit from the transformation of their sector?

Keywords -Covid-19- Purchase behavior-Retail.
Jel classification: I15-M31-L3

1-Introduction

COVID-19 is the infectious disease that has affected most countries of the world. Since its onset in December 2019, this epidemic has affected more than 40 million people, and killed more than a million. In April 2020, the WHO declared the disease to be a pandemic which has pitched several countries into a health crisis and forced them to live for months in total containment, causing a state of general panic. The preventive measures implemented have led to sudden and unforeseen changes in people's behavior and lifestyles. Since then, everyone has started avoiding crowds and public places and people were less and less enthusiastic as to the idea of leaving their homes.

(Libaert, 2018) explains that "the notion of crisis is associated with uncertainty about the present and the future and with a loss of bearings". In the event of a health crisis like the one the world is experiencing, fear arises from the presence of an invisible element transmitted through contact. Setting limits to purchases for essential and necessary products has become the norm. In addition, while many brick-and-mortar stores have closed down, a lot of consumers have resorted to online shopping. Studies have shown that the use of online shopping apps and sites has increased substantially. The development of new audiences who have proved to be active online using different applications has been primarily through websites offering food services and providing delivery services. (Zarchi et al., 2020).

As Goetzmann (2020) has stated it according to a detailed multi-factor analysis, "even if there is good reason to believe that the health crisis will change habits and consumption patterns, it is far too early to be positive about the future".However, the aim of this article is to explore the possible post-crisis impacts. The analysis has been carried out through a triangulation process of expert interviews, statistical data and scientific contributions. This analysis has

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identified a set of hypotheses about the possible impacts of the crisis on purchasing behavior and on the retail sector.

II- Post-Crisis Purchasing Behavior, Between New Habits and the Accelerated Pace of Trends:

To carry out our research, it is necessary to emphasize the buyers 'behaviors during the confinement period to build on our analysis.

During the mandate period, it has been found that:

- Some products, mainly food and cleaning products, were stored in big quantities. This may be explained by the effect of the state of panic that people experienced following the closure of several stores and especially by the uncertainty and lack of information. No one knew how long this confinement would last, or how the health situation would evolve.
- Consumers have avoided hypermarkets favoring short supply chains, such as mini markets, grocery stores and small retailers as well as home delivery. According to the president of Large Outlets Union, their turnover has fallen by 15% since the outbreak of the pandemic in Tunisia in March 2020 and the number of customers dwindled by 20%. A survey carried out by the National Consumer Institute and the National Chamber of Electronic Commerce has showed that 30% of Tunisian internet users bought online during the lockdown period.

84% are pre-COVID e-shoppers and 16% have purchased only during the period of the pandemic. According to the same study, the motivations behind buying online are mainly to avoid traveling (71%), avoid the risk of contagion (43%) and avoid queuing in front of the store (23%).

III- Possible Purchasing Behavior Once the Health Crisis Mitigated:

Four hypotheses have been identified while observing the purchasing behavior during the confinement and analysing interviews with experts;

H1: the health crisis favouring new trends and consumption habits:

This hypothesis is based on the fact that the crisis has introduced new consumption habits among Tunisian consumers. Most consumers today buy the bare essentials and often the cheapest goods or promotional products. Admittedly consumers are much more reassured than during the lockdown period. But the effects of the crisis on the country's economy have caused household purchasing power to deteriorate considerably. Several companies have been out of business and we do not yet know the real effects of this crisis on the unemployment and the inflation rates. With reference to a survey made by the World Bank after the lockdown, 41% of those surveyed were not yet working. Among the 41% declaring themselves off work, more than 80% have referred to reasons directly or indirectly related to COVID-19, especially in the tourism sector, one of the most affected sectors by the crisis and whose number of workers is very high.

Corporate failures are not yet fully known and we do not know exactly the extent of the damage or the time required to overcome them. However, households negatively impacted by the Covid-19 crisis account for the majority of the population used to hyper consumption and shopping at supermarkets. This crisis and the confinement experience have also given rise to new trends mainly "consume less but better", "Do it Yourself", the refocusing on family life and the consumption of local products. Many Tunisians have turned to organic and natural products and everything homemade. While this has been imposed by the new economic and social environment, it has proved to be a way to support the national economy. Consuming local has become the standard for a significant part of the population, which represents another challenge for the economy attempting to satisfy consumers who are highly-demanding in terms of quality.

These tendencies reflecting home and activities such as DIY, cooking and sewing had already been identified following periods of crisis and analyzed, in particular by Faith Popcorn in the 1990s (Popcorn, 1992; Popcorn and Hanft , 2001). "The reasons already aimed at protecting the purchasing power and reviving the pre-industrial values as antidotes to overconsumption. »

H2: Return to Short Supply Channels*:*

The confinement has highlighted clear differences in the nature of the distribution channels depending on the type of products purchased. Basic commodities and typical purchases have been done through convenience stores and short supply channels. Tunisians have resumed the habit of these purchasing modes and kept doing it even after the confinement. It is therefore likely that they will maintain this habit in the post-Covid-19 period.

This hypothesis (H2) tends to promote the development of short supply channels, especially as consumers are increasingly moving towards organic and local products. This amount to awareness of the benefits of consuming these products which are considered to be better in terms of healthiness, more ecological and for some people, consuming locally is somehow a way of expressing social responsibility. In addition, the supply problem during the Covid-19 crisis and in particular during the confinement period raised awareness of the need to relocate industries and production units. If companies take advantage of this observation, several regions could see the development of new factories, regenerating economic activity all over of the country. Perhaps a ratchet effect in favor of short supply channels and local products will occur once the health crisis has abated, "that of a life closer to nature, based on ecological values and resorting to responsible consumption of more authentic products "(Badot and Moati, 2020).

H3: Growth in online shopping :

It is very likely that once the anti-Covid-19 vaccine has been discovered and the barrier measures will disappear, the purchasing process could be different. Indeed, initiatives offering a smoother purchasing path and minimizing the buyers' efforts could be widely developed.

During the confinement period, and following the closure of several brick-and-mortar stores, e-commerce has emerged as a real solution providing more and more consumers with the opportunity to have a new shopping experience (online shopping) for different types of goods including food

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products. The most purchased products / services on the Internet during COVID-19 are: leisure and sports items (45%), utility bills (40%), household items / appliances (29%), food (23%) and health and beauty items (22%). Taking e-shoppers as a whole, 69% have expressed satisfaction. The most used media for online shopping are e-commerce sites (66%), social networks (36%), multi-brand sites (27%) and deal sites (11%).

Thus, several companies already present on this channel and others which proved to be predisposed have taken advantage of this crisis. Their success is mainly due to the flexibility of their business models as well as their ability to cope with unexpected demand. Considering the payment methods used, nearly 72% of e-buyers pay for their purchases on delivery. The main barriers for those who did not buy during the lock-down are: the difficulty to check the products quality (48%), the security of online payment (35%), the poor choice of the offers made on the Internet (22%) and delivery times which may take too long (16%).

Previously, online grocery shopping accounted for less than 1% of consumer goods sales. The two main limitations were the absence of having the habit to buy this type of product outside large and medium-sized stores and the low willingness to pay delivery costs. These also reflect very high internal costs of the supply chain management due to the complexity of manufacturing baskets and logistical burdens. This rate has risen to 39% during the confinement period and even after the lock-down, the percentage has remained high (28.8%).

In the light of this experience, we will undoubtedly witness a spread of market-places and new e-commerce sites of local suppliers enabling booking, recovering or delivering consumer products. However, this remains strongly dependent on the ability of operators to market user-friendly and low-cost systems (Clément and Badot, 2019).

H4: the health crisis has revived enthusiasm

This hypothesis is based on the fact that after the crisis, buyers will feel the need to restore the hedonic pleasure associated with the shopping experience. This would include a return to social activities, friendly outings and meetings whose absence has generated great frustration. During the confinement period, almost half of the households left their homes daily and more than a third went out regularly. The proportion of households who have been out or on a weekly basis represents a minority of the population (10%). 62% say they have met friends or relatives. Cafes, tea rooms and restaurants, as well as shopping centers and hypermarkets would then experience maximum activity as soon as health measures allow it. In fact it was summer when the rate of infection dropped considerably and people resumed their usual pace of life.

This echoes an analytical framework specific to the postmodern current, in line with Max Weber's thought, which considers a systematic resort to hedonic re-enchantment following periods of disenchantment (political, economic, social, etc.).This almost vital re-enchantment is mainly expressed by consuming rewarding products and attending shopping centers, amusement parks and other places of entertainment (Andrieu, Badot and Macé, 2004; Lipovestky and Serroy, 2013).

IV- Possible Impacts of the COVID-19 Crisis on the Retail Sector along with Clear Challenges.

Once again, we have to rexamine the main features of the Covid-19 crisis and their impacts on the distributors' strategies during the confinement period, in order to isolate them.

Following the closure of businesses considered non-essential, several phenomena have been observed:

- Sales of fresh food products are organized in short supply channels.
- The logistics services of food brands have been reorganized towards home delivery, despite the excessively high costs.
- The marketing departments have undertaken additional actions in social networks and through the media to keep in touch with consumers.

These trends could reoccur if the retail sector managed to overcome many challenges mainly:

- Corporate failures, particularly small or highly specialized suppliers, which would reduce the possibility of a less industrial supply required by demand.
- The consequences of a possible development of teleworking on trade surrounding the business location places. Indeed, the area of office space could decrease leading to a drop in the number of out-of-home employees, which would be problematic for restaurants and other sales outlests targeting employees.
- The massive integration of local producers and / or short supply chains into consumer supply channels, which may lead to higher prices of products due to the high purchasing and coordination costs. The other challenge will be to ensure a regular and homogeneous supply to demanding consumers with often disjointed or even contradictory behaviors.
- The logistics of the food trade through home delivery which has long struggled to find productivity gains due to the high costs of handling, robotization and delivery of fragile, fresh and small products.In addition, a sharp drop in income due to a possible economic and social crisis would only increase the stakes for this sector.
- The lack of interest in non-food products and impulse buys due to an economic retraction in better quality essentials in addition to the risk of weakening the non-food segment due to a number of factors (drop in affected income, growth in e-commerce, oligopolization of the sector through second-hand purchases and parallel markets).If this trend were to increase due to the habits acquired and made aware during the lock-down, it would undoubtedly lead to the closure of many outlets or even to the weakening of shopping centers.
- The technological and financial accessibility of digital marketplaces to "small producers" and independent traders who are often sensitive to the

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complexity of the entry and maintenance costs in these IT and logistics systems. However, even before the health crisis, the quality of merchandising as well as the simplicity of the ordering process and the speed of delivery are key success factors. The reinforcement of stakeholders such as local communities or Chambers of Commerce based on national programs should be of great help in this regard.

Overall, the impacts of the Covid-19 crisis on the mass retail sector should vary depending on several factors: type of product (basic necessities vs pondering or impulse purchases), sensory and emotional quality of the buyer's experience, capacity of producers and logistics providers to maintain the accessibility of products in short supply channels and the involvement of local and national public actors in supporting, accompanying and regulating future changes.

V- Conclusion

Like most countries in the world, the Tunisian economy has been severely impacted by the covid-19 crisis and the purchasing behavior of individuals has also experienced obvious changes. This study is part of a frontier research which aims at understanding the impact of this crisis on the consumers' purchasing behavior in the large retail sector by analysing a set of statistical data and through academic research and interviews with experts.

Through this exploration, we have tried to understand the various changes in the consumers' purchasing behavior in supermarkets resulting from the covid-19 crisis as well as the potential future impacts of this crisis on their purchasing behavior especially with the new economic circumstances of the country and consequently on the development of this sector.

The first step towards exploring the subject of the Covid-19 crisis impact on the buyers' future behaviour and on the mass retail sector once the crisis has eased, enables us to catch a glimpse of how certain trends are working long before the health crisis and the possible ratchet effects as a result of habits acquired and made aware during the confinement. No doubt exogenous factors, such as the spread of teleworking and the relocation of industries will have significant consequences for the sector.

Uncertainty and complexity are the key words linked to this state of crisis. However, when the companies based in the country manage to better identify their benchmarks and certainties as well as the decision-making factors, they will be able to choose their investments with relevance. On the other hand, an extension of this crisis, whether on a health, economic or social level, will reinforce uncertainties and multiply risks. The ratchet effect will then be of great importance.

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Transmission of shocks between Islamic and conventional banks in Emirates Arab Union

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Abstract- The objective of this paper is to test the existence of the contagion effect between Islamic and conventional banks in Emirates Arab Union. For this purpose, we use the DCC- GARCH model to estimate the conditional dynamic correlation which used to assess the financial contagion. We employ a sample composed of three Islamic bank and four conventional banks during the period of study from March 31, 2004 to March 18, 2014. The empirical results show that the correlation between the returns of the two types of banks in Emirates Arab Union increased between the period of calm and crisis. This finding implies the existence of a contagion effect between Islamic and conventional banks in Emirates Arab Union. In addition, thus result implies that financial contagion represent a major source for the spread of the crisis between the Islamic and conventional banks in Emirates Arab Union.

Keywords: Contagion;Islamic;conventional;banks; DCC-GARCH

JEL Classification: Q9, Q91.

KAUJIE Classification: E3, H2, I2.

I-Introduction

The global financial crisis in 2007 was one of the most turbulent economic events in world. In this respect, Islamic banks have emerged as an alternative to conventional banking.

Many researchers show that Islamic banks have been affected by the crisis because it is exposed to the same risks. The spread of the crisis is due to two factors, the first isthe direct exposure of financial institutions around the world to the US crisis. But the second factor is due tocontagion.

There are many studies of the existence of contagious consequences of different crises in various equity markets around the world. Numerous methodologies have been used to assess how shocks are transmitted internationally: market correlation coefficients, autoregressive conditional heteroscedasticity models and general autoregressive conditional heteroscedasticity models, cointegration techniques, and direct estimation of mechanistic mechanisms. specific transmission. The first empirical study on financial contagion consisted of a simple comparative study of Pearson's correlation coefficients between markets in times of calm and crisis.

Contagion has defined for many ways. contagion is the spread of financial disturbancesfromonecountrytoothers.KaminskyandReinhart(2000)definedcontagion as the spread of financial market disturbances from one country to financial markets of other countries. Other authors like Pericoli and sbracia (2001) contagion is defined as a significant increase in co-movement of prices and quantities across markets following a crisis in a marketoragroupofmarkets.ForbesandRigobon(2002) specifiedthatcontagion is find as a transmission mechanism during financial turbulence. Consequently, this change can be expressed as a significant increase in correlation across markets.

The source of banking contagion is the presence of the interbank market. The mission of an interbank market is to transfer liquidity between banks. Contagion risk is said to be triggered by liquidity shocks to the market, enabling the transmission of crises.

According to Forbes and Rigobon (2001), contagion causes an increase in correlation between financial assets.Accordingtothem,this mechanism is find only during crisis periods. On another side, Van Rijckeghen and Weder (2000) examined the notion of liquidity in the banking system. Indeed, banks react to a crisis in a country by a generalized reduction in credit granting depending on the

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borrowing countries. Therefore, investors will rebalance their portfolios, causing the spread ofcrises.

Contagion exists with the existence of significant correlations in times of crisis. King and Wadhwani (1990) and Lee and Kim (1993) use the correlation coefficient between equity returns to test the contagion of stock market crash on equity markets in many countries.

Gulf countries have recently become more integrated into the world economy and have also been seriously affected. indeed, it is important to examine the financial contagion in each country, especially in the context of Islamic and conventional banks.

In this context, we will focus empirically on the financial contagion between Islamic banks and the conventional banks Emirates Arab Union. Then, we used the DCC-GARCH model to estimate the conditional dynamic correlation which quantifies the financial contagion. We employ a sample composed by three Islamic bank and four conventional banks during the period of study from March 31, 2004 to March 18, 2014. The empirical results find that the correlation among the returns of the two types of banks in Emirates Arab Union increased between the period of calm and crisis. This finding implies the existence of a contagion effect between Islamic and conventional banks. Also, thus result implies that financial contagion represent a major source for the spread of the crisis between the Islamic and conventional banks in Emirates ArabUnion.

The rest of our paper is organized as follow: in section 2, presents the literature review. Section 3 summarizes the econometric methodology and data used to test the existence of the financial contagion. Section 4 presents the empirical results. Finally, Section 5 presents the conclusions.

II- **Literature review**

There are various methods of calculating financial contagion. Hamao et al .(1990) performed their research on the New York , London and Tokyo stock exchanges using the ARCH model. They examine the volatility of stock prices in each market and the potential transition from one market to another.The findings show that there are volatility effects transfer from New York to Tokyo and rates from London to Tokyo, but not from Tokyo to New York or London.

In addition, Tai (2004) uses the M-GARCH method to estimate conditional average stock returns and volatility throughout the crisis time. In addition, Tai (2004) applies the BEKK model developed by Baba et al .(1991) to assess the presence of contagion. Their findings indicate that the contagion effects appear to be multi-directional on average. The output shocks on each separate part of the three markets (banks, capital markets and the money market) seem to examine all markets, but the contagion effects on volatility were mainly due to negative shocks in the banking sector. These empiric findings indicate that the effect on volatility and returns can be contagious, indicating that banks can be an significant source of contagion throughout the crisis.

Hwang et al .(2010) investigate the contagion impact of the subprime crisis on the international stock market. The DCC-GARCH model is used in 38 countries. The result demonstrate that financial contagion not only occurred in developing markets, but also in developed markets during the crisis. Bouaziz et al .(2012) examine the contagion effects on the capital markets of developing countries during the subprime financial crisis (2007–2008). They're using a DCC-GARCH model.The findings indicate that market correlations have risen dramatically during the crisis era and suggest that the crisis has spread through various markets, suggesting the presence of contagion. Bekaert and Harvey (1997) research the contagion of the stock market in twenty developing countries. They employ the GARCH(Generalized Autoregressive Conditional Heteroskedasticity) multivariate model. They use macro-economic variables to calculate the degree of integration of each country (the share of foreign trade in GDP). According to their findings, the more integrated country is subjected to a heavy external shock from the transmission channels.

Nevertheless, few studies have focused on crisis transmission between conventional and Islamic banks. Cihak and Hesse (2008) found that small Islamic banks tend to be financially stronger than smaller commercial banks; that large commercial banks are financially stronger than large Islamic banks; and that small Islamic banks are stronger than large Islamic banks.Boumediane and Caby (2009) are studying the stability of Islamic banks during the subprime crisis. The results show that the volatility of Islamic banks' yields increased during the 2007 crisis.

They found two major conclusions: primary, Islamic banks were affected by the crisis, and subsequently, they were faced with the same risks as traditional banks. Empirical findings show that there are signs of a risk transfer between the Islamic stock market and the three key conventional markets, resulting in contagion across global equity markets. The volatility structure of these markets is driven by short-term volatility in the first cycle and high long-term volatility in the second period.

The challenges raised by Islamic banking therefore raised the question of whether there is any chance that the Islamic banking industry will hardly be insulated from infectious shocks from crisis-oriented countries during the recent financial crisis of

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2008.

In order to investigate the contagion effects of banking industries across countries, Dungey and Gajurel (2015) use the CAMP-based factor loading model and EGARCH to analyze the structural, idiosyncratic and unpredictable contagion impacts. The empiric investigation of Dungey and Gajurel(2015) specifically indicated that factors such as stronger regulatory capital, retail banking practices and increased market concentration appear to minimize the risk of a banking crisis even in the presence of contagion effects.

Ben Ltaifa M et al .(2018) explore the contagion between Islamic and traditional banks in Malaysia and notice the contagion effect between Islamic and conventional banks in Malaysia.

III-Data andmethodology

The main objective of this paper is to verify the presence of the financial contagion effect between Islamic and conventional banks in Emirates Arab Union. To do, we employ the DCC-GARCH model to assess the conditional dynamic correlation which used to capture the financial contagion. We utilize a sample composed by 3 Islamic banks and 4 conventional banks during the period of study from March 31, 2004 to March 18, 2014. We choose these banks because they represent 90% of the total market capitalization of banks listed in the stock exchange of Emirates Arab Union.

We employ the DCC-GARCH model to perform the estimation of financial contagion between conventional and Islamic banks in Emirates Arab Union. we base our study on the use of econometric model DCC-GARCH developed by Engle (2002). We note that the vector comprises the performance of both titles.
We denote by :

$$A(L)r_t = \mu + e_t \qquad \textbf{(1)}$$

Where, μindicates the vector of expected returns e_t is the vector of error terms.

The model of the Dynamic Conditional Correlation (DCC) is based on the assumption that the conditional returns are normally distributed with zero mean and the matrix of the conditional covariance is $H_t = E\left[r_t r_t' \middle| I_{t-1}\right]$. The covariance matrix is measured by the equation:

$$H_t = D_t R_t D_t \qquad \textbf{(2)}$$

With, $D_t = diag\left[\sqrt{h_{1t}}, \sqrt{h_{2t}}\right]$ is the diagonal matrix of volatilities temporal standard types deviations from the univariate estimate of GARCH (1,1). The DCC specification (1,1) can be obtained based on some steps:

First, one identifies the specification GARCH (1,1):
$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1}$ **(3)**
Where, α_0 , α_1 et β_1 are parameters to be estimated.

The Conditional correlation matrix R_t standardized distributions ε_t is given by:

$$R_t = \begin{bmatrix} 1 & q_{12t} \\ q_{21t} & 1 \end{bmatrix} \qquad \textbf{(4)}$$

With, $\varepsilon_t = D_t^{-1} r_t$

The matrix R_t is expressed as follows:

$$R_t = Q_t^{*-1} Q_t Q_t^{*-1} \qquad \textbf{(5)}$$

Where, $Q_t$is the temporal conditional volatility matrix ε_t and Q_t^{*-1} is the inverse of the Diagonal matrixQ_t. Note that Q_t^{*-1} is:

$$Q_t^{*-1} = \begin{bmatrix} 1/\sqrt{q_{11t}} & 0 \\ 0 & 1/\sqrt{q_{22t}} \end{bmatrix} \qquad \textbf{(6)}$$

Thus, the DCC (1,1) is given by equation:

$$Q_t = \omega + \alpha \varepsilon_{t-1} \varepsilon_{t-1}' + \beta Q_{t-1} \qquad \textbf{(7)}$$

Where, $\omega = (1-\alpha-\beta)\overline{Q}$, with $\overline{Q}$ is the covariance matrix unconditional standardized distributions ε_t. ω , α et β are parameters to be estimated.

Finally, the dynamic conditional correlation (DCC) is given by:

$$\rho_{12t} = \frac{q_{12t}}{\sqrt{q_{11t} q_{22t}}} \qquad \textbf{(8)}$$

According to Engle (2002), the maximum likelihood estimator of the DCC is

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$$L=-\frac{1}{2}\sum_{t=1}^{T}\left(k\log(2\pi)+2\log(|D_t|)+\log(|R_t|)+\varepsilon_t' R_t^{-1}\varepsilon_t\right) \quad \textbf{(9)}$$

IV-Empirical results

The main objective of this paper is to investigate empirically the presence of the financial contagion effect between Islamic and conventional banks in UAE. So, we utilize the DCC GARCH model to assess the conditional dynamic correlation which used to determinate the financial contagion. We employ a sample composed by 3 Islamic banks and 4 conventional banks during the period of study from March 31, 2004 to March 18, 2014.

In Table 2, we present the different descriptive statistics of dynamic conditional correlations between the different Islamic and conventional banks. We remark that in average the dynamic conditional correlation between Islamic and conventional banks is low. However, we can observe that DCC have an important level risk in negative or in positivesign.Thelevelriskbetweenislamicandconventionalbanksvariedbetween30% and4%.

1.

According to the two coefficients of asymmetry (skewness) and leptokurtic (kurtosis), the various variables used in this paper are characterized by non-normal distributions.Asfortheskewness,thisreflectsthattheDCCbetweenIslamicconventional banks is skewed to the right and that it is far from being symmetric for allvariables.

Additionally, the kurtosis statistic shows the leptokurtic feature of the series and shows the existence of a high peak or fat tail in the volatilities of all variables. Similarly, the positive estimate of the Jarque-Bera statistic signifies that we reject the null hypothesis of normal distribution of the variables used in our study. In addition, the high value of the Jarque-Bera statistic reflects that the series is not normallydistributed.

According to Figures 1, 2 and 3, we found that dynamic conditional correlations betweenbanksisveryvolatilefortheentirestudyperiodfor somebanksandpeaksmainly during the 2007 crisisperiod.

In Table 3, we estimate the DCC-GARCH (1,1) between conventional andIslamic banks in UAE. Then, we find that the dynamic conditional correlation estimated between conventional and Islamic banks is low for some and strong for others with a negative or positivesign.

We note that the level of DCC can explain the phenomenon of contagion between Islamic and conventional banks in UAE. Thereafter, we can confirm the existence of a contagion on the UAE banking market for the study period used in our research.

Additionally,theresultsoftheDCC-GARCHmodeldemonstratethatthecrisishas also affected GCC financial markets other than stock markets. The financial crisis of2008 has to a certain extent disrupted the syndicated loanmarkets.

V-Conclusion

The purpose of this paper is to examine empirically the existence of the financial contagion effect between Islamic and conventional banks in UAE. So, we use the DCC- GARCH model to assess the conditional dynamic correlation which employed to assess the financial contagion. We utilize a sample composed by 3 Islamic bank and 4 conventional banks over a daily period of study through March 31, 2004 to March 18, 2014.Our results verify the existence of a phenomenon of contagion between Islamic and conventional banks. These results are verified by testing the existence of contagion. To conclude, the Islamic finance does not evolve in a separate financial environment, but itis facing an environment of interdependence with the international financial market who knows more and more repetitive and unpredictable shocks, and requires measures to mitigate the effects of shocks on the real sector of the economy. Depending found conclusion, operators of Islamic finance should try to adopt prudent risk management practices, and adopt hedging mechanisms to defend the stability of the Islamic financial markets in times of economic and financial crisis. Several approaches havebeendeveloped inthisdirection,suchasthemacro-prudentialpolicywhichaimstolimitsystemicrisksandto avoid exposure to the real sector of the economy to the risks of devastating disruption of financial systems.

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Appendix

Figure 1: dynamic conditional correlations between BI1 and conventional banks of UAE

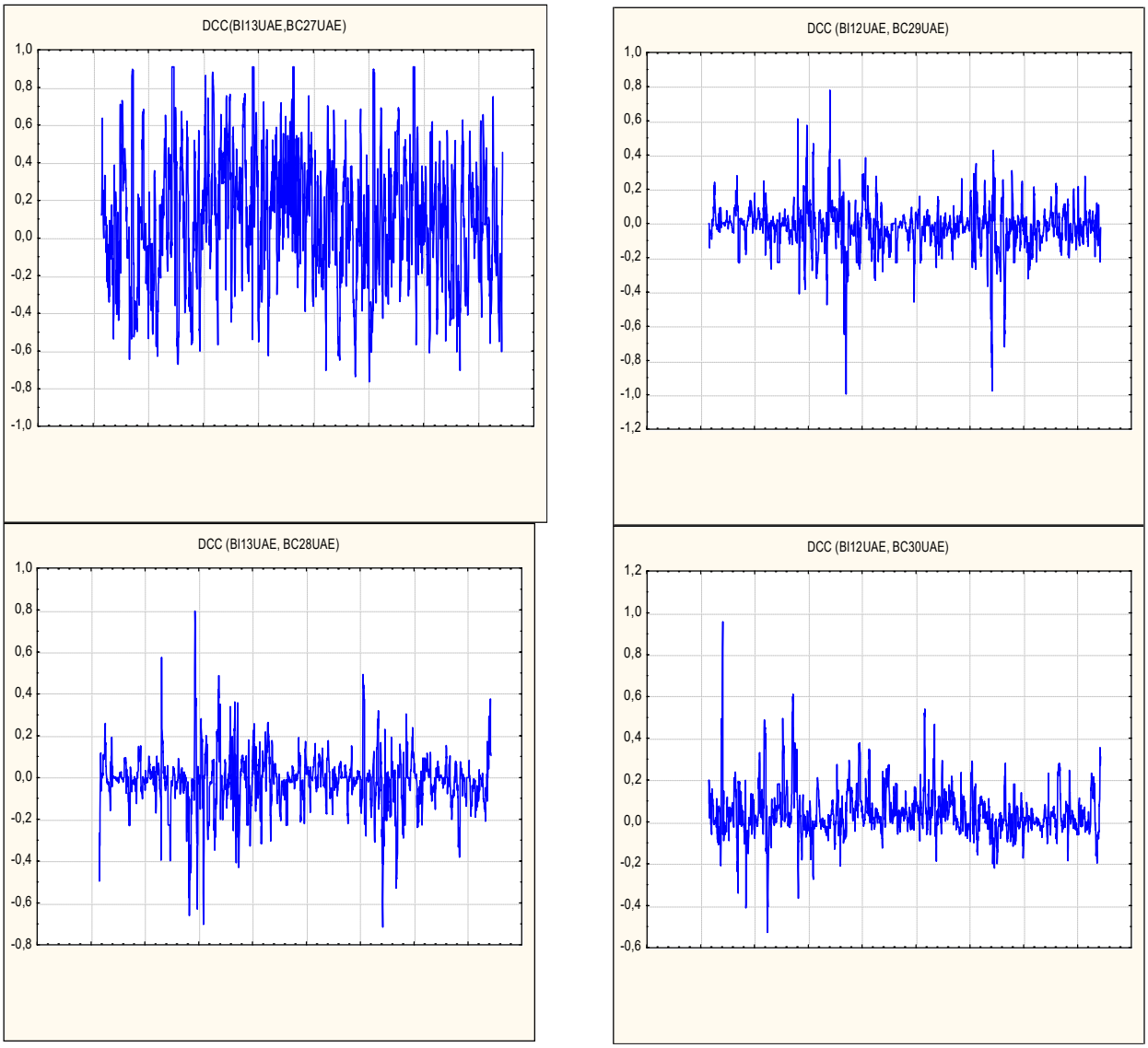

figure 2: Dynamic conditional correlations between BI2 and conventional banks of UAE

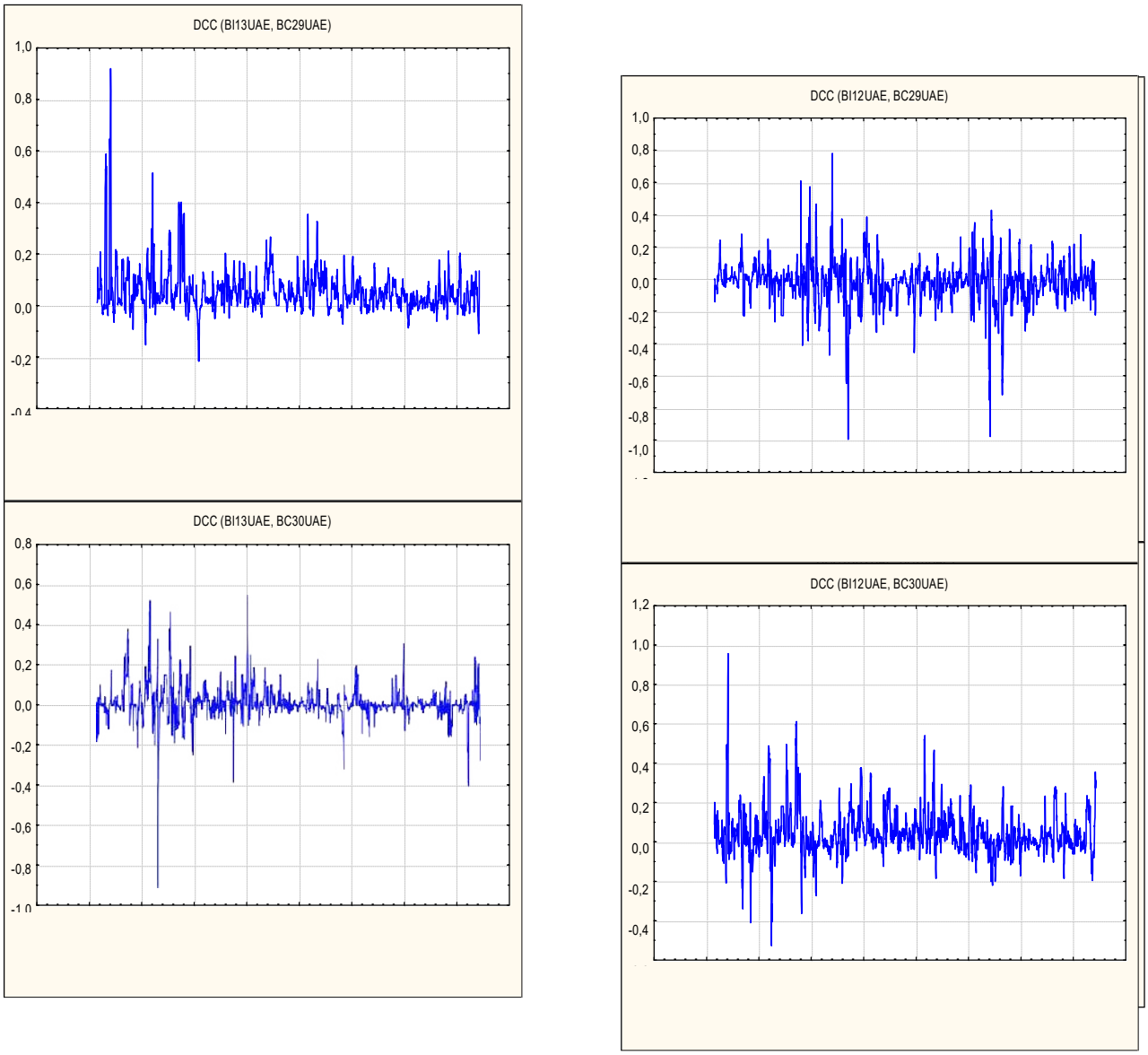

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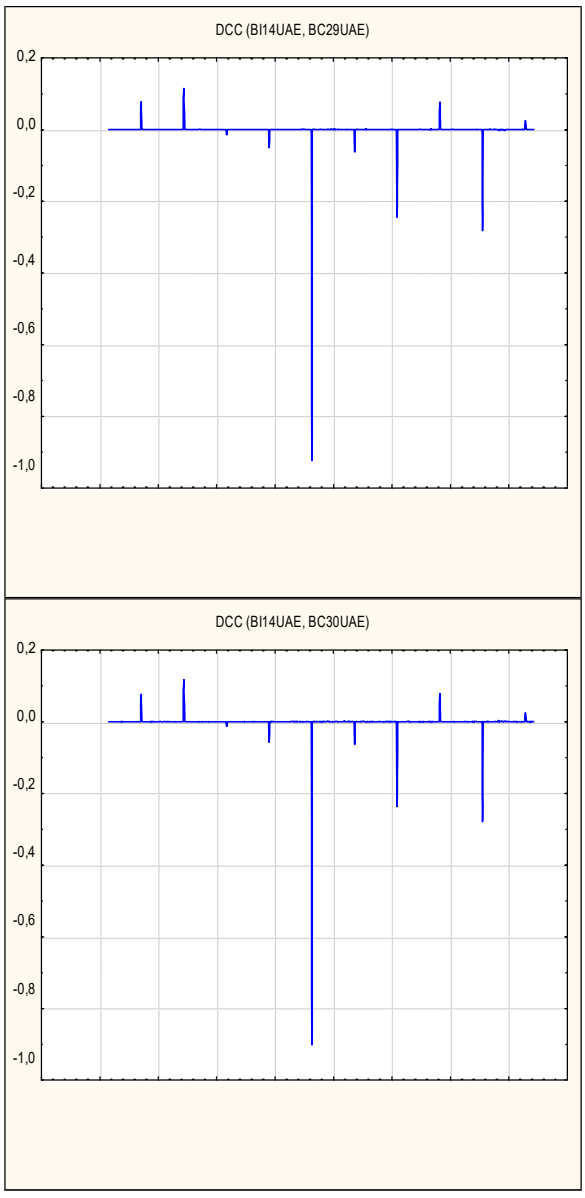
Figure 3: dynamic conditional correlations between BI3 and conventional banks of UAE



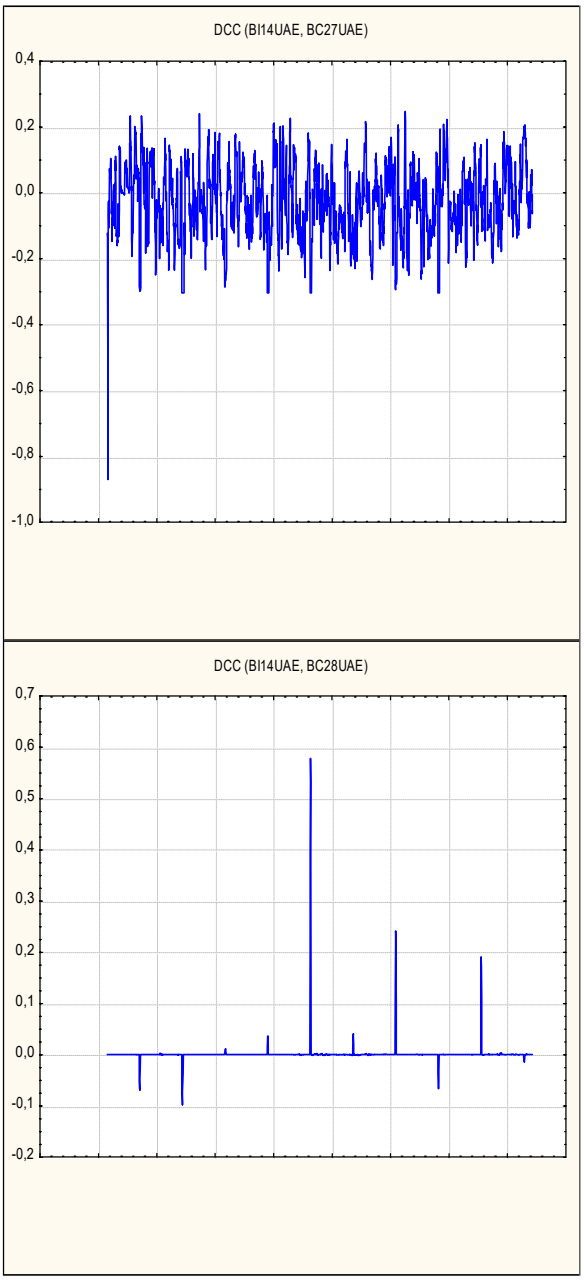


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Table 1. List of banks

UAE	Dubai islamic bank	BI1
UAE	Abu dhabi islamic bank	BI2
UAE	Sharjah islamic bank	BI3
UAE	abu dhabi commercial bank	BC1
UAE	commercial bank of Dubai	BC2
UAE	national bank of abu dhabi	BC3
UAE	banque of Sharjah	BC4

Table 2. Descriptive statistics of the DCC between the Islamic banks and conventional banks of UAE

	(BI1, BC1)	(BI1, BC2)	(BI1, BC3)	(BI1, BC4)
Mean	-97095	0.040363	-026750	0.043786
Median	-7290	0.011043	-014496	0.022702
Maximum	0.763347	0.909087	0.780018	0.956814
Minimum	-9079	-0.908940	-996851	-527696
Std. Dev.	0.332474	0.310577	0.133365	0.114511
Skewness	-3156	0.294114	-973664	1.182108
Kurtosis	2.728722	3.489222	10.56093	8.674222
Jarque-Bera	9.577765	62.60817	6520.159	4041.562
Probability	0.008322	0.000000	0.000000	0.000000
Observations	2567	2567	2567	2567
	(BI2, BC1)	**(BI2, BC2)**	**(BI2, BC3)**	**(BI2, BC4)**
Mean	0.097095	-0.018050	0.057328	0.014697
Median	0.107290	-0.004428	0.038647	0.002032
Maximum	0.909079	0.795241	0.920060	0.545644
Minimum	-0.763347	-0.715561	-0.217458	-907392
Std. Dev.	0.332474	0.129522	0.085417	0.086064
Skewness	0.063156	-0.256767	3.129823	-253037
Kurtosis	2.728722	8.001977	20.71845	17.76903
Jarque-Bera	9.577765	2704.280	37769.84	23357.60
Probability	0.008322	0.000000	0.000000	0.000000
Observations	2567	2567	2567	2567
	(BI3, BC1)	**(BI3, BC2)**	**(BI3, BC3)**	**(BI3, BC4)**
Mean	-0.028475	0.001497	-0.002160	-0.002110
Median	-0.028293	0.000000	-1.51E-31	-2.47E-31
Maximum	0.247435	0.578261	0.114027	0.116308
Minimum	-0.869830	-0.097851	-0.923479	-901097
Std. Dev.	0.109979	0.025526	0.037295	0.036849
Skewness	-0.358256	15.67071	-18.15309	-18.07446
Kurtosis	4.207882	298.2213	387.3103	384.2985
Jarque-Bera	210.9613	9427086.	15938132	15690283
Probability	0.000000	0.000000	0.000000	0.00000
Observations	2567	2567	2567	2567

Tableau 3: Estimation du DCC et effet de contagion

	DCC	**t-statistic (DCC)**
(BI1, BC1)	-0.9999286	(-1.6e+05)*
(BI1, BC2)	0.8758746	(59.55)*
(BI1, BC3)	-0.9999186	(-7.8e+04)*
(BI1, BC4)	-0.9999411	(-4.6e+05)*
(BI2, BC1)	0.9999121	(96143.47)*
(BI2, BC2)	0.9998858	(32697.62)*
(BI2, BC3)	0.9999279	(1.2e+05)*
(BI2, BC4)	0.9999422	(2.0e+05)*
(BI3, BC1)	-0.9998043	(-2.2e+04)*
(BI3, BC2)	-0.9998626	(-5.3e+04)*
(BI3, BC3)	-0.9998564	(-4.0e+04)*
(BI3, BC4)	-0.9649263	(-3.0e+04)*
(*), (**) et (***) sont des valeurs significatives à un seuil de 1%, 5% et 10%.		

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Covid-19 and Economy :Case of Tunisia

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Abstract-This paper highlights the immense economic and social effect of COVID-19 on studies that either anticipated such a large-scale phenomenon and its economic implications or measured the effect of other epidemics and pandemics. Consideration of the potential impacts of COVID-19 on financial markets and institutions, either directly or indirectly, is briefly illustrated in a number of literatures. The COVID-19 pandemic has had a catastrophic impact on the entire world in terms of health, economics and social life.

JEL Classifications: H12-H41-H51

Keywords : COVID-19 - finance Pandemics - Catastrophe insurance

I-Introduction

The model of economic and social development put in place in the 1970s, and with adjustments in favor of greater opening and liberalization of markets in the 1990s, gave its first signs of running out of steam in 2008 with the global economic crisis. The tensions social policies began to gain force, particularly in the mining area, and intensified in December Real GDP growth rate, year on year, for the year 2019. 2010s contributes to the fall of the regime in place in January 2011. It followed the entry of Tunisia in a phase of political transition, accompanied by an economic transition whose development has been largely seized by post-revolution social, political and security instability. This resulted in low economic growth, around 1.8% on annual average over the period 2011-2019, and 1% in 2019.

In Tunisia, the Covid-19 pandemic shed light on the capacities of public hospitals and the health sector in general. More than three months after the announcement of the first detected case and at the approach of the reopening of the borders, the health crisis seems, for the moment, to be under control.

The rest of our paper is organized as follow: section 1, presents the comparison between the first and second wave of coronavirus in Tunisia. Section 2 summarizes Policies taken to slow down the spread of the virus .Finally, Section 3 presents the impact of the coronavirus on the economy.

I1-Comparison between the first and the second wave of Covid-19 in Tunisia

In March, when the covid-19 reaches Tunisia, drastic measures are quickly taken: border closures, curfews and confinement. Faced with a fragile health system and lack of infrastructure, the impact of Covid-19 is likely to be fatal. But after the rapid increase in the number of patients in the first weeks, the situation stabilizes and the pandemic seems to be under control. Covid-19 seems far away until the borders reopen on June 27, 2020.

For the first time since the beginning of the Covid-19 epidemic in Tunisia, the bar of 100 daily cases is exceeded on August 14, 2020. In comparison, during the first period, the peak had been reached with 59 cases reported on March 24th and has steadily declined since then.

During the first wave, the number of contaminations began to decrease one month after the first case was discovered. Since June 27, on the contrary, the new cases observed during this second wave have been increasing steadily, particularly from August onwards. Thus, over the same period, the increase in the number of cases since the opening of the borders is much more consequent than during the first period.

But despite the significant increase in the number of cases, the authorities are still far from practicing a policy of massive screening despite the recommendations of the World Health Organization (WHO). For several weeks, the strategy was to screen people who had been in contact with the patients in order to limit the risks of contamination. On September 18, the Ministry of Health announced that asymptomatic people would no longer be screened.

After the opening of the borders, while the chains of transmission were under control on the territory, the new contaminations came above all from abroad. Thus, the first local case was not detected until July 13 and the curve gradually took off only one month after the opening of the borders. In March, by comparison, local cases grow rapidly. However, during the first wave, the evolution of local cases increased steadily and began to stabilize two months after the detection of the first case. On the contrary, the post-border reopening curve began to increase very rapidly around August 10. Thus, between September 6 and 7, nearly 300 new local cases were discovered.

During the first wave, the low rate of cases requiring hospitalization was partly explained by the fact that 85% of newly infected people were asymptomatic, according to information provided

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by the National Observatory of New and Emerging Diseases (ONMNE). They therefore did not require any special care. But even without apparent symptoms, these people remained contagious and if not detected, they risked infecting vulnerable populations while escaping the radar of the authorities.

On Saturday, September 26, 936 new cases were detected. Faced with this increase, certain decisions have been taken to slow down the spread of the virus, particularly by the local authorities in some outbreaks. Nationally, the authorities have made masks mandatory in airports, large commercial areas, public transport and hospitals. All large-scale gatherings are cancelled (conferences, fairs, seminars etc.).

III- Policies taken to slow down the spread of the virus

To limit the risks of renewed contamination, the Ministry of Health has established health measures depending on the country of origin. This list is updated regularly; the last update was on September 24. Among the countries subject to new regulations, France is on the list of "neighboring countries" concerned by specific measures that are still unclear, along with Italy, Malta and Luxembourg. Belgium has joined the list of countries classified in red, for which only persons of Tunisian nationality and foreigner's resident in Tunisia are allowed to enter the territory. The travelers are subject to mandatory testing and quarantine, as well as nationals of countries classified in orange. Since August 26, all travelers must provide an RT-PCR[1] test when entering the territory, regardless of the country of origin.

In El Hamma, a delegation from the governorate of Gabes, a curfew has been declared from 17h to 5h in the morning. A measure that comes in addition to others limiting gatherings, such as the ban on wedding parties, the closure of mosques or the ban on weekly markets. A mobile military hospital was set up in the city, where 437 cases were recorded until August 21.

These measures include the classification of countries according to their health situation. Travelers from "green countries" were not subject to any procedures. Those from "orange countries" were placed in two categories. Tourists must present a negative test and are obliged to stay in the hotel they have booked with a well determined tourist circuit, while Tunisians residing abroad are also subjected to a test and self-isolation for 14 days. Tourists from countries classified "red" are not allowed to come to Tunisia. Only Tunisians can enter. They must present a negative PCR test at boarding, performed less than 120 hours before the trip. They are then compulsorily placed in self-isolation for a period of 14 days.

A new development since the appearance of the virus in Tunisia, 90% of those infected are asymptomatic, the director of the National Observatory of New and Emerging Diseases. Undetected, asymptomatic infected people easily spread the virus, especially in the face of widespread laxity in the application of rules of hygiene, wearing masks and physical distancing.

In view of the large number of asymptomatic cases, the Ministry of Health is encouraging corona virus carriers who have not shown symptoms of illness to quarantine themselves at home. They must respect the sanitary rules, including physical distancing to avoid contamination of their entourage. Pending the start of the new school year on September 15, a health protocol dedicated to schools and universities has been unveiled. It provides for the taking of body temperature at the entrance to educational establishments in places with a high rate of contamination and the wearing of masks for teachers and educational staff.

Since August 25, the wearing of masks is mandatory in all public places and spaces. Violators risk a fine of between 100 and 3 thousand dinars. This penalty could result in imprisonment under article 312 of the penal code2.

A night curfew has been established in the Grand Tunis, for 15 days, to counter the spread of the corona virus pandemic, announced on Wednesday evening by governor of Ariana, adding that the exceptional measures transferred to the Ministry of the Interior and the presidency of the government are all approved. On this occasion, citizens were invited to stay at home until further notice, except in extreme emergencies and while wearing masks.

IV-Impact of Covid-19 on the economy

Like what is happening in several countries, the COVID-19 pandemic has transformed in Tunisia, in an economic and social crisis. The economic impacts of this crisis are heavy, especially for vulnerable households and micro and small enterprises. Everywhere in the world, it is accompanied by worsening unemployment and lower wages in jobs precarious (with a loss of jobs worldwide, ranging from 5.3 to 24.7 million, depending on the severity of impacts considered through different scenarios).

For a developing country such as Tunisia, it is essential to take into consideration the informal work when analyzing the impacts of the COVID-19 pandemic on income poverty and multidimensional.

[1] The PCR test can tell if a person is infected with SARS-CoV-2 at the time the test is performed. It usually begins with a nasopharyngeal swab, taken with a swab. Although it is possible to perform it with a saliva sample, since this method is not considered sufficiently reliable.

[2] Anyone who violates the prohibitions and prophylactic or control measures ordered in times of epidemic is punished by six months' imprisonment and a fine of 120 dinars.

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Indeed, the current pandemic is reflected in a shock on the demand for labor and therefore by a significant drop in sources of income and the number of hours of work, generating an increase in the number of workers in the informal sector. Special attention must, in addition, be granted to migrant workers, asylum seekers and refugees (household help, babysitter, gardeners, day workers in the construction, tourism and agriculture, etc.) in the informal sector, which are disproportionately affected by the measures containment.

According to table1 the COVID-19 pandemic would lead to economic growth of -4.4%, compared to a growth initially planned under the 2020 finance law of 2.7%. Several factors are believed to be responsible for this decline in growth for 2020: (1) a supply shock negative, the impact of which is direct on the activity of several sectors. All other things being equal, this shock is transmitted to other sectors causing indirect effects through a drop in demand addressed to these sectors as intermediate consumption, (2) a reduction in consumption households due to confinement and declining income for many of them, (3) a reduction in external demand for certain export sectors due to the pandemic of COVID-19 has also impacted Tunisia's main trading partners. The conjugation of these different effects would result in an increase in the consumer price index (CPI). Indeed, the impact on prices depends on the magnitude of the supply and demand shocks. If the shock of the supply is more (less) than the demand shock, the price of a given product / service increases (decrease).

The fall in production also leads to a decrease in demand for the labor factor, and consequently an increase in unemployment. Unemployment is expected to worsen, including the rate would drop from 15% (baseline scenario) to 21.6%, which corresponds to nearly 274,500 new unemployed. This would result in a drop in household income and also in their consumption (due to among other things, difficulties in accessing markets for goods and services). The net effect would be an increase in aggregate household savings, compared to the reference scenario, by 12.5% and 11.4%, respectively under scenarios 1 and 2.

In terms of public finances, the expected economic recession would result in a drop in tax revenues compared to the baseline scenario, as shown in Table 1. With regard to taxes indirect, for example, they will increase from a growth of around 11% provided for in the 2020 finance law, at 1.5% for the crisis scenario. Direct tax, on the other hand, in its corporate tax component would undergo a contraction of -6%. The fall in international hydrocarbon prices allows, however, a relaxation on energy subsidy expenditure and therefore on the operating budget of the state.

Foreign trade is also impacted by the fact that Tunisia is an open country dependent on its exchanges with the rest of the world. The COVID-19 pandemic having impacted the whole world, and in particularly Tunisia's main partners such as France and Italy, and because of the difficulties of maintenance of international transport, the overall impact on exports and imports would be negative. The volume of exports and imports fell by 20% and 22.3% respectively during the first four months of 2020 compared to the same period of 2019.

The overall effect of COVID-19 would therefore be negative on the Tunisian economy for the year 2020, with a decline growth of -4.4%. This decrease would be justified mainly by the decrease in investments (-4.9%), private consumption (-8%) and exports (-8%), in percentage points compared to the base line scenario.

Non-manufacturing industries are also very strongly impacted, mainly from caused by the collapse of international energy prices, the consequences of which would also heavy on oil activity and revenue for the state budget in the form of royalties and taxes direct on this sector.

The other sectors of activity are also negatively impacted by the COVID-19 crisis, but in a lesser extent. These are, for example, sectors related to other personal services, trade and repair and information and communication. It is interesting to note, however, that the crisis would have a positive effect on the gross operating surplus of the agri-food, building and civil engineering industries and woodworking and manufacturing of wooden articles. Indeed, the fall in the prices of certain products, in particular energy, would lead to a decrease in the cost of intermediate consumption and an increase in added value, despite the drop in the value of production. For example, consumption intermediary in petroleum products in the “Building and civil engineering” sector represents around 13.1% of total intermediate demand for these products, and 5.5% of total intermediate consumption of the sector. As a result, a 4.5% drop in the administered price of oil benefits this sector by reducing its costs and increasing its added value, despite the drop in the value of the production.

The COVID-19 pandemic appears to impact industries in different ways. Table 2 presents the impact on turnover (turnover), added value (VA) and gross operating surplus (GOS) of the business sectors. The hotel and catering industry, transport and textiles, clothing, leather are among the most impacted by the COVID-19 crisis because they are the most exposed to containment measures imposed by the Tunisian authorities and therefore to both supply and demand shocks.

Other sectors are indirectly impacted, due to their strong connection to the three sectors mentioned above. Agricultural and agri-food products, for

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example, represent around 85% of the total intermediate consumption of the hotel and restaurant industry. Therefore, the decline in value production of hotels and restaurants of 23% partly explains the decrease in agricultural production and agri-food respectively by 3% and 2.8% (in terms of turnover).

There has been no funding

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Appendix

Table1. The impact of covid-19 on economy

	Before Covid-19	Post Covid-19
Produit Intérieur Brut	2.7	-4.4
Inflation rate (CPI)	6.7	7.0
Unemployement rate	15.0	21.6
Gross Fixed Capital Formation	2.9	-4.9
Household consumption	1.9	-8.0
Exportations	5.8	-8.0
Importations	3.8	-9.6
Indirect taxes	11.3	1.5
Personal Income taxes	9.5	1.4
Society taxes	4.6	-6.0

Source: Estimates of the CGE model and data from the 2020 finance law

Table2. The impact of covid-19 on different sector

	Employment	Turnover	Added[3] value	Gross[4] operating surplus
Agriculture and fishing	-4.6	-3.0	-4.8	-4.5
Non-manufacturing industries	-34.5	-29.0	-29.4	-25.8
Agrifoods industries	-0.1	-2.8	-0.4	1.3
Textile, Clothing and Leather	-15.7	-17.7	-14.5	-12.3
Woodworking and manufacture of wood products	-4.1	-2.6	0.3	4.5
Metallurgy and Metal Product Manufacturing	-3.2	-6.9	-3.8	-2.4
Other industries	-7.6	-15.1	-9.7	-5.5
Building and civil engineering (construction)	2.6	-7.8	2.6	4.1
Trade and repair	-10.0	-10.6	-10.0	-8.4
Hotels and restaurants	-15.8	-23.0	-15.8	-14.6
Transports	-15.0	-19.6	-14.1	-10.8
Information and communication	-9.1	-10.2	-10.9	-8.7
Other personal services	-13.0	-12.6	-9.5	-9.4
Education	-0.3	-0.6	-0.3	-0.2
Human health activities	-3.4	-4.6	-3.4	-3.1
Other services	-1.0	-3.6	-5.4	-1.7

Source: Estimates of the CGE model and data from the 2020 finance law.

[3] Added Value = Turnover- (Purchases + Expenses).
[4] GOS= Added Value + Subsidies - Staff costs - Indirect taxes.

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The style of leadership in the Tunisian certified ISO 9001 enterprises

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Résumé

Nowadays, face to the economic challenges and the aggressive competition, the leader will gain a lot enhancing his skills to allowsuccess to his company.

The paper aims to describe the style of leadership and its main characteristics in the context of Tunisian enterprises. It is based on a literature review about the main theories of leadership and an empirical survey conducted about 82 leaders.

The literature review reveals many models, which specify the leadership style. For instance, the Gallup model (2001) is based on thirty-four talents whileManfred F. R. KETS de VRIES one (2011) specifieseight characteristics. Based on these later models and taking into account the characteristic of Risk Taker (ISO 9001-2015 norm), we propose a model of leadership style with ten leadership characteristics related to four leadership skills groups: strategic thinking, relationship building, influencing and executing. The ten key characteristics are Strategic, Communicator, Competitor, Achiever, Innovator, Responsible, Maximizer, Change facilitator, Empathic and Risk taker. The proposed model is tested about a sample of 82 Tunisian leaders. The survey outlines the main Tunisian leader style based on five main characteristics, which are strategic, responsible, maximizer, risk taker and communicator. Itreveals a gap between the theoretical model and the real characteristics in practice.

Keywords: Leadership, leadership style, Characteristics, Tunisian context, ISO 9001-2015

1. Introduction

Face to manynational and international challenges such as customers and suppliers structures and cultures, local and foreign laws and regulations, currency exchange and inflation rates, and human resources problems; the Tunisian companies will need to focus on their effectiveness. Since, all stakeholders should be responsible to consider this effectiveness as amain objective andleaders will need to play a major role to contribute to reach this objective.As concluded by Madanchian et *al.*

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(2017),"“Effectiveleadershavespecificattribute sitshowsspecificbehaviors orstylesofleadership.Theeffectiveleader createsthesituationthatis best fortheorganizationthroughthesituationthatis bestfortheorganizationthroughthe useofskillsandprocesses.Agood leadercanmake asuccess ofaweak businessplan, buta poorleader can destroy even the best plan. That'swhy developing effective leadership by using a consistenttalent management programat all levels across theorganization canmakesignificantbusinessvalue".

Talent management refers to the anticipation of required human capital for an organization and the planning to meet those needs. Human capital is such a resource and especially the resource and knowledge based views recognizes the firm's knowledge resources as its tool for achieving a sustainable competitive advantage (Odonez de Pablos, 2004). Heinen and O'Neill (2004) argue that Talent Management can be the best way to create a long-term competitive advantage. A sustainable competitive advantage stems from the valuable, company-specific resources that cannot beh imitated or substituted by competitors. Talent is an instinctive quality possessed by few people, who have the capability to make a significant difference to current and future company performance, which is equal to competencies of a person that needs to be explored for the competitive advantage of the organization.

(Dhar. et*al.,* 2001) found that themostcommonlyusedmeasureofleader effectivenessisassessinggroupperformanceandt hescopetowhichthegoalsandobjectivesofthegro uparereached.Itis considered asastrongindicatorthatleaderscould beabletoinfluencetheirsubordinates andleadthemto achievingthegoalsoftheorganization.

Furthermore, it should be noted that the organization effectiveness is tightly related to the style of leadership, which, is characterized by innate or acquired attributes or talents.The paper aims to define the style of leadership and its main characteristics in the context of certified ISO9001 enterprises in Tunisia.The choice of the certified ISO 9001 enterprises is justified by the importance of the leadership in the ISO 9001 certification process since leadership is one of the seven principles of the total quality management on which is based the ISO 9000(2015) standard. Besides, the subject is still ongoing and the knowledge is not consolidated in the area yet. Since, a theoretical analysis in the area will contribute to put the paper objective into practice.

Thereby, the structure of this paper is composed of seven sections. This first section is for introduction. The second section presents a literature review on the characteristics of leadership in some contexts focusing in particular on especially the Gallop model(2001) and the ManfredF.R.KETS de VRIES'sone(2011) and the recommended skills of leaders. The third section concerns the conceptual model while the fourth one shows the methodology of this research, based on a theoretical contribution, and the fifth section presents the results. The sixth section presents the discussion of the analysis. Finally, the

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seventh section refers to the conclusion and potential future research.

2. Literature review:

2.1 The leadership definition:

The leadershipconcept inspires many researches related to the industrial context as well services. For instance, the Amazon siteoffers nearly 66,000 books and more than 83,000 publications on leadership and the number of references continues to grow rapidly.Universities and business schools worldwide are positioning themselves in this same continuity by offering specific programs and support to senior and executive managers. They have in common the objective of developing management skills by putting the emphasis on leadership practices (Mintzberg, 2009, p.143).However,the results remain very limited due to the complexity of the concept.

Bennis (1997) and Bennis and Nannus (2003) underline the difficulty todefine leadership using these very appropriate metaphors "... leadership islike the Abominable Snowman, whose foot prints are everywhere but who is nowhere to be seen ", or". To an extent leadership is like beauty: it's hard todefine, but you know it when you see it".

However, despite the proliferation of sometimes-divergent researches, the greatest consensus has relatively formed around the definition of leadership as "a process by which an individual (the leader) influences a group of individuals (the followers)in order to achieve a common goal "(Northouse, 2010: 12). Also JM Plane, 2015) did provide a more precise definition on leadership as being "a process of decisive orientation and influence of a person on the action of a human group with a view to putting in place a policy and achieving a certainty.

The two mentioned definitions above are the synthesis of successive leadership theories, the ones contradicting of completing the others. The majority of theories are linkedto leadership styles that knew a chronological evolution.

2.2 The evolution of leadership theories and styles:

The theories and styles related to the leadership know various evolutions, and the first theories was associated with the personality Era (Great Man theory late 1800's and 1990's). Those theories hypothesizes that true leaders are born not made, and the best example is the Great Man Theory (Bowden, 1927; Carlyle, 1841; Galton, 1869). Then appeared the Trait Period mainly represented by the Trait Theory of (Bingham, 1927). Those theories consider that leaders have this extra capacity to rise when needed through their charisma, wisdom, intelligence or other natural qualities. The great leaders are notorious people such as Abraham Lincoln, Julius Caesar, Mahatma Gandhi, and Alexander the Great. However, those theories were criticized after the failure of those famous people. Then appeared the behavioral theories focus on how leaders act, and arrived to the conclusion that leadership can

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developed, by defining and learning behavior. The most notorious theories are

the Ohio State studies (Fleishman, Harris, and Burtt, 1955), then the early behavioral theory((Reinforced Change Theory (Bass, 1960)) which gave four states of business success and no success, and effective or ineffective people. The Michigan State Studies, (Likert, 1961) and the late behavior Period Managerial Grid Model (Blake and Mouton, 1964), which focuses on two axis, the concern for people and the concern for results. The other related theories, such as the Four-Factor Theory (Bowers and Seashore, 1966) Action Theory of Leadership (Argyris, 1976) Theory X and Y (McGregor, 1960, 1966) Operant Period (Sims, 1977; Ashour and Johns, 1983) will focus on two orientations, the production and the people. Those theories did not take into account a third factor, which is the environment, and the response came from the Situational and contingency theories, which began by the environment Approach (Hook, 1943), then the Open-Systems Model (Katz and Kahn, 1978), followed by the Social Status Period with Role Attainment Theory (Stogdill, 1959), Leader Role Theory (Homans, 1959) . The Contingency theories are contingency Theory (Fiedler, 1964), Path-Goal Theory (Evans, 1970; House, 1971), Multiple Linkage Model (Yukl, 1971; 1989), Normative Theory (Vroom and Yetton, 1973 and Vroomand Jago, 1988). This later theory is an organizational one that claims that there is no best way to organize or lead a company, or to make decisions. Any action should take into account the internal and the external situations.

The transactional theories began by the Emergent Leadership (Hollander, 1958), then the Social Exchange Leadership (Hollander, 1958, Jacobs, 1970), Vertical Dyad linkage/Leader Member ExchangeTheory(Dansereau, Graen, and Haga, 1975), the Reciprocal Influence Approach (Greene, 1975), so the Social Exchange Theory (Hollander, 1979; and the Role Making Model (Graen and Cashman, 1975). Between the 1980s and 2000, the Transformational theories with the charismatic Theory (House, 1977) , the Transforming Leadership Theory (Burns, 1978), the Self-Fulfilling Prophecy Period SFP Leader Theory (Field, 1989; Eden, 1984) and the Performance Beyond Expectations Approach (Bass,1985). We note that the transactional leadership works within set established objectives and organizational boundaries, and is mainly oriented performance, so evaluate tasks and reward the outcomes. The transformational approach challenges the status quo and is more future-oriented.

As from the 2000s, the Integrated Leader-manager and adaptive leadership theories came with many styles. The graph here below summarizes this evolution

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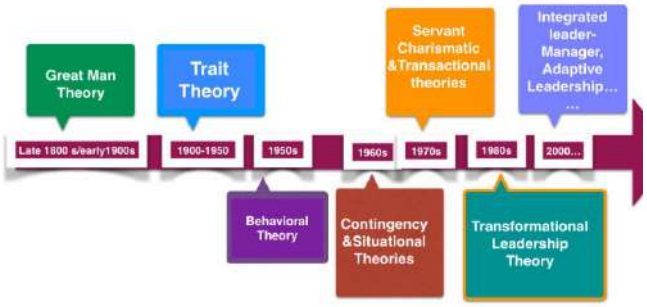

Figure 1: The chronological evolution of the leadership theories

The models of leadership styles developed after the year 2K are multiple. Our choice went to two models, the Gallup one that enunciates 34 possible talents a leader can possess, and the Manfred K. De VRIES with its eight characteristics, that may be innate or acquired. Our choice to mix the two models will allow us to emphasize the possible characteristics that may build an "ideal" model of leadership style.

2.3 The Gallup and M.Kets DE VRIES models:

Here are the descriptions of the two models used in our study

2.3.1 The Gallup model (2001):

In 2001, Marcus Buckingham and Donald Clifton, both working for the Gallup Institute in the USA, published the results of their research, based on a strong premise "The best way to move forward in your career and to be satisfied in your work is to develop your strengths".

Using polls and surveys carried out around the world (all sectors combined) on a sample of more than 10 million people, they succeeded in isolating 34 themes related to the strengths and talents that enable these people to achieve success. .

The 34 talents were divided into four groups 1) Strategic thinking defined as people with dominant strategic thinking themes help teams consider what could be. The talents under this group are Strategic, Futuristic, Intellection, Ideation, Analytical, Input, Learner, and Context. 2) Relationship building defined aspeople with dominant relationship building themes have the ability to build strong relationships that can hold a team together and make the team greater than the sum of its parts. The talents under this group are Developer, Relator, Empathy, Harmony, Adaptability, Connectedness, Positivity and Individualization. 3) Influencing defined aspeople with dominant influencing themes know how to take charge, speak up and make sure the team is heard.The talents under this group are Activator, Command, Communication, Competition, Maximizer, Self-Assurance; Significance and Woo. 4) Executing defined; as people with dominant themes know how to make things happen. The talents under this group are Achiever, Arranger, Belief, Consistency, Deliberative, Discipline, Focus, Responsibility and Restorative.

2.3.2 The Manfred Kets De VRIES model (2011) :

This model is composed by eight characteristics: 1) The strategist: leadership as a game of chess. These people are good at dealing with developments in the organization's environment. They provide

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vision, strategic direction and outside the box, thinking to create new organizational forms and generate future growth. 2) The communicator: leadership as stage management. These executives are great influencers,and have a considerable impact on their surroundings. 3) The change-catalyst: leadership as a turnaround activity. These executives love messy situations. They are masters at re-engineering and creating new organizational «blueprints.". 4) The transactor: leadership as deal making. These executives are great dealmakers. Skilled at identifying and tackling new opportunities, they thrive on negotiations. 5) The builder: leadership as an entrepreneurial activity. These executives dream of creating something and have the talent and determination to make their dream come true. 6) The innovator: leadership as creative idea generation. These people are focused on the new. They possess a great capacity to solve extremely difficult problems. 7) The processor: leadership as an exercise in efficiency. These executives like organizations to be smoothly running, well-oiled machines. They are very effective at setting up the structures and systems needed to support an organization's objectives. 8) The coach: leadership as a form of people development. These executives know how to get the best out of people, thus creating high performance cultures.

3. Conceptual framework:

3.1 Research question and Objectives

We do reiterate our research question

What are the leadership main characteristics of decision makers in ISO 9001 certified Tunisian companies?

R. Ashkenas and B. Manville (2018) identified six leadership skills, based on interviews of successful leaders of large corporations, startups, and non-profits companies to get to know their view about what it takes to become a leader. Based on their research, these skills are: 1) shaping a vision for focusing and challenging the team; 2) translating the vision into clear strategy about what action to take and what not; 3) recruiting, developing and rewarding a team of great people; 4) focusing on measurable results; 5) promoting innovation and learning to sustain the team or organization and 6) leading yourself. According to the authors, the main points to develop proficiency of these leader skills are based on continual practice and real experience, rather than just reading books or attending courses or seminars. This confirms what Kouzes and Posner (1995) stated,"leadership is a learnable set of practices".

3.2 Conceptual model

We are at the integrated leader-manager, Adaptive leadership; hence, the theoretical model need to be derived from characteristics models as from Y2K. The models identified are 1) the Gallup's set of 34 talents model (2001), 2) the Manfred F. R. KETS de VRIES's 8 characteristics (2011) and 3) the characteristic of Risk Taker (ISO

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9000-2015 norm).

3.2.1 The proposed model

We propose a model derived from the two above models, and added the risk taker characteristic taken from the ISO 9001-2015 norm.In fact, and According to ISO 9001, planning for risk is a form of quality management and doing so contextually ensures that the business' quality management system is able to achieve its intended results by preventing or reducing the risk and mitigating any of the potential side effects of an undesired outcome, thus by improvingthhe identification of opportunities and threats and effectively allocate and use resources for risk treatment.

The below table illustrates this:

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Gallup Model (Group)	M. K. De VRIES Model	Proposed Model	Principle characteristics of the talent
Strategic (Strategic thinking)	**Strategist**	**Strategic**	This talent allows the leaders to identify the best route for his company taking into account the vision, the mission, the common values and strategic objectives
Communicator (Influencing)	**Communicator**	**Communicator**	This talent allows the leader the capacity to communicate the needed information to the stakeholders that internally and externally by various means.
Adaptability (Relashionship building)	**Change catalyst**	**Change facilitator**	This talent allows the leader to act a businessperson who is the trusted confidante of both employees and leadership team. He need to be flexible and adaptable to stay productive when exposed to different directions work flows
Competition (Influencing)	**Transactor**	**Competitor**	This talent allows the leader to keep his company's performance comparable to the competition, and have the appropriate negotiation skills to close the deals.
Achiever (Executing)	**Processor**	**Achiever**	This talent allows the leader to possess a great deal of stamina, and a constant need for attainment, through smooth operations running and efficient resolutions of problems, as well as constant results orientation.
Intellection &Ideation (Strategic thinking)	**Innovator**	**Innovator**	This talent allows the leader toexploit his mental activity that depends on the other strengths The leader will need to generate creative ideas and implement them as well as having a great capacity of difficult problems solving
Responsible (Executing)	**Builder**	**Responsible**	This talent allows the leader to take psychological ownership for anything he commits to, and whether large or small, he feels emotionally bound to follow it through to completion. He makes things happen and still accountable for his actions
Developer&Includer (Relashionship building)	**Coach & People development**	**Maximizer**	He is willing to transform something strong into better. He creates and maintain high performance through high standards
Empathy (Relashionship building)	**-**	**Empathic**	This talent allows the leader to sense the emotions of people's around him; hence he will be able to see the world through their eyes and share their perspective by understanding their needs and raise their motivation
------	**------**	**Risk Taker**	This talent allows the leader to identify the risks, work to eliminate or address them, and at least mitigate those risks

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4. Methodology

4.1 Variables itemization

Aspresentedinthefirstsection,theobjectiveofth isresearchistoidentifykeyleadershipcharacteri sticswithin the context of the Tunisian ISO 9001-2015 certified companies. We will consider the expected ten characteristics identified above into the proposed model. Our objective is to determinebetween the following characteristics (Strategic, Communicator, Competitor, Achiever, Innovator, Responsible, Maximizer, Change facilitator, Empathic and Risk taker), those that differentiate the Tunisian leadership style. Thus, the theoretical leadership style is represented according to the following equation : $Y = A + ßi \times Xi$, where Y is the dependent variable “Leadership style” and Xi are the independent variables “the characteristics”.

We did itemize the variables as per the following table:

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Variables (Characteristics)	Items	Criterions
Strategic	Vision Mission Values Strategic objectives	Enunciation & clarity Enunciation & clarity Enunciation & clarity Enunciation & clarity
Communicator	Internal and/or external Items communicated Means of communication Stakeholders (Recipients)	Whom's All strategic items Efficiency Whom needed to be informed
Change facilitator	Adaptability Flexibility Change sponsor	When needed When needed In case of change
Competitor	Competitive advantage Company positioning Deals negotiations	Consciousness Consciousness Capability
Achiever	Smooth operations running Problems solving Results oriented	Smoothness Resolution Results attainment
Innovator	Creative ideas generation New ideas implementation Great capacity of difficult problems solving	Generation Implementation Resolution
Responsible	Accountability for his actions Making things happen	Accountability Concretization
Maximizer	Create high performance culture Create high performance standards People development	Team members federation and common values share SMART objectives setting and challenging results attainment Investment in Human resources

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Risk Taker	✚ Risks identification ✚ Address risks ✚ Mitigate risks	✚ Clear procedures ✚ Risks elimination ✚ Risks impact attenuated
Empathic	✚ Ability to understand people's needs ✚ People motivation	✚ Peoples needs identified and answered ✚ High motivation within the employees

4.2 Questionnaire:

We designed the questionnaire with qualitative questions derived from the leadership characteristics of the proposed model. Itwasdividedintotwosections:inthe firstsection,interviewees wereaskedthegeneralquestions,inordertoobtainbasicinformationnecessary todefinecompaniesprofileand the respondent identity and responsibilitieswhile the second section considered the identification of the 10 characteristics of leadership and composed by 20 questions:

- Some of them are close-ended (yes or no).
- Some other questions are partial open-ended (multiple-choice with 'other' option),
- The remaining ones are ranking questions (Likert scale),

4.3 Survey Sample

The research was conducted through a questionnaire proposedto700 enterprises that have a clear e-mail address among the

list of 1,004 ISO 9001-2015 certified enterprises provided to us by the A.P.I.I. (Agence de la promotion de l'Investissement et de l'Innovation, a government body responsible to promote the investments and the innovation in Tunisia).

We conducted the survey during the period between december 2019 and april 2020.The response ratio was very low. We sent it again, february 2020, and only 82 responded. The response rate reached finally 11,7%. The respondents distributionis made up of 60 leaders from industry (Metalic, Wood, Textiles, food …); 12 leaders from the energy and oil services field, 6 leaders from the real estate domain and and 4 contractors.

5. Data collection and analysis

Descriptive methods were used to test construct validity and scale reliability. The

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validity of the construct (which brings together convergent validity and discriminant validity) wastested within the framework of the PCA analysis carried out on the items concerned. The reliability of the scales, carried out within the framework of this study using the SPSS 20.0 software, is tested using Cronbach's Alpha in accordance with the recommendations of Evrard et al. (2003). To validate the internal structure of the model and the research hypotheses, we used the test which is based on the linear regression method (Evrard et al. Op. Cit.). According to Evrard et al. (2003), multiple regression aims to isolate a relationship between a variable to be explained and several explanatory variables and put them into equation. This relation is expressed in the form of a regression equation which presents the variable to be explained as the sum of the explanatory variables affected by their regression coefficients to which is added a constant regression term.

6. Results

The following linear regression table shows the ten variables (Leadership characteristics) with their corresponding significance. The coefficient R=0,844 indicates a positive correlation coefficient is positive and > 0.8, therefore, a direct and strong correlation. The R square= 0,712 indicates that 71,2% of total variation in Leader is explained by variation in the independent variables and 28,8% are explained by the otherwise . The ANOVA table shows a significance equal to 0,000, then < 0.05 then equation is significant and can be used for prediction.

According to the results, it seems that the Tunisian leadership style is determined by the combination of the following characteristics (Strategic, Responsible, Maximizer, Risk taker and Communicator).

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Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		A	Standard Error	Bêta		
1	(Constante)	1,145	,317		3,610	,001
	Strategic	,679	,057	,679	12,006	,000
	communicator	,162	,090	,278	1,801	,081
	Competitor	,057	,174	,117	,327	,745
	Achiever	,088	,126	,168	,698	,490
	Responsible	,209	,059	,209	3,557	,001
	Maximizer	,238	,109	,431	2,188	,036
	Innovator	,101	,124	,230	,819	,419
	Change facilitator	,097	,106	,197	,913	,368
	Risk taker	,117	,052	,117	2,269	,026
	Empathic	,009	,030	,008	,312	,756

a. Dependent variable : Leader

b. All requested variables entered

Model	R	R Square	Adjusted R square
1	,844[a]	,712	,634

ANOVA[a]

Model		Sum of squares	df	Mean Square	F	Sig.
1	Regression	24,945	9	2,772	9,077	,000[b]
	Residual	10,077	33	,305		
	Total	35,021	42			

a. Dependent Variable : Leader

b. Predictors : (constants), Strategic, communicator, competitor, Achiever, Responsible, Maximizer, Innovator, Change facilitator, Risk taker , Empathic

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According to above, the Tunisian leadership style could be formulated as::

Tunisian Leadership style = 1,145 + 0,679 Strategic* + 0,209 Responsible* + 0,431 Maximizer** + 0,117 Risk Taker** + 0,279 Communicator***

- * significant at 1%
- ** significant at 5%
- *** significant at 10%

7. Discussion

The results of the descriptive statistics and the correlation analysis using the Cronbach's Alpha (greater than 0.8) give a strong support to the conclusion that the Tunisian leadership style is highly dependent on the main characteristics, with different significance. Our survey reveals that the Tunisian leadership style is highly dependent on the strategic talent. The strategic leaders must therefore create the future by constantly evaluating the business environment and analyzing the actions taken to make the best decisions. They do not hesitate to question their position and seek different points of view, even the most divergent, in order to ensure that they have "covered the issue" by developing a macro perspective of the situation (Goldman , 2012; Goldman, Scott and Follman, 2015; Sigter and Cooper, 2015).

Indeed, the first step that the leaders need to undertake is to establish why the organization exists and what it wants to achieve. If they do not clarify and communicate the vision and mission, they cannot be effective. They also should involve their leadership team in evolving the vision and mission.Theyalso should involve their leadership team in evolving the vision and mission in order to develop their commitment

Indeed, the results reveal that the leaders should be responsible, and accountable for their actions.The third characteristic ismaximizer whocreates high performance culture, high performance standards. The fourth characteristic is risk-taker, so the leader is the person who identifies both internal and external risks. the leader is required to demonstrate leadership and commit to ensuring that risks and opportunities that can affect the conformity of a product or service are determined and addressed". The last characteristic iscommunicator who needs to establish a channel of information exchange with his team to reinforce the vision, mission, values and culture and to ensure that the organization is working together as a consolidated team. In addition, he needs to know who are the different external stakeholders groups in order to develop approaches allowing him to understand, anticipate and respond to their different needs and expectations.

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The five remaining characteristics revealed non-significant, that are competitor, achiever, innovator, change facilitator and empathic should be enhanced by the Tunisian leader, and if we take into account the statement of Kouzes and Posner (1995), leadership is a learnable set of practices, then leadership can be developed by practice.

8. Conclusion and future research

Theobjectiveofthisresearchwastopresentas hape of the Tunisian leadership style, with its characteristics,consideringaliterature review that allowed us to propose a theoreticalstyle, taking mainly into account the requirements of the ISO 9001:2015;and an empirical survey conducted over 700 Tunisian certified ISO 9001:2015 enterprises, with only 82 respondents.Basedonthisassociation,fivem aincharacteristics, among ten identified by the theoretical model were revealed. We can consider that adevelopment ofsome skills related to the non-significant characteristics may allow theTunisian leader succeed to develop them, and be as effective as the theoretical model.

Alimitationofthispaperis that the empirical leadership style is a snapshot within the present context of post-revolution, pandemic COVID-19, and a three dimensions turbulent environment, economic, social and political. In addition, the response ratio is very low, and this is mainly due to the Tunisian culture that does not pay the due importance to the academic researches, and a certain skepticism or/and fear of indiscretion.

Then, and due to the above reasons, this result cannot be generalized, and needs to be deepen.

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Determining Key Oasis Strategic Factors Using AHP-MICMAC

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Abstract*— In fact, the date sector in Tunisia has been facing several problems related to both technical and social production conditions. Therefore, the objective of this article is to identify the constraints facing this sector by examining its structure in the region of Kebili, in the south of Tunisia. In this context, Dubost (1990), used a two-step complementary methodological approach to conduct a field survey through which interviews were organized with producers of dates to identify the main constraints they are facing. In fact, the most important identified constraints are of two types, structural constraints, which include under-investment in the renewal and maintenance of palm groves, and institutional constraints, which consist in the lack of governmental, technical, financial and organizational support for producers. For this reason, this document integrates the Matrix-based Multiplication Applied to a Classification technique (MICMAC) and the Hierarchical Process Analysis (AHP) technique to manage the understanding of the key strategic variables of the oasis ecosystem. In fact, the MICMAC method is used to determine the classification of the variables while the AHP method is integrated to weigh this classification. First of all, the MICMAC is used as a structural analysis tool that builds ideas to cope with complex decision making and help decision makers take the best decisions. In fact, the obtained results showed that the strategic variables have a direct, an indirect and a potential influence. Moreover, the combination of the AHP and the MICMAC assigns a weight to each variable, which implies that it plays an important role in the elaboration of strategies and the development scenarios of the oasis ecosystem.

***Keywords*— Dates, Kebili, production, performance, decision making for dates, oasis palm cultivation**

I. INTRODUCTION

In fact, date palm cultivation is considered as the central axis in the Saharan regions due to its great socioeconomic and environmental importance in many oasis regions (Dubost, 1990). In Tunisia, this crop occupies a leading place in the Saharan agriculture in terms of employment and the settlement of populations and products). In fact, with more than 3.55 million varieties of "Deglet Ennour" and 1.85 million common varieties, Tunisia is at the top of the world ranking since its dates are marketed in 73 countries and 5 continents. Moreover, thanks to the quality of Deglet Ennour", which represents (65%) of the date production, Tunisa ranks first. Therefore, among the ambitions of Tunisia is the exploitation of this sector through the improvement and enhancement of the product. For example, in November 2019, it was declared that the revenue from dates was above 870MD and could reach 1000 million dinars in the new season. Nevertheless, a number of studies have shown that the date sector in Tunisia is having some difficulties in its operations and therefore cannot achieve the objectives assigned to it by the public authorities. Therefore, the objective of this research is to identify the main difficulties of

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the sector through an in-depth survey conducted in Kebili, a region in the South of Tunisia. Moreover, after presenting our methodology, we will address the main constraints that hinder the date sector, which are caused by the technical and socio-economic conditions of date production and after that, we will present our suggestions.

I. Materials and Methods

1. Context of date cultivation in Tunisia

In fact, the record concerning the constraints of the date sector in Tunisia has been frequently mentioned and recalled by researchers and heads of agricultural institutions (Rhouma A. Ferry M., Greiner D. 1993). Despite its significant progress and the improvements that have been made, this sector has often suffered considerable losses and inadequate packaging and a significant undervaluation of products, especially those intended for export. On the other hand, thanks to the expansion of the capacity of existing units, the installation of new units, and the privatization of the sector and the advancement of the harvest season to the month of Ramadan, the capacity of conditioning and processing of dates has more than doubled over the last decade in Kebili. However, it remains insufficient (with 50,000 tons/year) compared to the production and the quantity of dates that need to be valorized. It should be noted that the classical date processing system is dominant and represents more than 80% although the extension of modern processing capacity has contributed to the regression of classical processing, which remains dominant in the southern and south-central regions with 97% while in the eastern regions, it represents less than 30%.

Box 1: Context of the date sector in Tunisia:

1. Evolution of the date sector between 2011/2019; according to the CTD data, the total production is deteriorated. On the other hand, the number of palm trees has almost doubled (from 6.5 million to 11.9 million). Yield increased from 51 kg per tree in 2011 to 100 kg in 2019, but the quality is poor.
2. World rank / production; Tunisia, occupies the 1st place among producing and exporting countries.
3. Number of palm trees; 18 million feet on 160 000 ha (2019)
4. Main varieties; Deglet Nour, Late and early varieties, Lagou, Amari((Goundi), Besser helou, Kentichi, Kenta, Khouat, Alligh.
5 . Other by-products; Date Paste, Honey, Date Vinegar, Jam, Yeast, Alcohol, Date Flour.
6. Main producing regions; Douz-North (232%), Douz-South (146%), El Fawar (423%), Kébili-North (1289%), Kébili-South (534%) and Soug Lahad (664%). 19.0% Export/production; in 2012/2013, 4.62%. In 2016, it is 16%.
7. Rank Tunisia / exporting countries; Tunisia is ranked first with 17% of global exports of dates on average while in value, it ranks 5th with 8% of exports with Saudi Arabia in terms of exports of dates.
8. Institutions involved; many actors support the date sector in Tunisia; research (INPV, ITDAS, INRA, CRSTRA), financing (CIE, FNDA), insurance (CNMA), export promotion (GDA, GIZ), technical control and monitoring (CTD, CRDA). Within the sector, several stakeholders are to be mentioned in addition to the producing farmers; the different types of collectors, packaging and storage units, transporters, etc.. (see the presentation diagram of the value chain in the appendix).

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Source: Regional Commission for Agricultural Development (RCAD).

EIG: *Economic Interest Grouping*
ADG: *Agricultural Development Grouping*

Although date processing has become one of the most important industries in recent years, it should be noted that in Tunisia, no processing activity on an industrial or semi-industrial scale based on dates has been identified since the existing technology enables only the production of "Ghars" date paste or stuffed dates, which is practiced by some packers despite the incentive to develop this segment.

In fact, Tunisian dates are characterized by very interesting processing abilities due to the diversity of their physical, physico-chemical, biochemical and sensory characteristics. In this sense, Harrak et al. (2005) and Harrak, (2007) indicated that dates of different consistencies (soft, semi-soft and dry), with different properties (aromas, flavors, colors, etc.), sugar and fiber contents highly variables, are preferred to be processed. In fact, the oasis population traditionally values the transformation of dates into diversified ad locally appreciated products, such as juice, paste, syrup, flour, etc.

On the international level, Tunisia occupied the 1st place with 17% of the average global exports of dates in quantity during the period (2012-2016), however, in recent years, it has been on decline due mainly to the weak structuring of the sector and poor quality of packaged dates following the misconduct of the phoneniciculture as well as the climatic conditions (high heat and low rainfall). Moreover, there are external factors that weigh on this sector, such as the competitive pressure from Morocco and the saturation of the international markets beside some obstacles encountered by export operators, which greatly weakened the competitive position of the Tunisian dates, especially in the European and African markets.

2.2. Survey methodology and main characteristics of the sample:

In our research study, we use a combination of methodology, a questionnaire survey of a large sample of oasis farms in the Kebili region as well as a series of interviews with agricultural services. The first step in our methodological approach consists in establishing a basis for exploration. Therefore, starting from the lists drawn up by the communal people's assemblies of the three types of the concerned oases, we drew up lists of farmers by interviewing the notables in each commune. In fact, about 50,000 farms were identified in this way. The choice of the study sample was made on the basis of lists of the palm trees each of which is characterized by the number of farmers.

After that, the identified farms were classified on the basis of their size, while distinguishing between small (1 to 100 palms), medium (101 to 300 palms) and large farms (more than 300 palms), according to what is commonly accepted in the region, In fact, we noted that farms with less than 50 palm trees are extremely rare.

Moreover, the survey is based on a sample of a few palm trees in each class randomly determined from the population of each commune. The used data collection method is the questionnaire in a hypothetical-deductive approach, while the administration mode is that of a self-administered survey as well as an interview during and after the harvest period. In fact, the characteristics of the surveyed farms in relation to the size of the field and the legal status of the farmed areas (box 1) are presented below. As a consequence, our surveyed sample includes 200 farmers, mostly medium-sized in which land is individually owned. On the other hand, our accommodation enabled us to include 19% and 40% of small and large farms, respectively. Then, in terms of surface area ownership, 8% represent collective farms and 30% of fields are planted by individual producers. Furthermore, other surveys, either through a questionnaire or an guided interviews, were carried out among institutions and associations, such as the Regional Agricultural Development Commission, the Technical Center of Oasis Agriculture, the Technical Center of Dates in Kebili, the Agricultural Land

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Agency, the Agricultural Development Groupings, the mutual societies of the agricultural service, the Association of the Safeguard of the Oasis of Chenini and the local association for the development of Souk Lahad).

On the other hand, some information has been ordered from the Regional Agricultural Development Commission (RADC) in Kébili. In fact, the collected information was used to guide us in improving the content of our questionnaires, which were tested on a small number of farmers. Besides, some questions as well as the order of presentation have been modified accordingly. Finally, we obtained, among others, responses from 200 farmers collected through interviews with the involved institutions and associations, which enabled us to identify the main obstacles of the date palm sector in Tunisia.

Box 2: The key characteristics of the sample

The Kebili region, which is located in southern Tunisia, is a region known for its important production of dates as it includes several oases, such as "Douz, East and South of Kebili, Souk Lahad and Elfawar". In fact, Kebili is a very active region in terms of date production. Recently, the RADC, together with the GIE, organized the first edition of the Palm Festival in order to promote the local production and support the farmers.

Based on a segmentation per size category and the type of oasis, 200 farmers were surveyed face-to-face where interviews focused on two main groups of questions.

-The first concerns the technical conditions of production and palm renewal, cultivation practices, technical itineraries, tillage, irrigation, etc.

-The second is about the technical conditions of production, palm renewal, cultivation practices, technical itineraries, tillage, ad irrigation, etc. The third concerns the technical conditions of production and palm renewal.

-The second group is related to the social and economic conditions of production. It deals with the land status, the labor, funding and the difficulties of accessing credit, and finally, problems related to technical extension (training and seminars).

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3.Results of the survey on the technical conditions of production:

Our results will be presented first in relation to the technical conditions of production and then, to the social and financial conditions.

3.1. Age of the palm trees

In fact, age plays a crucial role in the productivity of palm trees (Rhouma, 1990). As a result of the survey, we noted that 13% of the palm trees are over 80 years old with 40% of which are between 70 and 80 years old. However, the situation of non-renewal of the existing plantations is the same in all categories of farms, mainly in small formerly self-managed farms as well as in private non-land holdings.

In fact, focusing on the palm age per variety in our study, we noticed that the proportion of palm trees over 80 years old is higher for common varieties (20%) while it is more remarkable for "Deglet Ennour" (80%), which is the most exported. On the other hand, both varieties are the most commercialized on the national markets. Then, the aging of the orchards is justified by the low renewal and the modesty of the extensions, while palm trees less than 5 years old account for only 7.5% of the orchard. In our sample, 30% of the farmers are not concerned about replacing old palm trees because only 40% believe in replacement while 40% have to do so but they have not done it. Generally, palm trees should be replaced when they reach 80 years of age (78% of farmers are concerned about this problem while only 8% are interested in replacing orchards when they reach 50 years of age. In fact, the reasons for not replacing over-aged palm trees are related to the weakness or lack of financing, the impoverishment of soils planted with old palm trees, insufficient labor force and also the problem of the jointly owned farms. Moreover, the density of the location of palm trees is considered one of the major problems stated by the CRDA. Moreover, the systematization of the work for the underlying crops and the maintenance of the palm trees impose the spacing of 9 meters between the palm trees. In fact, the palm tree must be amended with at least 10 kg of manure per year, 1 ton per year, 3kg of ammonitrate per year. However, the surveyed farms do not follow this route, since they use only 20kg of manure and 1 ton of sand every 3 years.

3.2. The farming practices and the technical itinerary

In fact, the analysis of the different operations that interfere with the cultivation of date palms makes us think that these practices differ from one farmer to another and from one operation to another according to the necessity, specificity, the importance of these operations and the financial means of the date palm grower. Generally, the technical itinerary is carried out through the following operations; weed control, drainage maintenance (once a year), ploughing, manure (100 kg of manure per palm tree per year), sand fertilizer (1 ton of sand per palm tree preferably every 3 years), mineral fertilization (3 kg of amonitrate per palm tree per year), irrigation (every 7 days in the summer period, and every 12 days in winter)...

As for tillage, it is relatively light since it is manually conducted but too expensive. On the other hand, the mechanization of tillage in old oases is more difficult. In fact, the lack of skilled labor in technical itineraries is considered one of the main problems hindering the development of palm trees (Benziouche and Chehat, 2010). Moreover, some palm growers do not carry out some operations, which, explains how this domain can resist in front of the other sectors. Furthermore, soil improvement (usually sand) is a labor-and transport-intensive operation for which it is little practiced by micro-farms. Generally, tillage is relatively light since it is manually conducted but too expensive. On the other hand, the mechanization of tillage in old oases is more difficult due to the lack of skilled labor in technical itineraries, which is considered as one of the main problems hindering the development of palm trees (Benziouche and Chehat, 2010). Besides, some palm growers do not carry out some required operations, which indicates how this field can resist in front of the other sectors. O the other hand, soil improvement (usually sand) is a labor and transport-expensive operation. As a result, it is little practiced by micro-farms. Furthermore, the application of manure spreading is necessary to maintain

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the output of palm trees. A very small number of farms, especially the medium and large ones, use chemical fertilizers while amendments and manuring are applied in small quantities below the needs of the soils, which are generally poor and below the standards recommended by the CTD. In fact, the low use of inputs, such as tractor rental (250 TD per trip), purchasing of manure (2700 TD per trailer) as well as the high cost of labor with the lack of extension. is due to the high cost of their application.

3.3. Phytosanitary situation, irrigation and drainage:

The phytosanitary situation in the region of our study is poorly treated. In fact, nearly one out of every two studied palm trees is infected by diseases, such as mold and stiffness or is affected by parasites (date worms, Orectas, Rhynchophorus ferrugineus, ...). In general, it is the small farms that suffer the most because half of them do not practice any of the treatments while the other half practices only traditional treatments. On the other hand, the treatments applied through the use of chemical products seem to be not very efficient..

Moreover, the vegetation acquired can generate some diseases and pests. In fact, according to a carried out survey, we have noticed a wide spread of diseases in the palm fields. On the other hand, weeds are a major threat to the development of the palm trees because they push farmers to abandon some parcels of land, which represent 37% of the farms. Besides, inadequate irrigation and drainage due to the lack of water and the absence of a drainage system are major constraints that prevent good palm productivity among the surveyed farmers. In fact, two-thirds of the farms need maintenance and drainage.

As a consequence, insufficient irrigation is the discrepancy between the quantities of water needed per year (31536 m3 per ha) and the one actually supplied (11038 m3/year/ha). On the other hand, in summer, irrigation must be carried out every 7 days, whereas in practice, it takes place every 15 days. Moreover, the salinity of irrigation water is a well known constraint in this region, which makes it difficult for irrigation farms to use drainage water due to insufficient drilling, power grid failures and the deficit to pay electricity bills. In fact, the causes that prevent the farmers from effectively dealing with the drainage problem are multiple. The most well-known problem is the refusal of the farmers to accept the use of the main collective drainage systems because of the existence of vegetation and sand, a problem reported by 37% of the respondents. Moreover, the irrigation water salinity is a well-known constraint in this region, which makes it difficult for irrigation farms to use drainage water due to insufficient drilling, power failures and non-payment of electricity bills. In fact, the causes that prevent the palm tree farmers from effectively dealing with the drainage problem are many, the most well known of which is the farmers' refusal to accept the use of the main collective drainage systems because of the existence of plants and sand, a problem reported by 37% of respondents.

4. The survey results on the economic and social production conditions

The results of the questionnaires sent to farmers cover the economic and social conditions of land ownership, date palm production systems and quality, as well as financing and technical extension constraints, which are cited below.

4.1. Land ownership and tenure :

In fact, sole proprietorships and direct tenure largely dominate in the surveyed area. On the other hand, individual ownership, which is more common in small farms, accounts for more than 351% in Kébili, especially in its southern region, while joint ownership is very present in large farms, especially in Bazma and Rgime Maatoug.

In general, the rate of used workers is 40% seasonal workers, 50% family workers and 10% a combination of both. In fact, there are no specializations according to the type of work, On the other hand, irrigation workers are seasonal probably due to the fact that irrigation is more difficult and painful because it is carried out at night, (Perennes, 1980).

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4.2. The production quality:

In fact, the low product quality is the effect of date worm infection. On the other hand, the effects of rainfall, the quality promotion programs are limited to packing with mosquito nets, which represents only 32% of the number of vaccinated Al-Nour palms, and plastic packaging, which represents only 25% of the number of vaccinated Deglet Ennour palms as well as the weakness of the oasis cleaning process within the exploited areas.

4.3. The MICMAC method:

The methodology used is that of Michel Godet and Philippe Durance (GODET, DURANCE, 2008) who define structural analysis as "a systematic method, in matrix form, of analyzing the relationships between the constituent variables of the system under study and those of its explanatory environment." and which is composed in three stages

- Census of the variables

- The identification of the relationships in the structural analysis matrix

- The identification of the key variables through the Micmac method.

This study uses the Micmac software, created by the Laboratory for Investigation in Prospective Strategy and Organization((LIPSOR), which is a free of charge software and made available to the public during 2009. Moreover, this study is based on diversified data collection and validation of the data collected by a group of experts.

The data collection, which is based on an empirical approach, is mainly carried out through observations and interviews with the stakeholders involved in the palm plantation sector. In fact, it is a main step in the collection of all the data needed to carry out the structural analysis. This data collection is also based on the scientific literature concerned with the development of the palm sector in a direct and indirect way. Therefore, once the data are collected and processed, we will validate them by a committee of experts composed mainly of people who are part of the working group on the sustainable development of palm tree sector.

Census of the variables

As François Plassard points out, the variables census is a major step which consists in the richness of the structural analysis at the same time as its limits besides, it is crucial in choice of the variables in order to analyze the environment of the oases by first identifying all its components, then indicating the main constraints that the date palm sector faces in order to obtain a list of the variables that are representative of the system.

Actually, the process of the variables identification consists of several stages. The first stage consists of an unorganized list that will be enriched later on. Then, this list is organized into different themes which will be later grouped together. In this context, Michet Godet, 2007 states that each variable must be briefly explained. In fact, this stage is very important because it helps us to keep in mind everything understood in the wording of a variable because without the creation of this common language, reflection and identification of relationships would be impossible or meaningless".

Moreover, the definition of each variable helps with the verification of the relevance of each one to be identified. Therefore, in order to correct and validate these variables, we have submitted them an expert committee which will examine them. In fact, we have identified the variables according to the production technical, social and economic conditions.

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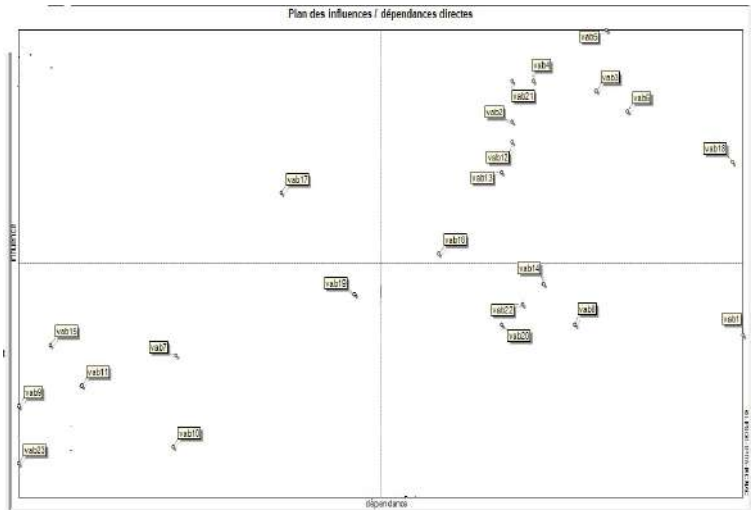
5.1. Key variables in the development of date palms.

Table1

	Variables headings
V01	The renewal of palm trees
V02	Farming practices
V03	Technical lines
V04	Tillage
V5	Irrigation and phytosanitary use
V6	Plantation age
V7	Orchard renewal
V8	Planting mode
V9	Cultivation channels
V10	Private extensions (equipment of water ressources)
V11	Optimal use of inputs (seeds, fertilizers, etc.)
V12	The climate
V13	Production quality
V14	Variables headings
V15	Funding
V16	Technical extension (trainings and seminars)
V17	The land status
V18	The farms' size
V19	The type of occupancy of the land.
V20	The workforce status
V21	The number of workers
V22	Production volume
V23	The number of plots

Figure 1: The Influence-Dependency Plan



This classification helps with the identification of the bridging variables, in other words, the variables that are highly influential and not very dependent on the other variables in the same system (V2, V3, V4, V5, V6, V12, V13, V 16 and V18).

These variables enabled us to identify all the key issues, in other words, all the issues related to the sustainable development of date palms.

5.2. Hierarchical Process Analysis

The Analytical Hierarchy Process (AHP) is a structured technique whch appeared in the 1970s. It is a tool for complex decision making and helps decision makers set priorities and make the best decisions. In fact, the AHP is used to reduce the complexity of decision making by implementing a series of comparisons. Moreover, it helps the subjective and objective aspects of a decision to be captured by combining the results. On the other hand, it is used to reduce biases in the decision-making process. In fact, the AHP is implemented through the following steps:

1. Define the problem and identify the objectives, criteria and alternatives.

2. Structure the hierarchy of decisions from the goal of the decision to the alternatives.

3. Construct a set of paired comparison matrices where each item at a higher level is used to compare items at the next lower level.

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4. Calculate the vector of the criterion weights.

5. Calculate the option score matrix. For each item in the level below, add its weighted values and get its overall priority.

6. Rank the options (alternatives).

Each step will be described in detail. We assume that the m evaluation criteria are considered to evaluate n options or alternatives (in our study, 23 variables).

(1)-Define the problem or objective to determine the strategic variables that contribute to the development of the date sector.

(2)-Structure the decision hierarchy: It is illustrated in figure 2. This hierarchical process has three levels: a) an objective (in our study, it is to determine the system variables), b) criteria (in our study, there are eight types of classifications of alternative variables, such as DI, II, DD, ID, PDI, PII, PDD and PID) and c).

(3)- Create a pairwise comparison matrix (A), which is an m × m matrix. Each entry aij, presents the importance of the ith criterion with respect to the jth one. If aij = k and k> 1, this means that the ith criterion is k times more important than the jth one, while if aij = k and k < 1, this means that the ith criterion is k times less important than the jth one. On the other hand, if k = 1, then both criteria have the same importance. Therefore, the entries aij and aji satisfy the following constraint: aij × aji = 1 (aij = 1 / aji). Moreover, the relative importance between two criteria is measured on a numerical scale from 1 to 9 (1 for an importance equal to i and j,..., 9 where i is absolutely more important than j). The coherence index (CI) is used to check the reliability of the matched comparison.

$$A = \begin{array}{c|cccc} & a_1 & a_2 & .. & a_j \\ a_1 & a_{11} & a_{12} & .. & a_{1j} \\ a_2 & a_{21} & a_{22} & .. & a_{2j} \\ a_i & a_{i1} & a_{i2} & .. & a_{ij} \end{array}$$

4) Calculate the weight vector of the criteria: Once the matrix A is constructed, it must be normalized. In the resulting matrix (Anorm), each input $\bar{a}_{ij}$ is calculated as in equation (1):

$$\bar{a}_{ij} = \frac{a_{ij}}{\sum_{j=1}^{m} a_{ij}}$$

Finally, the criteria weight vector w is constructed by averaging the inputs in each Anorm matrix row (equation (2)).

$$w_i = \frac{\sum_{i=1}^{m} \bar{a}_{ij}}{m}$$

(5) Calculate the option score matrix, which is a real m × n (S) matrix where each entry sij of S represents the score of the ith option with respect to the jth criterion. In our study, this matrix is the output of the MICMAC method, which is an 8 × 23 matrix (8 types of relationships and 23 strategic variables).

(6) Rank the options or alternatives (variables): in this phase, a vector v of the overall scores is obtained by multiplying matrix S and vector w, i.e. vj = S×wi

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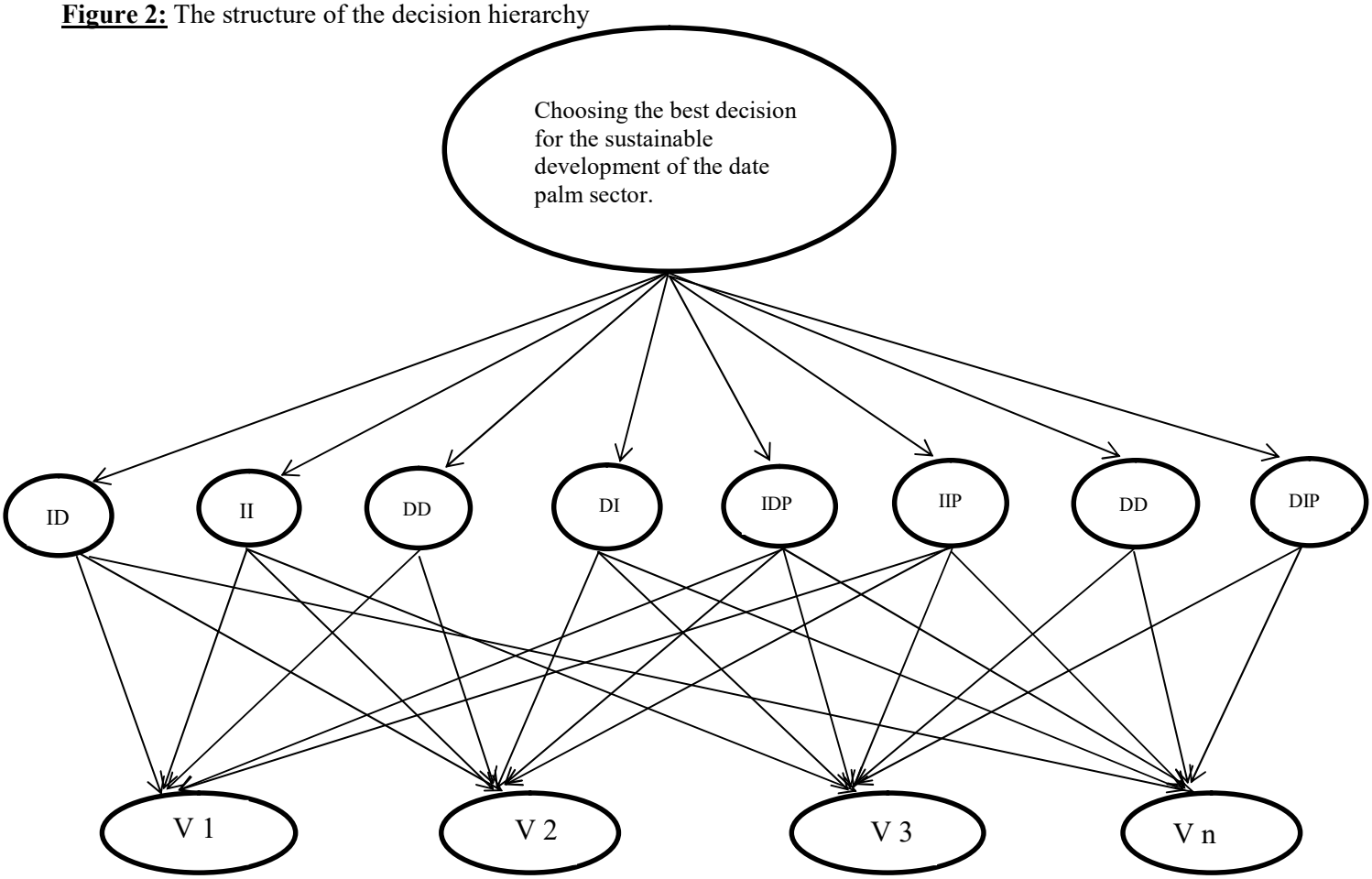
Figure 2: The structure of the decision hierarchy



ID: direct influence, **II:** indirect influence, **DD:** direct dependence, **DI:** indirect dependence, **IDP:** potential direct influence, **IIP:** potential indirect influence, **DDP:** potential direct dependence, **DIP:** potential indirect dependence, **V:** a variable

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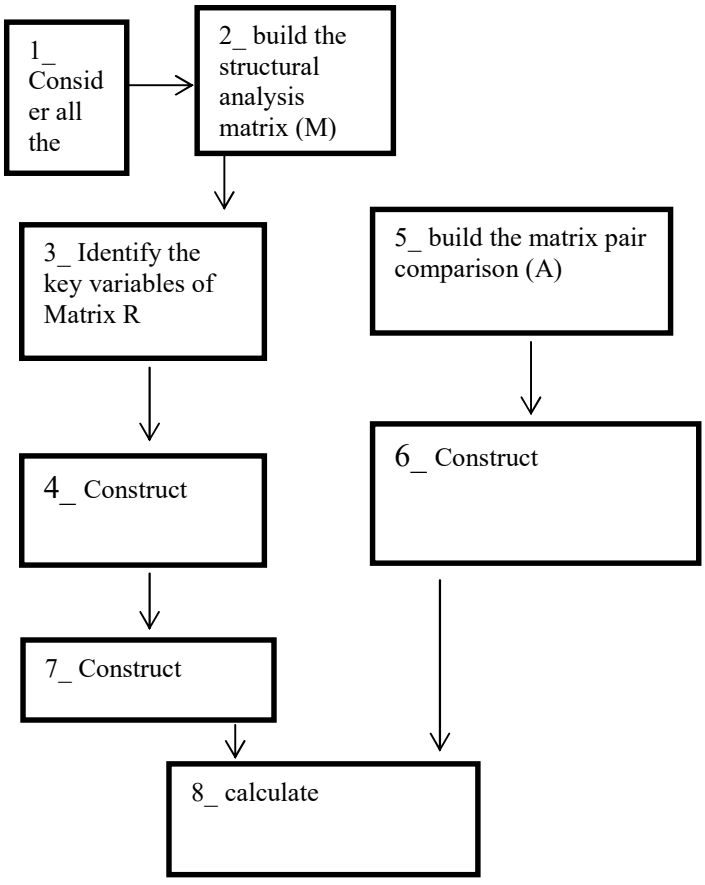
2.3. The integration of the AHP-MICMAC method:

Although the MICMAC method is useful for identifying key variables as it gives us the priority of each variable according to different types of relationships (from direct influence to potential indirect dependence), however, it could not calculate the appropriate weight for the types of relationships or for the ranking of priorities in relation to the weight of each variable. Therefore, we introduced the AHP-MICMAC method to solve this problem. As shown in the following figure, the AHP-MICMAC method can be implemented in eight simple consecutive steps:

Figure 3: The process of the AHP-MICMAC method.



(1) Let's consider all the variables: First, we prepared a list of the important variables from the literature review then, we organized a panel of 10 experts, including five professors of agricultural and development economics at the University of Sfax and five experienced experts from the Ministry of Agriculture) to prepare a final list of all the variables which are fundamental for the development of agriculture in Kebili. In fact, thanks to the Brainstorming within the group, the panel finally extracted 23 key variables for the development of the palm sector in Kebili (tables 1 and 2).

(2) Construct the structural analysis matrix (M): We constructed a 23 × 23 matrix of the key variables and asked a group of experts to rate the degree of influence between each pair of the variables on a scale from 0 to 3 (0, no influence, 1, low influence, 2, medium influence, 3, high influence and p, potential) (Table 5).

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Table 5: Structural Analysis Matrix

	vab 1	vab 2	vab3	vab 4	vab 5	vab 6	vab 7	vab 8	vab 9	vab 10	vab1 1	vab 12	vab1 3	vab 14	vab 15	vab 16	vab 17	vab 18	vab1 9	vab2 0	vab 21	vab2 2	Vab23
vab1	0	2	1	1	0	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	2	3	3
vab2	3	0	2	2	3	3	3	0	0	2	0	2	2	3	0	0	P	0	3	3	1	3	3
vab3	3	2	0	2	3	3	2	3	0	2	0	3	3	3	0	p	1	3	2	3	P	3	3
vab4	3	2	3	0	3	3	2	2	0	2	0	1	2	3	0	2	1	3	2	2	2	3	3
vab5	3	3	3	3	3	3	2	2	0	2	0	3	3	3	0	2	1	3	3	3	2	3	3
Vab6	3	3	3	3	0	0	0	2	0	2	0	3	3	3	0	2	1	3	3	3	2	3	3
vab7	3	3	0	0	2	2	0	1	0	0	0	1	2	2	0	1	0	3	0	1	0	1	3
vab8	2	3	3	2	0	2	0	0	0	0	0	2	2	1	0	1	0	3	1	2	0	3	3
vab9	0	P	1	0	0	3	0	0	0	0	0	3	3	3	0	p	P	0	3	3	0	0	0
vab10	p	0	2	1	2	0	0	0	0	0	0	0	0	p	0	3	0	2	1	0	0	0	0
vab11	0	0	0	0	0	3	0	0	0	0	0	3	2	3	0	2	P	0	3	3	0	0	0
vab12	3	0	1	3	3	3	1	0	0	P	0	0	0	3	0	3	0	3	2	3	1	2	0
vab13	3	3	2	3	3	3	2	3	0	0	0	1	3	3	0	3	0	3	0	2	1	3	0
vab14	0	3	2	P	3	0	P	3	0	P	0	2	0	0	0	2	0	2	0	3	2	p	3
vab15	3	2	3	P	2	3	0	0	0	0	0	3	1	3	0	0	0	1	0	0	0	2	3
vab16	0	3	0	2	2	p	0	3	0	2	0	2	3	0	0	0	2	3	0	0	2	0	0
vab17	2	3	0	3	3	3	0	1	0	0	0	3	3	p	0	3	0	3	0	2	0	p	0
vab18	3	3	2	3	3	3	0	2	0	0	0	3	2	2	0	0	1	0	0	2	3	3	0
vab19	2	2	3	2	3	3	1	3	0	0	0	2	2	2	0	p	0	2	2	2	1	0	0
vab20	2	2	2	2	3	3	1	3	0	0	0	P	3	2	0	p	0	1	0	0	1	0	3
vab21	2	3	2	3	3	3	0	3	0	0	0	P	P	3	0	3	3	3	2	1	0	3	2
vab22	3	0	2	1	1	0	0	3	0	2	0	2	P	0	0	0	1	2		0	1	0	0
Vab23	3	0	p	1	2	0	0	1	0	p	0	0	0	0	0	1	3	0	0	2	3	0	2

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Table 6: The normal structural analysis matrix

	Non-Normal(Matrix R)								Normal(Matrix R norm)							
Institut e	ID	II	DD	DI	IDP	IIP	DDP	DIP	ID	II	DD	DI	IDP	IIP	DDP	DIP
Vab1	24*	210	333	334	291	288	311	310	0.034	0.021	0.035	0.033	0.029	0.023	0.031	0.031
Vab2	409	396	363	343	419	41*	3*6	330	0.040	0.039	0.036	0.034	0.042	0.042	0.03*	0.033
Vab3	433	42*	423	439	440	441	434	431	0.043	0.043	0.042	0.04	0.044	0.044	0.043	0.043
Vab4	440	436	3*8	3*3	405	401	390	3*4	0.044	0.044	0.038	0.03*	0.04	0.04	0.040	0.03*
Vab5	4*9	482	433	408	440	444	419	396	0.048	0.048	0.043	0.041	0.044	0.044	0.042	0.040
vab6	41*	419	443	3*9	383	388	433	3*4	0.041	0.042	0.043	0.038	0.038	0.039	0.043	0.03*
Vab*	232	236	116	133	234	246	12*	130	0.023	0.023	0.011	0.013	0.023	0.024	0.012	0.013
Vab8	233	2*0	409	381	234	243	3*6	332	0.023	0.02*	0.041	0.036	0.023	0.023	0.03*	0.033
Vab9	193	211	0	0	241	263	0	0	0.019	0.021	0	0	0.024	0.026	0	0
Vab10	162	1*0	146	16*	213	206	220	263	0.016	0.01*	0.014	0.016	0.021	0.02	0.022	0.026
vab11	208	219	48	38	213	222	42	42	0.02	0.022	0.004	0.003	0.021	0.022	0.004	0.004
Vab12	394	382	363	313	383	362	395	348	0.040	0.038	0.036	0.031	0.038	0.036	0.039	0.034
Vab13	3*1	36*	333	300	362	354	412	380	0.03*	0.036	0.033	0.03	0.036	0.035	0.041	0.038
vab14	286	303	386	351	326	331	398	360	0.028	0.030	0.038	0.035	0.032	0.033	0.040	0.036
vab15	239	243	23	22	262	2**	21	23	0.024	0.024	0.002	0.002	0.026	0.02*	0.002	0.002
Vab16	309	318	369	299	326	333	389	330	0.03	0.031	0.03	0.03	0.032	0.033	0.03*	0.033
vab17	333	336	193	21*	348	343	241	222	0.03	0.03	0.019	0.021	0.033	0.034	0.024	0.022
Vab18	3*8	395	523	516	348	339	483	4*6	0.038	0.039	0.052	0.051	0.034	0.033	0.048	0.04*
Vab19	2*6	304	24*	202	298	323	22*	189	0.02*	0.03	0.024	0.02	0.029	0.032	0.022	0.019
Vab20	233	281	333	31*	2**	300	328	296	0.023	0.028	0.033	0.031	0.02*	0.03	0.032	0.029
Vab21	440	438	363	393	44*	44*	333	333	0.044	0.043	0.036	0.039	0.044	0.044	0.033	0.033
vab22	2*0	23*	3*1	413	2*0	242	383	423	0.02*	0.023	0.03*	0.041	0.02*	0.024	0.038	0.042
Vab23	201	189	456	344	22*	214	419	492	0.02	0.019	0.045	0.034	0.022	0.021	0.041	0.049

(1) Identification of the key variables based on different relationships (R matrix). Using the MICMAC software (Version 6.1.2 [32]), we identified the key variables from 8 different types of relationships: Direct influence (DI), Indirect influence (II), Direct dependence (DD), Indirect dependence (DI), Potential direct influence (IDP), Potential indirect influence (IIP), Potential direct dependence (DDP) and Potential indirect dependence (DIP) (table 6).

(2) Construct the normal structural analysis matrix (Rnorm): During this phase, equation (3) is applied to the matrix R to convert it into the norm matrix R (table 6).

(3)-Construct the matched comparison matrix of criteria (A). Since the MICMAC method includes eight different types of classifications (ID, II, DD, DI, IDP, IIP, DDP and DIP), there are eight criteria. Therefore, the matched comparison matrix A is an 8x8 matrix while the next matrix is the construct of matrix A in this study:

(4)-Construct the Anorm matrix to calculate the vector of criterion weights (w): The Anorm matrix and the criteria weight vector (w) were calculated, respectively, using equations (3) and (4). The matrix and vector for our study are shown below:

A=

	DI	II	DD	ID	PDI	PII	PDD	PID
DI	1.00	2.00	2.00	4.00	2.00	4.00	4.00	8.00
II	0.50	1.00	1.00	2.00	1.00	2.00	2.00	4.00
DD	0.50	1.00	1.00	2.00	1.00	2.00	2.00	4.00
ID	0.25	0.50	0.50	1.00	0.50	1.00	1.00	2.00
PDI	0.50	1.00	1.00	2.00	1.00	2.00	2.00	4.00
PII	0.25	0.50	0.50	1.00	0.50	1.00	1.00	2.00
PDD	0.25	0.50	0.50	1.00	0.50	1.00	1.00	2.00
PID	0.13	0.25	0.25	0.50	0.25	0.50	0.50	1.00

(5)-Calculate the matrix of variable scores (construct the matrix S, which is a matrix that includes the matrix Rnorm and the criteria weight vector (w). Table 7 presents part of this matrix. The first row includes the weights of the criteria while the other rows include the normalized scores of the variables. Thus, the construction of this table can help researchers calculate the overall priority of each variable.

A_{norm} =

	DI	II	DD	ID	PDI	PII	PDD	PID	w_i
DI	0.296	0.296	0.296	0.296	0.296	0.296	0.296	0.296	0.296
II	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148
DD	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148
ID	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
PDI	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148	0.148
PII	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
PDD	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074	0.074
PID	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037
	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Inconsistency Index = 0.000

(5)-Calculate the matrix of variable scores (construct the matrix S, which is a matrix that includes the matrix Rnorm and the criteria weight vector (w). Table 7 presents part of this matrix. The first row includes the weights of the criteria while the other rows include the normalized scores of the variables. Thus, the construction of this table can help researchers calculate the overall priority of each variable.

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Table 7 : The matrix S part

w_i	0.296	0.148	0.148	0.074	0.148	0.074	0.074	0.037
R_{norm}	ID	II	DD	DI	IDP	IIP	DDP	DIP
V1	0.024	0.021	0.053	0.053	0.029	0.025	0.051	0.051
V2	0.040	0.039	0.036	0.034	0.042	0.042	0.037	0.035
V3	0.043	0.043	0.042	0.04	0.044	0.044	0.045	0.045
V4	0.044	0.044	0.038	0.037	0.04	0.042	0.04	0.037
V5	0.048	0.048	0.043	0.041	0.044	0.044	0.042	0.04
:	:	:	:	:	:	:	:	:
V23	0.02	0.019	0.045	0.054	0.022	0.021	0.041	0.049

(1)-Calculation of the global priority of each variable: In order to calculate the global priority for each variable, we multiplied the matrix "*Rnorm"* by the vector wi (v = "*Rnorm"* × wi). Table 8 shows the total priority (TP = OPI + OPD), the global priority of influences (OPI = DI + II + IDP + IIP), and the global priority of dependencies (OPD = DD + DI + DDP + DIP) for all the variables. Therefore, to determine the validity of the model (the difference between the model results and the reality), we asked some experts to judge the results of the proposed integrated method (AHP-MICMAC).

Table 8: TP, All the influence (OPI) and Dependency (OPD) priorities

Var	OPI	OPD	TP
V1	0.099	0.208	0.307
V2	0.163	0.142	0.305
V3	0.174	0.172	0.346
V4	0.168	0.152	0.32
V6	0.16	0.163	0.323
V7	0.093	0.051	0.144
V8	0.1	0.151	0.251
V9	0.09	0	0.09
V10	0.074	0.078	0.152
V11	0.085	0.015	0.1
V12	0.152	0.14	0.292
V13	0.144	0.144	0.288
V14	0.114	0.149	0.293
V15	0.101	0.008	0.109
V16	0.126	0.132	0.258
V17	0.129	0.086	0.215
V18	0.146	0.198	0.344
V19	0.118	0.085	0.203
V20	0.11	0.127	0.237
V21	0.175	0.148	0.323
V22	0.101	0.158	0.259
V23	0.082	0.189	0.271
Sum	2.918	2.762	5.78

Results and discussion:

The weight of the various types of classifications:

Contrary to the MICMAC method, with the AHP-MICMAC method, we could identify different classes of variables that do not have the same weights. As shown in the "*Anorm"* matrix, direct influences (DI) and potential indirect dependence (PID), respectively, have the highest and lowest weight (0.296) (0.037), respectively among the various types of classifications. In addition, classes II, DD, and IDP (0.148) are identical to one another however, their weight is twice as high as that of classes DI, IIP, and DDP (0.074), which have the same weight. On the basis of table 8, the sum of the global priorities of influences (2.918) is higher than that of the global priorities of dependencies (2.762), which means that experts believe that the characteristics of the influences of the variables are more important than those of the

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dependencies of the variables of the development of the date sector. This is also true for the sum of the potential weight (IDP + IIP + DDP + DIP = 0.667) compared to the actual weight (ID + II + DD + DI = 0.333). As shown in the next section, the application of the weight may change the priority of the variables.

The most influential and dependent variables

Table 6 shows that for a date sector development system, the most and least influential direct and indirect variables, both actual and potential, are respectively V5. the irrigation and phytosanitary use and V10; the private extensions and water resource equipment). Moreover, the government influence and agricultural development policies and programs have been examined by other authors [33,34], but the focus of this paper is on the type, weight and rank of these types of influence. In fact, the level of influence of the other variables is shown in table 6. On the other hand, the most and least direct and indirect dependency variables are presented in the following order; V1, palm renewal, V23; the number of plots and V9; the cultivation conditions. On the other hand, the dependence of agricultural production on the other factors and variables has been studied by many researchers and organizations. In fact, table 6 shows that V18 and V23 are the most important other dependent variables that should be taken into account by planners and decision-makers. In fact, the degree of dependence of the other variables is presented in table 6.

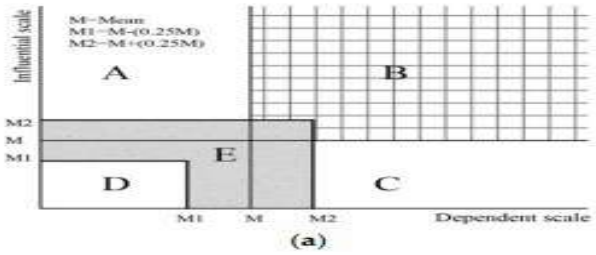
3.4. The influence/dependency graph

If we draw the same graph as the one is presented in figure 4a in which the scaled horizontal and vertical axes are respectively the OPD and the OPI, this implies that we will have a graph that contains five distinct sectors (A, B, C, D and E) where each variable is associated with its influential and dependent indicator (OPI and OPD) throughout the system. All the variables can then be positioned on a dependency influence.

Each area identified in this graph represents a type of variables:

(A)-The input variables: these variables are highly influential and less dependent. They tend to describe the dynamics of the system and the conditions of the other variables. For this reason, they are the first choice when developing different scenarios and strategies. According to figure 4b, the development of the Kebilli date sector has one input variable: V17. This means that in order to ensure a dynamic and sustainable development in Kébili, we need to organize the farmers and improve their knowledge and their awareness and skills. Moreover, many studies emphasized the importance of the human and capital resources, including training, organization and skills, for the development of the sector.

(B)-Relays or intermediate variables: these variables are highly influential and highly dependent. Therefore, any change will have a high flow into the other variables in the system. In fact, figure 4b shows 6 relay variables for the development of the kebilli date sector. Among these variables, we find V3; technical itineraries, V5; irrigation, V6; age of plantations and V18. mode of marketing, which are the most important. This implies that our results are consistent with various studies in other regions.



a) The area of the influence-dependency diagram of the variables and (b); the position of the study variables on the influence-dependency graph.

C) The resulting variables: These variables have a low degree of influence and are highly dependent. On the other hand, the result variables are affected by both the input and the determinant variables (A) and relay variables (B). Based on figure 4b, there are five outcome variables in the system, which are V1; palm renewal, V8; planting mode, V14;

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financing), V20; labor force and V22; institutionalization. In fact, some studies, such as those of John and Samuel Noi [33] and Qingshui and Xuewei, have also noted the importance of these variables for the agricultural development in other parts of the world.

D) The excluded or independent variables: this group is relatively unconnected to the system, which means that these variables lack connection to the system and therefore are not determinant of the future of the system. As a consequence, they can be excluded from the steps. E) Average variables: these variables cannot be clearly attributed to the remaining sectors because they are not sufficiently influential or dependent although they will be studied in the future in the rest of the analysis. As can be seen in figure 4b, there is one excluded variable (V9) in our study.

Conclusion

In fact, despite the significant socio-economic weight in the Saharan regions (Ministry of the Environment and Sustainable Development, 2008), palm trees and date production in Kebili is experiencing many difficulties due to the technical and social conditions of production. Therefore, the objective of this article is to identify the constraints through the survey conducted on the Kebili region in Southern Tunisia. The procedure used in this work consists of two complementary methodological approaches; a survey of the studied farmers and a series of interviews with the heads of agricultural and financing institutions in the date palm sector. As for the interviews, which were conducted face-to-face, they facilitate a precise identification of the farmers' constraints and the identification of the role of the different institutions. More specifically, our work focuses on two theme; the technical conditions of production and the socio-economic constraints of the sector. Moreover, the main constraints, which are related to the structure of the sector and the institutions, indicate a lack of technical, financial and organizational support for farmers. On the other hand, the main problem that arises, particularly in the developing countries, and which is generally complex, is the lack of water. In fact, although this problem has been solved by the installation of numerous boreholes realized and put into service in the region thanks to a World Bank loan that caused the renewal of the drainage network, there remains the problem of the refusal of collective infrastructures. Furthermore, access to credit is another major problem because the farmers do not have sources of financing that meet their needs and possibilities. Finally, the problem of extension remains, especially if one accepts that the extension worker who enables the mastery of farming techniques is the development facilitator (Bédrani, 1994). For this purpose, special efforts must be made in the transfer of technical skills and the renewal of palm groves. In spite of the limits linked in particular to the regional specificities of the production of dates in kébili, our work, in our opinion, opens two promising research perspectives, the first one is linked to the analysis of the articulations between the different actors (in a perspective of "industrial" analysis of the sector) and the second one relates more to the effects of the niche markets; organic, export, etc. (Bédrani, 1994).

The agricultural systems in the developing countries are generally complex which caused the failure of the available methods to capture the essence of these complex systems. Therefore, the main objective of this study is to solve this problem through the integration of two methods, such as MICMAC and AHP. The former consists in determining the different classifications of the variables while the latter is intended to apply weights to these different variables.

Moreover, according to several experts, the use of the AHP-MICMAC method has led to a classification of the variables the combination which has improved the obtained results because it facilitates the classification of the variables according to their different types of influences and the weight of their dependence.

Undoubtedly, any improvement of our understanding of the key variables of a system will lead to the formation of better scenarios and strategies for the development of this system. Although the AHP-MICMAC method can illustrate the

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complexities between the variables as many other methods did, it still needs to be developed to better reflect the interdependence of the variables, including the economic, social, and environmental, etc. variables. In this respect, we are conducting a study to compare the efficiency of the various methods, such as the dynamic system modeling, the AHP-MICMAC, or the cross-impact analysis, the complexity of which is very crucial.

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