

**DETERMINANTS OF BANKS PERFORMANCE: VIEWING TEST BY  
COGNITIVE MAPPING TECHNIQUE (CASE OF BIAT)***Nassreddine GAROUI<sup>1</sup>, Fatma SESSI<sup>2</sup> and Anis JARBOU<sup>3</sup>***Abstract**

*Determinants of bank performance can be split between those that are internal and those that are external. Internal determinants are also sometimes called microeconomic determinants or inherent performance, while external determinants are variables that reflect economic and legal environment in which the bank operates. This paper investigates the determinants of banks performance in the Tunisian banking .In attempts to identify the determinants in order to provide practical guides for improved profitability performance. In view of our results, size, control and credit quality are the important variables can determine the performance of bank.*

**Key words:** *bank performance, internal determinants, external determinants, cognitive mapping.*

**1. Introduction**

The structure of the banking system has undergone many changes since the eighties. These changes are the result of adaptation to the new order of the bank's financial markets marked by an opening of markets has resulted in increased competition. As part of such restructuring banking systems, understand "the banking performance" and "its determinants" issues becomes important. The literature review showed that "the banking performance" is represented mainly by quantitative or quantifiable such as financial indicators (ROA, ROE, etc.). The same situation is to be found when studying "The determinants of bank performance." Indeed, the literature holds primarily internal or external variables quantitative or quantifiable to explain bank performance. Although these account for bank performance, we believe they are incomplete and therefore insufficient. For our part, we assume that the performance of a bank, as a multi-product company (or multi), which operates in an uncertain and volatile (Naylor, 1995: 58), is probably affected not only by internal variables of a quantitative nature (eg financial ratios) but also by the internal variables of a qualitative nature (eg: variables related activities, managerial preferences etc.). This position has two consequences. Firstly, to address the issue of the performance of a bank, it is necessary to refer to a global model that integrates financial, organizational and environmental. In addition, it is necessary that this model takes into account the interactions between each of these aspects since bank must be designed as a system with

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functions or multiple determinants that interact among themselves and with the environment (Schein 1971, p: 94). In this context, the objective of this study is to propose a system model that is able to integrate all of the interrelationships or links which connect the banking performance and its determinants. To achieve our goal, we built the model "OPERA-BANK". This model is a transposition of "OPERA" is a generic model intended for the diagnosis of a non-financial company by Capet et. al. (1983). Within the OPERA model, the model-BANK OPERA creates and uses its own dimensions and variables taking into account the special nature of banks. First we will discuss the characteristics of model dimensions BANK-OPERA before exploring the links between these dimensions.

## **2. Literature review**

Bank performance is usually measured by return on assets (ROA), return on equity (ROE) or the net interest margin (NIM) and is a function of internal and external determinants. Internal determinants are also sometimes called microeconomic determinants or inherent performance, while external determinants are variables that reflect economic and legal environment in which the bank operates. Many studies have attempted to explain the contribution of a particular variable on the performance of banks. It should be noted that very often, the authors found different results even contradictory. This is mainly due to the different data they use, which covers different areas and periods. Thus, some authors have studied the performance data from several countries, such Molyneux et al. (1992), Demirgüç-Kunt et al. (1999), Abreu et al. (2002), Goddard et al. (2004) and Athanasoglou et al. (2006). Others, such as Berger et al. (1987) (banking system in the United States), Barajas (1999) (Colombia), Mamatzakis Remoundos (2003) (Greece) and García-Herrero et al. (2009) (China) are interested in specific countries.

### **2.1 Determinants of performance**

#### **2.1.1 The internal determinants**

##### ***2.1.1.1 Size***

As with many variables, the impact of size on bank performance is hotly debated among researchers. It is possible to divide them into three groups: those who believe that size has a positive impact on performance, those who find a negative impact, and those for whom the impact is not significant. Start with the studies in the first group, who find a positive impact on performance. It includes Short (1979), Smirlock (1985), Bikker et al. (2002) and Pasiouras et al. (2007). They advance several arguments to justify their results: A large reduces costs due to economies of scale that this entails, large banks can also raise capital at a lower cost.

In the second group, Stiroh et al. (2006) show the negative effects of the size and emphasize that the more a bank is, the more difficult it is to manage. In addition, the authors point out that the size may result from aggressive growth strategy, obtained at the expense of margins and performance. In the same vein, Kasman (2010) finds a statistically significant and negative impact on the size of the net interest margin (net interest margin) watching a panel of 431 banks in 39 countries. De Jonghe (2010) concludes that small banks are better able to withstand difficult economic conditions, while Barros et al. (2007) argue that small banks are more likely to get good performance and less chances of getting bad performance. Conversely, large banks are less likely to obtain good performance and a greater chance of getting bad results. Many other authors, such as Berger et al. (1987) respond to the argument of economies of scale and argue that some costs can be reduced simply by increasing the size.

Finally, the third groups are not statistically significant impact of size on the performance of banks. This is Goddard et al. (2004), Micco et al. (2007) and Athanasoglou et al. (2008).

#### **2.1.1.2 Capitalization**

Capitalization is usually measured by the ratio of equity to assets ratio (CAR capital to asset ratio). Rapid approach to the question might suggest a higher CAR ratio reduces the ROE due to two mechanisms: A high ratio indicates a lower risk, and the theory of markets to balance advocating a strong relationship at risk and profitability would lead us to infer a lower profitability, An increase in this ratio may indicate that the share of the debt decreases and thus implies a lower earnings from the tax exemption of the debt burden.

However, all the authors who have studied the issue (Bourke (1989), Berger (1995), try to summarize here the main explanations given by the authors to justify their results:

- A high level of capital reduces the risk (bankruptcy) incurred by banks. They can therefore afford to maintain the same level of risk of investing in riskier assets whose expected return is of course higher. This results in better performance.
- Have a high level of equity is a very positive signal sent to the market on the solvency of the bank and its very low credit risk. Accordingly, such banks are able to reduce their financing costs, for example by paying low interest rates on their debt.
- In addition to the cost of debt is lower, a strongly capitalized bank, compared to a weakly capitalized bank, does not need to borrow as much to finance a given level of assets.

- Finally, taking the signal theory, the use of equity (more expensive than debt) to finance a project tells the market that the bank is very confident in its projects and their profitability will be up to the expectations.

### **2.1.1.3 Liquidity**

Very often, liquidity is measured by the ratio of loans to assets. The higher the ratio, the lower the bank has liquidity. In fact, the loan agreements have various maturities, and thus, in case of urgent need of capital, the bank can not rely on these loans, since they will only be reimbursed later.

The vast majority of authors found a positive relationship between this ratio and performance, and therefore a negative relationship between liquidity and performance. This result is surprising, especially in these times of crisis, where we could see how the banks were seeking liquidity. Authors obtain results more consistent with what one might think, as Berger and Bouwman (2009), which explains in detail the positive impact of liquidity on the value of banks.

Certainly, they have not studied the impact on performance, which may explain these results as opposed to the existing literature, but their reasoning should be clarified here. These authors argue that a bank with a high ratio of loans to assets may be less well equipped in case of occurrence of unanticipated crisis events. In addition, the bank is more likely to experience significant losses if a sale urgent (and therefore sold off) of assets necessary to meet liquidity needs. The current financial crisis, which is particularly a liquidity crisis, is an example oh speaking that goes in the direction of the two authors.

As mentioned, other authors who have studied the impact on the performance of banks (not value) of assets ratio loans discover a positive relationship.

Authors such Miller (1997), Abreu and Mendes (2002), or Naceur et al (2010), in fact interpret the ratio of loans to assets as a measure of credit risk: the higher the ratio, the higher the number of loans granted by the bank is high, and therefore the risk of default (ie credit risk) increases. To pay the higher credit risk, banks will increase their margins on interest on loans, which increases the NIM and performance.

Conclude this section on liquidity with a remark on the choice of the ratio, as a proxy for liquidity. We discussed this ratio can equally well be interpreted as a measure of liquidity risk than credit risk. In this, it is perhaps not the best to characterize liquidity. Authors have used a different ratio than the cash plus bank deposits, investments in more liquid assets to total assets. Bourke (1989) discovers a positive relationship between the liquidity ratio and ROE, which contradicts both the arguments and findings described above, the following argument: the liquidity reserves, especially if they are imposed by law, are a

burden for banks. Molyneux and Thornton (1992), seeking work Bourke verify, analyze data and find other a negative impact, but statistically insignificant.

#### **2.1.1.4 Credit quality**

Credit quality, fairly close to the concept of credit risk, is usually measured by two ratios: the ratio of provisions for credit losses to total loans and the ratio of provisions for doubtful debts on total loans. (To be completely accurate, note that these ratios actually measure the quality of non-credit).

As can be expected, Miller (1997), Athanasoglou et al. (2008) and Liu H. et al. (2010) find that a deterioration of the credit quality reduces the ROA and ROE. The impact on the NIM seems positive as banks seek to increase their margins to compensate the one hand the risk of default, and other additional costs necessary to monitor these credits. The study of Dietrich et al. (2011) on the performance of banks in Switzerland is particularly interesting because the authors study the impact of many variables on the performance of both pre-crisis and during the crisis. Sometimes they notice changes in these impacts with the arrival of the crisis, and this is especially the case for credit quality. Thus, pre-crisis credit quality had no statistically significant impact on the performance of banks, perhaps authors suggest, because Swiss banks at that time had very few provisions for losses or bad debts. The arrival of the crisis changed the situation and significantly increased the number of such provisions recorded by Swiss banks. The authors note now a strong positive impact on the credit quality of their performance.

#### **2.1.1.5 Efficiency**

The efficiency is usually measured by the ratio of costs or result by the ratio of overheads to total assets. First, we note with Altunbas et al. (2001) and Maudos et al. (2002) that the level of effectiveness varies considerably in Europe, between different banks and also between different banking sectors. The authors have studied the impact of effectiveness generally agree to say that it improves the performance of banks. Thus, Athanasoglou et al. (2008) found a positive relationship by studying Greek banks from 1985 to 2001 and explained that a bank is better able to more effectively use its resources better and reduce costs, which results in a better performance. This reasoning is echoed by Liu et al. (2010), in their analysis of Japanese banks from 2000 to 2007 regardless of the variable used to measure performance (ROA, ROE and NIM), and regardless of the type of control that is exerted on the bank (state or private ), the ratio of costs to income has a negative impact on performance.

Kunt and Huizinga Demirgüç (1999) have also sought to quantify the effectiveness and found that on average only 17% of overhead costs were incurred by investors who deposited money in the bank and other lenders of the

bank, and the remainder reduced performance. The study by Berger and Humphrey (1997) allows us to refine our understanding of the impact and effectiveness. Performing a regression between efficiency and size, the authors find that large banks are more efficient than smaller ones.

#### **2.1.1.6 Control**

Most authors show that public banks / nationalized are less efficient than private banks. In is true for Iannota et al. (2007), Barth et al. (2004) and Million Cornett (2010). These authors show that the nationalized banks:

- Grant riskier loans, which means a higher credit risk and poor asset quality,
- Know solvency ratios worse than private banks,
- Have a ratio of "core capital" pus low.

Million Cornet et al. (2010) point out that the difference in performance between private and public banks is even more pronounced in countries where power is heavily involved in the banking system and where political corruption exists. The authors explain these results by the generally high inefficiency and nationalized banks, which may seem surprising, little attention to their social objectives. They also highlight the potential conflicts of interest which may lead politicians to prioritize their political interests before the public interest.

Some authors however nuanced the relationship between control and performance. Thus, Micco et al. (2007) do find that the type of control over the bank has an impact on performance. But for them, this relationship is verified especially in developing countries where nationalized banks have low performance, low margins and high overhead. In developed countries, this relationship is much less marked. Wanzenried and Dietrich (2011) have studied the case of Switzerland and confirm that the nationalized banks are less efficient than private banks ... but not in a crisis! The current financial crisis has reversed this trend, nationalized banks are then considered safer and better managed than private institutions.

Note, finally, that the two studies are not statistically significant impact on the type of control over the performance. Those of Athanasoglou et al. (2008) and Goddard et al. (2004). Molyneux et al. (1992), studying the banks of eighteen European countries from 1986 to 1989 are the only authors find that the nationalized banks are more efficient than private banks. This may be explained by the period, the 1980s.

#### **2.1.1.7 Degree of diversification**

The degree of diversification is usually measured by the ratio of non-interest income related to loans on operating income. Only the study by Dietrich and Wanzenried (2011) finds a positive effect of diversification on performance.

All other studies on the subject lead to the opposite result and suggest that this movement towards non-interest results did not improve the risk-return torque. Thus, DemirgüçKunt and Huizinga (1999) show that banks with a large share of their assets do not earn interest are less profitable than others. They link this to the positive impact already commented, the ratio between loans and asset performance. Barros et al. (2007) also find that more diversified banks are less likely to be successful and more likely to provide a poor performance. De Jonghe (2010) finds that the diversification within an institution does not improve the stability of the banking system, which may explain why financial conglomerates content with a discount.

#### **2.1.1.8 Amount of bank deposits**

It is not easy to estimate a priori the impact of the level of bank deposits on bank performance. Indeed, two arguments can be opposed on the one hand, a high level of deposits can increase performance, because they are more stable funding and less expensive than borrowed funds, but on the other hand, such deposits require large teams and specialist departments to manage, causing many expenses. It seems that only-Kunt and Huizinga Demirgüç (1999) were interested in this issue. Their results support the second argument that the high costs generated by these deposits lead to weigh negatively on the performance of banks.

#### **2.1.1.9 Governance**

These are again Beltratti and Stulz (2009) that included governance in their lists of independent variables. They used to do model CGQ (Corporate Governance Quotient), which, on the basis of many criteria such as the powers and composition of the board of directors, remuneration of directors, or the presence of an audit committee independent, emits a note. The media and commentators have talked a lot about compensation, modes of governance, and how deficiencies in these areas have contributed to the severity of the crisis we are experiencing.

The authors, however, based on global data banks whose assets exceed 10 billion euros in 2006, found no evidence confirming the widespread belief: their results do not indicate that banks with higher CGQ rating performed better during the crisis. In addition, we regularly hear the argument that executive compensation and traders should be aligned with the results of the company and its stock price, including the introduction in the remuneration package of stock options provided a period long enough intangible (vesting period). This argument rests on the idea that if bankers actually acted in the interest of shareholders, they would not take steps to improve the share price in the short term, to worry about long-term performance. This argument holds and seems

quite defensible. However, past through the prism of a quantitative analysis of the current crisis, it becomes much less relevant: Beltratti and Stulz (2009) show that it is the banks that the board was the closest shareholders (many CA shareholders, bank policy with the wishes of shareholders ...) who have experienced the worst performance during the crisis! This raises many questions about how to avoid a future crisis. If the remuneration policy and compliance with the wishes of shareholders can not, on the contrary, the occurrence of crises, what other levers available to banks? This brief will highlight some specific variables that may explain the differences in performance of retail banks in France during the crisis. Causing the same problems the same remedies, we expect that these variables will also be identified relevant to better cope with future crises.

#### ***2.1.1.10 The market share***

The impact of market share has mainly been studied by H. Liu et al. (2010). These authors show that, at least in Japan, a negative relationship between market share and performance (measured by NIM), and regardless of the type of bank. Only the performance of banks and type City Trust are indifferent to this variable. How to explain this relationship?

On the one hand, by analyzing the behavior of banks with low market share. Banks seek to grow and gain market share. To do this, one of the few resources at their disposal is the granting of loans to risky people. These risky loans that refuse to grant the big banks, allowing banks to smaller market share to grow. These loans are riskier, they will match the higher interest rates, which will increase their performance and their NIM. On the other hand, we can with Martinez Peria and Mody, (2004) we adopt the point of view of banks with a significant market share. They can use their market share and size to eliminate existing or potential competitors by reducing their margins on interest rates. This result in the short term, reduce the NIM and the performance of these banks.

#### **2.1.2 The external determinants**

External determinants of banks, such as the economic environment, inflation, or interest rates also affect performance. This dissertation focuses on internal determinants of French banks, which may explain the differences in performance during the crisis. It remains worth stopping for a moment on these external determinants to draw a picture as complete as possible of the literature on the determinants of bank performance.

##### ***2.1.2.1 The inflation***

The first author to address the issue of inflation was Revel (1979). He showed that the impact on performance is dependent on the rate of growth in operating



expenses: if these expenses are rising faster than inflation, there is a negative impact on performance. If, however, the growth rate is lower, there is a positive impact. Elaborating the model developed by Revel (1979), Perry (1992) refines the analysis by introducing the notion of anticipation: if inflation is fully anticipated, then it can be passed on to prices *ex-ante*, and this improves the Performance. If, however, it is not anticipated, the costs will rise faster than prices and the impact on performance is negative.

Many other authors have focused on inflation, and found a positive and statistically significant. This is Bourke (1989), Molyneux and Thornton (1992), Demirgüç-Kunt and Huizinga (1999), Athanasoglou et al. (2006, 2008), and Pasiouras Kosmidou (2007).

Both studies, however, lead to the opposite result: those Afanasieff et al. (2002) and Ben Naceur and Kandil (2009). They conclude that inflation has a negative impact on interest margins. Ben Naceur Kandil and offer the following explanation: the main activity of banks (mostly commercial) is lending. The market is therefore based on an offer of credit (provided by banks) and demand (the individuals and companies). Inflation reduces the demand for credit because it increases uncertainty about the future. However, it has been proven that individuals and businesses if their level of risk aversion varies widely showers are uncertainty (ambiguity-aversion). This drop in demand would lead to a decline in lending and therefore a decrease in performance.

#### **2.1.2.2 GDP growth**

It is easy to assume that the growth in economic activity, measured by GDP, has a positive impact on the performance of banks: a period of high growth leads to higher investment and consumption, which increased the credit, and hence increase the performance of banks.

This is actually the result reached by the majority of authors who have studied this relationship, namely Goddard et al. (2004), Demirgüç-Kunt and Huizinga (1998), Arpa et al. (2001), Bikker and Hu (2002) and Schwaiger and Liebig (2008). Yet all authors fail to this conclusion. Thus, Claeys and Vennet (2008) who study the situation in Europe, find that it is true that in Western Europe, but the impact is zero on the banks of Eastern Europe.

In addition, Bernake and Gertler (1989) and Demirgüç-Kunt et al. (2004) even find an inverse relationship between GDP growth and performance of banks. One explanation they advance is as follows: in periods of recession, the risk of borrower default increases. To compensate for this increased risk, banks increase interest rates on loans, which improve their performance.

### **2.1.2.3 The tax**

Few authors have attempted to measure the impact of taxation on the performance of banks, and it is certainly something that could be the subject of further research. The result which is expected, namely a negative impact, is what are Demirgüç-Kunt and Huizinga (1999). We can easily understand why: the tax is deducted from the result; it automatically assigns the ROA and ROE. However, a study by Albertazzi and Gambacorta (2009) finds a very low impact of taxation on performance. Indeed, the authors consider that it is very easy for banks to pass their taxes on other actors (depositors, borrowers, customers paying commissions ...).

### **2.1.2.4 Market concentration**

Without going into details, note that both theories face in terms of impact of the concentration on the performance of banks. The first, called "Structure conduite performance" (SCP) states that an increase in market share and market concentration leads to monopoly powers. The second, "Efficient-structure" (ES) refutes this idea. The results of Bourke (1989) and Molyneux and Thornton (1992) show that bank concentration ratio has a positive and statistically significant impact on the performance of banks. This bears out the theory SCP.

But other studies, such as those of Berger (1995), Demirgüç-Kunt and Huizinga (1999), and Mamatzakis Remoundos (2003) and Staikouras and Wood (2004) lead to precisely the opposite result, which would tend to support the theory ES.

### **2.1.2.5 The maturity of the banking sector**

-Kunt and Huizinga Demirgüç are few authors have analyzed the relationship between bank performance and maturity of the banking system as a whole, as measured by its size or level of development. In their 1999 study, the authors conclude that there is a negative relationship between the size of the banking sector and the banks' performance. They explain that most banking market, the greater the number of players is important and the competition is fierce. This gradually reduces the maximum performance of each player.

They confirm this result in a second study published in 2001. The authors analyze, on the basis of data covering a large number of countries over the period 1990-1997, the relationship between bank performance and financial market development, the level of complexity of its structure. They show that there are statistically significant: a developed banking system reduced performance due to greater competition.

### **2.1.2.6 The stock market**

That Naceur et al. (2010) analyzed is not so much the relation "immediate" between the market price of the banks and their performance measured by ROE, ROA and NIM. They further considered the level of stock market development. They find that banks that operate in areas where the stock market is well developed experiencing higher profits than banks operating in areas where the market is undeveloped.

### **2.1.2.7 The choice of a country**

Numerous studies have confirmed the existence of highly heterogeneous performance between banks in different countries. Studies by La Porta (1997), Stulz and Williamson (2003) and Beck et al. (2003) and provide evidence suggesting that legal systems, accounting rules, cultures and religions explain differences in cross-border economic growth and business development. In their analysis of European banks over the period 1993-2001, Barros et al. (2007) lead to the same conclusions. They also bring a new element if performance differences between such and such a country such period, do not necessarily mean that the choice of a country brings in itself an advantage in terms of performance over its competitors.

## **3. Research Methodology**

### **3.1 Methodological tools**

We chose to approach the bank performance by using a common technique in cognitive approaches, that of cognitive mapping. This is a graphical modeling technique of cognition used in numerous studies in management sciences. The cognitive map is not the only tool for analyzing the managerial cognition, but it is the most popular for the presentation of cognitive structures.

Cognitive mapping is a technique now well established captures the minds of the actors about a problem or situation. A cognitive map allows you to view certain ideas and beliefs of an individual on a complex area such as corporate governance (Garoui et.al., 2012). A cognitive map is usually defined as the graphical representation of a person's beliefs about a particular field. A map is not a scientific model based on an objective reality, but a representation of a part of the world as seen by an individual.

### **3.2. Description of the empirical investigation**

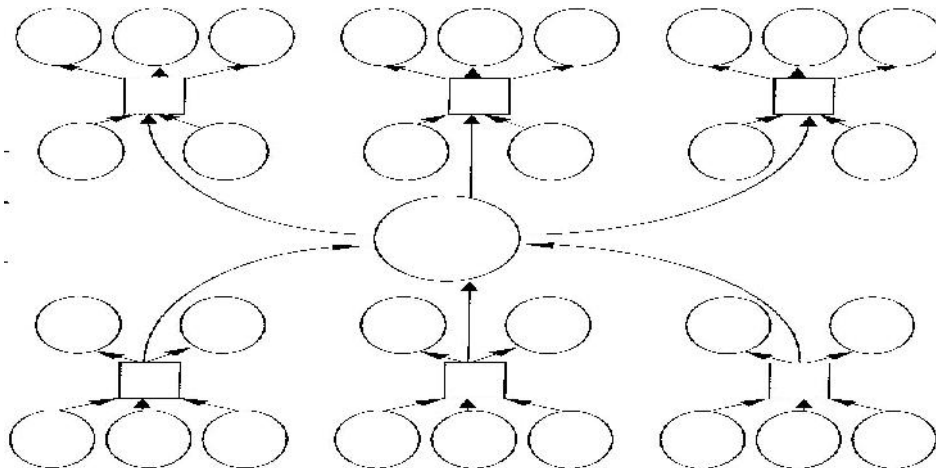
To meet the research objectives mentioned above, a survey was conducted among players in the bank (BIAT) in Tunisia. We have chosen as exploratory approach using a case study. The data is the BIAT bank. The decision to

base our study on a case of bank is based on the assumption that a variety of issues will be addressed as well. The output is a cognitive map for actors reflecting their perceptions of the determinants of bank performance. The method used to create cognitive maps is the questionnaire.

### 3.3. Presentation of the questionnaire

The questionnaire is divided into two parts: the first identifies the company and the second deals with bank performance. For the second part, relating to determinants of bank performance, we interview actors from the bank on determinants of performance by providing a list of concepts (determinants of bank performance) with systematic exploration grids and matrices cross. Systematic exploration of the grid is a technique for collecting materials.

Each actor is encouraged to explore their own ideas or cognitive representations in relation to its strategic vision. The subject is asked to identify important factors that he said will have an impact on the key concept related to bank performance..



**Figure1: Grid systematic exploration**

Regarding the cross-matrix, it is also a technique of data collection and the basis for the construction of the cognitive map. The matrix is presented in the form of a table with n rows and n columns. Box of index (i, j) indicates the relationship between concept i and concept j.

The actors manipulate the key concepts and assign pairs of concepts depending on the nature and degree of proximity sensed between these concepts.

**Table1: Adjacency matrix**

	Concept1	Concep2	.....	Concept n
Concept1	1			
Concept2	L21	1		L2n
.....			1	
Concept n	Ln1	Ln2		1

### 3.4. Proposal for modeling cognitive maps

When it is difficult to identify the goals, an integrated approach of performance provides a holistic view in which the performance is analyzed by the processes that lead, through the performances of the actors. These representation processes are two problems of implementation: the sharing of representations of actors and the identification of dominant representations in the organization in order to act upon them. The construction of this representation necessarily requires a model that allows understanding to act is "an action of intentional design and construction, for composition of symbols, patterns that would make a complex phenomenon intelligible perceived.

In this context, the use of cognitive maps seems relevant, because they can take into account the complexity and comprehensiveness of the system in which [the behavior] is embedded, while maintaining access to the analysis" (Komocar, 1994). The value of the tool is instrumental (Audet, 1994), it allows both improving their actions and making sense.

Cognitive mapping is used as a tool for representation of an idiosyncratic schema (Cossette, 1994), a pattern is "a cognitive structure that guides the cutting of reality, the interpretation of events, and action individuals", pattern unique to each individual, causing it to have its own behavior.

### 3.5. The construction of cognitive maps

We will see at first step that allowed the construction of concepts, methodological approach that we discuss. Then we will examine how the cards were dealt.

#### 3.5.1. Concepts

We addressed this issue by the representations constructed by players using the method of cognitive maps, a method that can be applied to poorly structured situations. An analysis based on cognitive maps can understand this process of structuring, as this model is to build or rebuild the mental simultaneously modeling. This construction takes the form of a structure, carrier for clarification (Garoui et.al. (2012)). It helps to identify ways to implement to achieve a given goal, the same way it helps to identify the goals justifying the use of such means. Finally, it facilitates communication and negotiation.

There are two major trends in the construction method of the cards: the determination of the concepts can be ex ante, or subsequent interviews with respondents for whom the cards are built. Komocar (1994) links the question of determining nodes - or concepts - and links to two paradigms. In the phenomenological paradigm, the universe is largely unknown. The emphasis is on describing the world from the experiences of people who experience it.

Nodes and links are determined directly by the participants that advocate Cossette and Audet (1994), not to deprive the subject of representations: the questions should be invitations for the respondent verbalizes his thoughts on what he considers important subject of research (Cossette, 1994). In addition, the researcher cannot force the subject to consider every possible link because the links must be made spontaneously or in response to open questions, so that the subject constructs its reality (Cossette and Audet, 1994). In the normative paradigm, the universe is more or less determined. The focus is on operational definitions and research plans reproducible. Observers, different participants, may determine the relationship between variables and nodes that can be.

We selected 17 concepts for the determinants of bank performance to their ability to describe the field of performance. We were guided in this by a literature review and an exploratory study based on a questionnaire made up of grids of systematic exploration and cross-matrices. The concepts presented in the table below.

**Table2: Key concepts for behavioral approach**

<b>Size</b>	<b>Market share</b>
<b>Capitalization</b>	<b>Inflation</b>
<b>Liquidity</b>	<b>GDP growth</b>
<b>Credit quality</b>	<b>The tax</b>
<b>Efficiency</b>	<b>Market concentration</b>
<b>Control</b>	<b>The maturity of the banking sector</b>
<b>Diversification</b>	<b>The stock market</b>
<b>Bank deposits amount</b>	<b>The Choice of a country</b>
<b>Governance</b>	

#### **4. Materials and methods of structural analysis**

Analysis of the results led initially by a preliminary investigation of perceptions that are players in the Tunisian bank (BIAT).

From cognitive maps, we could identify and qualify the designs are the actors of the field of bank performance. The development and analysis of cognitive maps were made using the Mic-Mac software. Our initial investigation focused on two elements: the relative importance of concepts and analysis of the

dynamics of influence / dependence concepts (or variables) in the cognitive universe of actors in the bank. The relative importance of concepts was evaluated from the MIC. Mic-Mac program allowed us to rank the concepts in order to "balance" and "dependency." Thus arise the ideas that dominate in the cognitive universe of actors.

#### **4.1. Overview of structural analysis method**

The main objective of structural analysis is to identify the most important variables in determining the evolution of the system. Inspired by graph theory, structural analysis is based on the description of a system using a matrix linking all its components. By weighting these relationships, the method highlights the key variables to changes in the system. As a tool, we opted for the software "Micmac" (cross-impact matrices, Multiplication Applied to Classification).

The first step of the method MICMAC is to identify all the variables characterizing the system under study (both external and internal variables). The second step involves the linking of variables in the construction of the matrix of direct influence and potential. Indeed, this approach is supported by the fact that in a systemic approach, a variable exists only through its network of relationships with other variables.

It is from this matrix what has identified the key variables. Indeed, we obtain the classification by the direct sum row and column. If the total connections line indicates the importance of the influence of a variable on the overall system (direct motor level), the total column shows the degree of dependence of one variable (level of direct dependence). The ranking against indirect detects hidden variables through a matrix multiplication program applied to indirect classification. "This program allows us to study the distribution of impacts by the paths and feedback loops, and therefore to prioritize the variables in order of influence."

#### **4.2. Matrix and processing MIC-MAC method**

All structural analysis matrices above have been established only from direct relationships between variables. However, it is clear that a variable can also exert influence on other variables indirectly, or through another variable ("path" of order 2), or through several others exercising their influence cascaded through "paths" for longer and longer, and can also loop over themselves. The classification of motor skills may be significantly altered, and understanding the mechanisms of the system similarly.

Establish direct relations matrices indirect paths of length two, then three ... then N would quickly become intractable.

A relatively simple mathematical processing (multiplication of a matrix by itself and elevation of the power matrices  $N$ ) solves this problem. Benefiting from the spread of computers and personal computer, the method MICMAC (cross-impact matrix-multiplication applied to classification) is a commercial version. As expected, the rankings of variables by motor / decreasing influence (or dependence) generally find it changed. But experience has shown that these rankings become almost stable after three or four students to the power, and they are clearly the importance of some new variables in terms of their indirect influences.

Map and analyzed at the collective level, the map is the collective model of mental representations of several people on a research topic identified. In some cases, the cards are developed by collective aggregation of individual cards and in other cases they are developed directly by building a group card. In the first case, the card is called collective and composite map is constructed by superimposing individual maps (M.G. Bougon & J.M. Komocar, 1994; J.Ford & H. Hegarty, 1984). While in the second case, the cards are called strategic and more individuals come to gather to create a community card. It then seeks to map the shared perceptions of a group of individuals on a particular area.

### **4.3. Presentation Of Variables**

#### **4.3.1. List Of Variables**

##### ***4.3.1.1. The Input***

This step was to compile a matrix of direct influence between these variables in a scoring session. Matrix of direct influence (MID) which describes the relationship of direct influence between the variables defining the system and the Matrix Influences MIDP represents the potential direct influences and dependencies between existing and potential variables. The scoring has developed the input matrix "matrix of direct influences (MID). The influences are rated from 0 to 3, with the ability to report potential influences.

##### ***4.3.1.2. Matrix of direct influences (MID)***

Matrix of direct influence (MID) describes the relationship of direct influences between the variables defining the system.



**Table 3 : Matrix of direct influences**

	Choice of a country	Stock market	Maturity	Market	The tax	Gdp growth	Inflation	Market share	Governance	Bank deposits	Diversification	Control	Efficiency	Credit quality	Liquidity	Capitalization	Size
Size	0	1	0	2	0	3	0	1	0	P	0	2	0	0	2	0	1
Capitalization	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liquidity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Credit quality	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Efficiency	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Control	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Diversification	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	P
Bank deposits amount	1	0	3	0	0	0	0	0	P	0	0	0	0	0	0	0	0
Governance	0	0	0	0	P	0	0	0	0	0	0	0	0	0	0	0	0
Market share	P	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	P
Inflation	0	0	0	0	2	0	0	0	P	0	0	0	0	0	0	0	0
Gdp growth	2	0	0	1	0	0	0	0	0	0	0	0	0	0	3	1	0
The tax	0	0	P	0	0	3	0	0	0	2	0	0	0	0	0	0	1
Market concentration	0	0	0	1	0	0	0	P	0	0	0	0	0	0	0	1	0
Maturity	0	0	3	0	0	0	0	0	0	0	0	0	3	0	1	0	0
Stock market	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0
The choice of a country	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0

The influences are rated from 0 to 3, with the ability to report potential influences:

0: No influence    1: Low    2: Average    3: Strong    P: Potential

#### **4.3.1.3. Matrix Of Direct Potential Influences (MIDP)**

The Matrix Influences MIDP represents the potential direct influences and dependencies between existing and potential variables.

It complements the matrix MID also taking into account possible relationships in the future.

**Table 4: Matrix of potential direct influences**

	Size	Capitalization	Liquidity	Credit quality	Efficiency	Control	Diversification	Bank deposits	Governance	Market share	Inflation	GDP growth	The tax	Market concentration	Maturity	Stock market	Choice of a country
Size	0	1	0	2	0	3	0	1	0	3	0	2	0	0	2	0	1
Capitalization	1	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0
Liquidity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Credit quality	2	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0
Efficiency	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Control	3	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	3
diversification	0	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	3
bank deposits amount	1	0	3	0	0	0	0	0	3	0	0	0	0	0	0	1	0
Governance	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0
Market share	3	0	0	0	1	0	0	3	0	0	0	0	0	2	0	0	3
Inflation	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	1	0
GDP growth	2	0	0	1	0	0	0	0	0	0	0	0	3	1	0	0	0
The tax	0	0	3	0	0	3	0	0	0	2	0	0	0	0	0	0	1
Market concentration	0	0	0	1	0	0	0	3	0	0	0	0	0	0	1	0	0
Maturity	0	0	3	0	0	0	0	0	0	0	0	3	0	1	0	0	0
stock market	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0
The Choice of a country	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0

The influences are scored from 0 to 3:

0: No influence

1: Low

2: Average

3: Strong

**Table 5: Sum of rows and columns**

N°	Variable	Total of rows	Total of columns
1	<b>Size</b>	12	10
2	<b>Capitalization</b>	3	1
3	<b>Liquidity</b>	2	10
4	<b>Credit quality</b>	9	7
5	<b>Efficiency</b>	3	4
6	<b>Control</b>	10	9
7	<b>diversification</b>	5	2
8	<b>bank deposits amount</b>	5	6
9	<b>Governance</b>	1	1
10	<b>Market share</b>	6	3
11	<b>Inflation</b>	5	1
12	<b>GDP growth</b>	7	6
13	<b>The tax</b>	7	5
14	<b>Market concentration</b>	2	7
15	<b>Maturity</b>	7	7
16	<b>stock market</b>	3	4
17	<b>The Choice of a country</b>	6	8
	Totals	93	93

Weight of each concept  $W = W' + W''$  with  $W'$ : sum of lines and  $W''$ : Column totals

$w_1 = 22, w_2 = 4, w_3 = 12, w_4 = 16, w_5 = 7, w_6 = 19, w_7 = 7, w_8 = 11,$   
 $w_9 = 2, w_{10} = 9,$

$w_{11} = 6, w_{12} = 13, w_{13} = 12, w_{14} = 9, w_{15} = 14, w_{16} = 7, w_{17} = 14$

Concepts 1, 6 and 4 are the most central. The calculation of the weight of each concept from the direct influence matrix shows that concepts: size, control and credit quality are the most central.

#### 4.4. Conclusion and implications of the research

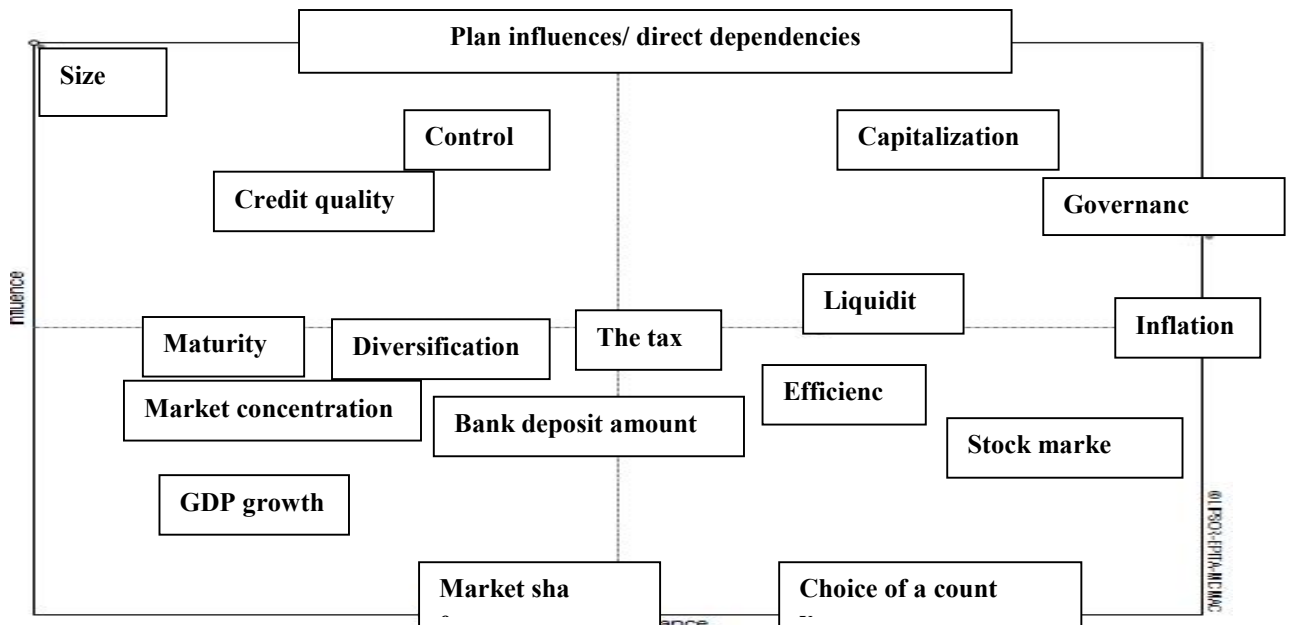
Empirical evidence finds that size, control and credit quality are a significant determinant of banks' performance.

We found that a significant relationship between bank performance and size of the banking. The size of the banking is an important variable because large size is expected to promote economies of scale and reduce the cost of gathering and processing information.

In general, large-sized banks have the advantage of providing a larger menu of financial services to their customers, and hence mobilize more funds (Bashir,

1999). SIZE is used to capture the fact that larger banks are better placed than smaller banks in harnessing economies of scale in transactions to the plain effect that they will tend to enjoy a higher level of profits. Consequently, existence of an important relationship between size and performance. Molyneux and Thornton (1992), Bikker and Hu (2002) and Goddard et al. (2004) find size has a positively related to profitability.

Our results show also that the control and credit quality are two important variables that contribute to bank performance. Million Cornet et al. (2010) point out that the difference in performance between private and public banks is even more pronounced in countries where power is heavily involved in the banking system and where political corruption exists.



**Figure2: Cognitive mapping through the plan influences dependencies**

This plan visualizes the concepts (variables) structuring the cognitive universe of actors can be projected in terms of influences / dependencies. By the distribution of the scatter plot variables in this plan, particularly in relation to different quadrants, we can distinguish four major categories of variables.

The first quadrant includes the most prominent concepts in the dynamics of thought of the actors. For the actors of BIAT, the notions of "SIZE", "CONTROL", and "CREDIT QUALITY" are the most dominant in their cognitions reflecting an intention that internal variables are the determinants of bank performance.

The second quadrant contains the relay variables that are by definition both very influential and very dependent. In analyzing the plan influences / dependencies, there are players for the concepts or ideas illustrating the concepts of "GOVERNANCE", "CAPITALIZATION" and "LIQUIDITY".

The third quadrant contains the dependent variables or resulting. They are both influential and very little dependent, therefore particularly sensitive. They are the results of which is explained by the variables and motor relay. Thus there are only one variable namely on trust. The fourth quadrant contains the variables that are simultaneously autonomous and influential little bit dependent. They are relatively excluded from the dynamics of thinking by the Tunisian bank.

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