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Management Control in Medium Tunisian Enterprises: A Study through Cognitive Mapping of Management Controllers

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Abstract *In this article we will try, on the one hand, to make a literature review of studies on the determinants of the design of the control system management in medium enterprises. On the other hand, we will try to propose and analyze the contingency factors will have an impact on the development of the function of management control as perceived by Tunisian management controllers. The study will be conducted through the method of cognitive mapping among four management controllers from Tunisian industrial midsize enterprises.*

Key words Management control, contingency factors, perception of management controllers, cognitive mapping

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1. Introduction

The study of the management control system design determinants is currently one of the favourite themes within research in management control (Merchant, Vander Stede, 2007). However, the development of the function of management control has been studied mainly in large enterprises and in the specific context of some medium enterprises. It is always weakly considered (Nobre (2001 ab), Moores and Yen (2001), Meyssonnier and Zawadzki (2007).Nevertheless it seems interesting to look at these companies where a genuine control of management can be developed.

Moreover, the contingency approach states that the system of management control of a small and medium enterprises (SME) must fit the set of different contingent variables (Bajan-Banaszak, 93; Chapellier, 97; Davila, 2005; Meyssonnier and Zawadzki, 2007; Nobre, 2001; Van Caillie, 2002).

These studies showed the predominance of two contingencies variables. On the one hand we can stress the role played by the contractor that influences the management control system configuration. On the other hand we mention the role played by the environmental context.

However, some factors that influence the management control system does not, or just been explored in context of SMEs and especially in medium enterprises.

Hence our research question is the following: What is driving the design of management control system in medium enterprises as perceived by Tunisian management controllers?

The aim of our study is to identify and analyze the determinants of the design of control management system in the medium companies according to the perception of management controllers by using a methodology rarely used in research about this topic: the method of cognitive mapping.

2. Literature review about researches in control of management of SMEs

2.1 Topics covered in previous research

The results generated by the study F. Villésque-Dubus and Courrent JM (2008) show from the point of view of the main research themes tackled; some themes are often mobilized than others. In particular, issues

relating to financial instruments accounting and control or contingency theory appear to be most frequent in the studied reviews.

Most searches also highlight the wide variety of practices. While it is recognized that small and medium enterprises do not control management as larger enterprises: information systems are sometimes obsolete, the regularity of inspections is less important and management control is performed partially or is outsourced etc. (Nobre, 2001a, 2001b). But the typical heterogeneity of SMEs also applies to modes of management control: the more the business grows, the closer it is to be large and its management control to be developed (Lavigne, 2002; Meyssonnier and Zawadzki, 2007; Nobre, 2001a, 2001b; Caillie Van, 2003).

An earlier study, but an important sample, conducted in France by Bajan-Banaszak (1993) (by questionnaires from 893 enterprises and 95% smaller than 50 employees) shows that only about a quarter of them have management tools other than financial accounting. A study by questionnaires conducted in Quebec by Lavigne (2002) with 282 manufacturing SMEs (with between 10 and 250 employees and an average of 60 people) indicates that the size is the key factor in the use of structural contingency tools for management control.

A study by questionnaires conducted in Belgium Van Caillie (2002) survey of 100 manufacturing SMEs with 20 to 100 employees seek to measure the importance of different tools of management control in the perceptions of leadership and organization functions. Some studies focus on other contingency factors.

Moreover, the Chapelier study (1997) with SMEs from 10 to 100 employees shows the relationship between the profile of leaders and types of practices in management accounting and management control: management instrumentation seems to be strongly correlated with the profile of the leader of the SMEs.

A study by Fernandez et al. (1996) with a hundred SMEs, who for two thirds of them less than 50 employees effective, focuses on the impact of the contingency factor "competitive space" on methods and the tools of management control. This allows authors to propose two models of management control each linked to a type of competitive space.

Profile leaders are also a significant contingency factor. Age, education, experience, and especially his purposes will impact the operating modes of management control (Chapellier, 1997).Thus, the reasons why a contractor makes management control are variable and depend equally the ownership structure of the firm, the size of the profile manager as factors relating to the environment.

We believe that all contingency factors have not been studied in the research so far and that much remains to be done in understanding the “why” and “how” of management control in small and medium enterprises. Among the research, mainly quantitative, some highlight many contingency factors without really dig each of them. For example, the Chapelier study (1997) focuses mainly on analyzing the profile of the leader and its impact on the practice of management accounting. Nobre (2001a) further develops the size factor. As for Van Caillie (2003), he took the previous two variables and adds sophisticated couples product/market. However, as the Meyssonnierand Zawadzki (2007) study shows, the understanding of these factors also requires qualitative research. Thus, in their research on a company in the textile industry, they are able to show how the weight of family and inheritance of ancestral management block implementation of management control.

In the light of this case study, we can consider that how management control is implemented in the medium business growth depends on the willingness of actors (subjective factor), the technical quality tools (objective factor) and management situations (contextual factor)[1]. In another study, C, Zawadzki (2011) showed that the development of the function of management control in a medium company growth is faced by the conventions and routines.

2.2 Methodologies used in previous research

Research methods used to identify practices of management control of SMEs were quantitative in nature, most often based on questionnaires administered directly with the business manager or any other management control actor.

[1]Meyssonnier F. et C. Zawadzki (2007) «L’introduction du contrôle de gestion en PME: étude d’un cas de structuration tardive de la gestion d’une entreprise familiale en forte croissance», *Congrès de l’Association Francophone de Comptabilité*, Poitiers, p. 16.

The choice is mainly oriented closed questions with the aim to establish typology practices and cross these with profiles of enterprises or executives.

However, in recent years some field research have appeared (Lavigne, 2002; Van Caillie, 2002, 2003, Nobre, 2001 ab; F.VillesqueDubus, 2008, Davila and Foster, 2005; Moores and Yen, 2001 Meyssonnier and Zawadzki, 2007; Sandino, 2007 Cindy Zawadzki, 2011).

Many of these researchers have shown that the heterogeneity of SMEs applies to modes of management control. The more the business grows, the closer it is of large companies and its management control system develops (Lavigne, 2002; Van Caillie 2003 Nobre, 2001 ab; Meyssonnier and Zawadzki, 2007).

Nobre (2001 ab) conducted a survey on the methods and tools of management control interviews lasting an hour on average with 86 industrial enterprises with 50 to 500 employees. This work therefore focuses on medium-sized enterprises where effective control of management can develop. The methodology used is qualitative in nature; it is not of collected information from databases or through questionnaire but from face to face exchanges.

Nobre (2001, b) finishes its work by returning to the limits of his methodology and advocating the use of complementary approaches "it is an exploratory approach ... The declaratory nature of the data, even if they were collected orally, should lead the researcher to be very careful. There may be a significant gap between the rhetoric and practices performed. Other modes of apprehending reality are needed to confirm the results."[2] Is that some researchers have tried to make this a new methodology that allows to better analyze the real.

At this stage, qualitative research was conducted by AbiAzar (2006) in an exploratory and abductive approach. We can also mention the work of Meyssonnier and Zawadzki (2007) and that of Cindy Sawadzki (2011), these authors follow a monographic approach initially on action research and in a second time (in the same company) on participant observation.

The reason lies in the intention of the authors to better understand the process of rejection of management control by average growing enterprises. Research aimed to the understanding of a process, it is clear that the qualitative method is justified in this case. Another explanation lies in the opportunity as one of the authors has a function of a management controller in the enterprise in question.

Regarding the Anglo-Saxon research, they are characterized by a dual approach: quantitative and qualitative (Davila and Foster, 2005; Moores and Yen, 2001; Sandino, 2007). They have also the peculiarity of focusing on one area of activity and focus in the choice of business, age, size (issue of management control in business start-ups or growth).

The methodologies used and the profiles of the companies surveyed, researches on the function of the management control of SMEs can be summarized in the following table:

Table 1. Studies about the functioning of management control of SMEs

Authors	Enterprise size	Number of surveyed enterprises	Empirical method
Nobre (2001)	from 50 to 500 employee	86 industrial companies	Interviewing for an average of 1-hour duration
Moores and Yen (2001)	from 0 to 600 employee	49 companies	Inquiry by email from 600 institutions, 49 returns, 10 companies selected for semi-structured interviews
Davila and Foster (2005)	from 50 to 150 employee	78 startups (less than 10 years old)	Qualitative study (50% face to face and 50% by phone)
Sandino (2007)	Evaluated by the number of distribution points for each brand	97 companies	Exploratory talks as a first step then study on 9 enterprises (questionnaire)
Meyssonier et Zawadzki (2007)	500 persons in 2005 and 1000 in 2006	High-growing familial enterprise	Monography Research-action Then a participating observation

[2] Nobre T. (2001b), «Méthodes et outils du contrôle de gestion dans les PME», *Finance-Contrôle-Stratégie,* p. 145

Authors	Enterprise size	Number of surveyed enterprises	Empirical method
ByAbi-Azar (2006)	between 30 and 100 employee	Six industrial agrifood enterprises	exploratory and abductive approach

3. The followed research methodology: cognitive mapping

As mentioned above, most of the research methods used to identify management control practices of SMEs and the factors that influence its development, which were quantitative. However, in recent years, some field research has emerged. For us, we will try to follow a new methodology that allows bettering analyzing the real through the representation of the perceptions of controllers of four Tunisian midsize companies. This is the method of cognitive mapping which will be followed.

In terms of methodology of analysis of representations and discourses, both are used frequently (Poesi-Allard *et al*., 2007): content analysis and cognitive mapping.

"Content analysis is based on the assumption that the repetition of discourse analysis (words, phrases or similar meanings, sentences, paragraphs) units reveals the interests, the concerns of the authors of the text.

The text is cut and ordered according to the units of analysis that the researcher has chosen to study, in a very precise coding methodology. These analyzes usually go through counting, statistical analysis ...»[3]

Another method of analysis of performances and speeches, "cognitive mapping is used mainly for management:

- Compare the performances of different people or the same person over time and help managers to formulate and solve strategic problems;

- Understand the interactions within a group or between different groups of manager or the development of a business strategy over time»[4]

Between these two methods, in relation to our research question, cognitive mapping seemed more appropriate to analyze interviews in that this method allows us to better understand the relationships between different concepts and to account for the complexity of the thought.

Studies using the method of cognitive mapping were numerous since twenty years. Research initiated by Tolman (1948) in psychology is mainly driven by the sociologist Axelord (1976) that social scientists have begun to use this method of analysis. Huff (1990), Cossette (1994), Gervais and Cossette (2008), like many others, have recently encouraged the use of cognitive maps to improve the understanding of the functioning of the organization.

The use of cognitive mapping to explore the cognitive structures and representations of individuals in an organization is now widely used in management research (Huff 90; Laukkanen 98). Cognitive mapping is a representation of a scheme, it is a technique used to capture the thoughts of an individual on a particular subject or problem in a schematic format types. It focuses on the values, beliefs and assumptions of an individual on a particular topic (Eden and Ackermann, 98).

In practical terms, it is a graphical representation articulating entities defined (bults, ideas or concepts) based on causal links between them, can be labelled in the speech. It is composed of nodes and links.

A causal map is therefore to raise awareness and give meaning to verbal or written data more relevant than would have done other techniques at their disposal (content analysis, for example).

It is a "graphical representation of a general model taking knowledge from which, the said individual is organizing experience".[5]

It is also "a graphical representation of the mental representation that the researcher [or consultant] is a set of discursive representations contained by a subject [or a group of subjects] from his own cognitive representations about a particular object"[6]

The use of such a tool requires, in most cases, the adoption of an interpretative or subjectivist perspective (Cossette, 1994). This perspective focuses on the representations that individuals give their reality

[3]Allard-Poesi F. et al. 2007, «Analyses de représentations et de discours», *Méthodes de recherche en management*, p 493.
[4]Ibidem, p. 494.
[5]Cossette, 1994, « L'organisation: une perspective cognitiviste » Presses de l'Université Laval.
[6]Cossette P ; Audet M (1994), « Qu'est-ce qu'une carte cognitive ? Cartes cognitives et organisation, Editions ESKA, p 15.

rather than the "objective" reality, i.e.: the reality as it really is. This is the reference system of the individual who becomes the center of interest. In this regard, the researcher will avoid imposing a framework beforehand, i.e.: to submit topics for tests or quizzes or tests in which the responses are classified into predetermined categories. Instead, it will seek to make the subjective construction explicit, that the individual realizes of its own reality, assuming that it is based on it and that he interprets the events, makes decisions and acts.

Beyond the primary interest of cognitive mapping (representing the thought of a subject), some researchers interested in the problems of cognition in organizations are employed to update the common structures between individuals by providing methods aggregation and comparison of cognitive maps (Grump & al, 1977 Eden & al, 1981 Ford & Hegarty, 1984 Stubbart&Ramaprasad, 1988, Fiol and Huff, 1992, Langfield-Smith, 1992). The construction of inter-causal maps is a delicate step because, on the one hand, it is based on the theoretical foundations all around the formalization of individual mental representations and, on the other hand, it requires additional assumptions conceptualizing forms of sharing these representations within a collective.

From a general point of view, the representations would be shared if it was possible to compare the individual maps and if, from this comparison, the researchers came to observe the similarities between the maps (their content as their structure). Otherwise, the researcher may decide on the existence of areas of "differences" and finding a weak identity between the individual beliefs of the group.

3.1 The phases of the method followed

The method of collecting and analyzing data is based on the method proposed by Cossette (2001, 2008) divided into four sequential phases: an exploration phase, a validation phase, an analysis phase and finalization phase.

3.1.1 Exploration Phase

The main objective of the exploration phase is to drive the Controller to use his own ideas or graphic representations to aid the systematic exploration grid. It is positioned as a tool for data collection in a face to face interview (Cossette, 2003).

The subject is requested to identify important factors that, according to him, will have an impact on the management control of the company. Each of these factors is written by the researcher the centre of a sheet prepared for this purpose (one factor per sheet). This work was completed, the researcher asks the subject to focus on the first strategic factor identified and to determine the factors that will influence him in this strategic factor and the factors that will be influenced by him. All of these "explanations" and "consequences" are recorded in the appropriate places. In a second step, the researcher asks the subject to determine the factors influencing these newly identified factors and factors influenced by them.

The course of this procedure is not unlike that of an expert system. This systematic exploration work is repeated for each of the strategic factors initially identified by the controller. It is important to note that the latter is informed that he can appeal as often as desired to the same factor to weave a network of explanations and consequences, it is not required to fill all the spaces provided for this purpose on systematic exploration of the grid and can add as needed.

3.1.2 Validation Phase

In this phase, the researcher seeks to ensure the credibility of the cognitive map i.e.: whether it is drawn using systematic exploration grids corresponds actually to the ideas expressed by the subject (Cossette, 2003).

3.1.3 Analysis Phase

Proposed by Cossette (2003), analysis phase rests on a model based on four aspects: the relative importance of each of the concepts, the grouping of concepts, explanations and preferred consequences in the system shown and loops. The analysis is done through the Decision Explorer software developed by Eden *et al.* (1983) used for the analysis of qualitative data.

- ***The relative importance of concepts***

The relative importance of concepts is evaluated from a number of factors to which a concept is connected directly or indirectly (Cossette, 2004). This analysis is based on the measure developed by Eden *et al.* (1983) which takes into account, in addition to the total number of all the factors influencing or influenced directly or indirectly, the length of all paths connecting a concept to another regardless of the direction of influence (Cossette, 2004). It is a method to isolate the core constructs (Eden and Ackermann, 1992), which shows the depth of the context of each variable in the map (Eden and Ackermann, 1998).The proposed measure would lead to "a centrality score" for each concept, which is calculated in a specific way. First level concepts connected directly to the concept in question get a value of 1. Those of the second level have a value of 0.5 (connected to the concepts of the first level). The concepts of third level have a value of 0.33, with the fourth level a value of 0.25 and the calculation continues until the seventh level (Cossette, 2003, Eden and Ackermann, 1998).

- ***The clustering analysis***

This analysis is intended to illustrate how a subject structures his own thoughts, without necessarily being aware (Cossette, 2004). It determines the extent to which individual simplifies its reality by creating groups and categorizations (Eden and Ackermann, 1992). The advantage of using the Decision Explorer software is that it allows a clustering analysis determinant of relatively isolated groups of concepts that is, groups in which the number of links between each of the groups is minimal (Cossette, 2003).

Indeed, each group consists of highly related concepts together but weakly connected to other sets of concepts. Therefore, the software takes into account only the direct relationships between variables regardless of their direction. Ultimately a group contains between 8 and 45 concepts.

- ***Explanatory Factors and Consequence***

This analysis seeks to identify the factors considered as inputs, that is to say they have a direct influence on many other factors known and outputs upon which several other factors exert a direct influence (Cossette, 2003).

- ***Loops***

The last analysis interests loops of the cognitive map. In fact, the concepts and relationships can form in some cases "trails" that correspond to paths connecting a concept to another by passing through one or more other concepts and create a loop when the final design is connected to the initial concept (Cossette, 2003) i.e. when a factor has an indirect influence on itself. A loop is called positive if it contains no negative relationship and is called negative if it contains. Thus, in a positive feedback loop, there is a destabilizing effect on the system i.e. that the value taken by each concept is always changing in the same direction when the starting motion triggered. Following the same logic, a negative loop has a stabilizing effect on the system (Maruyama, 63) because the dynamics of the system increase or decrease the value of each alternate concept.

3.1.4 Finalization phase

The last phase of the analysis process developed by Cossette (2001) is that the finalization. It consists to make on the results of the analysis and interpretations in order to consider the advisability of making certain changes in the cognitive map.

4. Research results

4.1 Cognitive map analysis of management controller « A »

"A" is the management controller of a manufacturing enterprises specializing in the manufacture of agricultural equipment, food and industrial who is employing 323 employees.

"A" has a master's degree in accounting, has held this position for two years. His experience as management controller is five years. The first phase of exploration was conducted with "A" within two meetings of one hour each.

Three important factors that have an impact on the management control of the company have been identified by the management controller and served as starting points for the development of three grids systematic exploration. These factors in order are: "the internal organization of the company," "the strategy of the company" and "the behaviour and attitudes of the actors."

From these materials as well as other concepts and links collected using grids during the exploration phase, I drew a complete cognitive map with the "decision explore software). (See Figure 1)

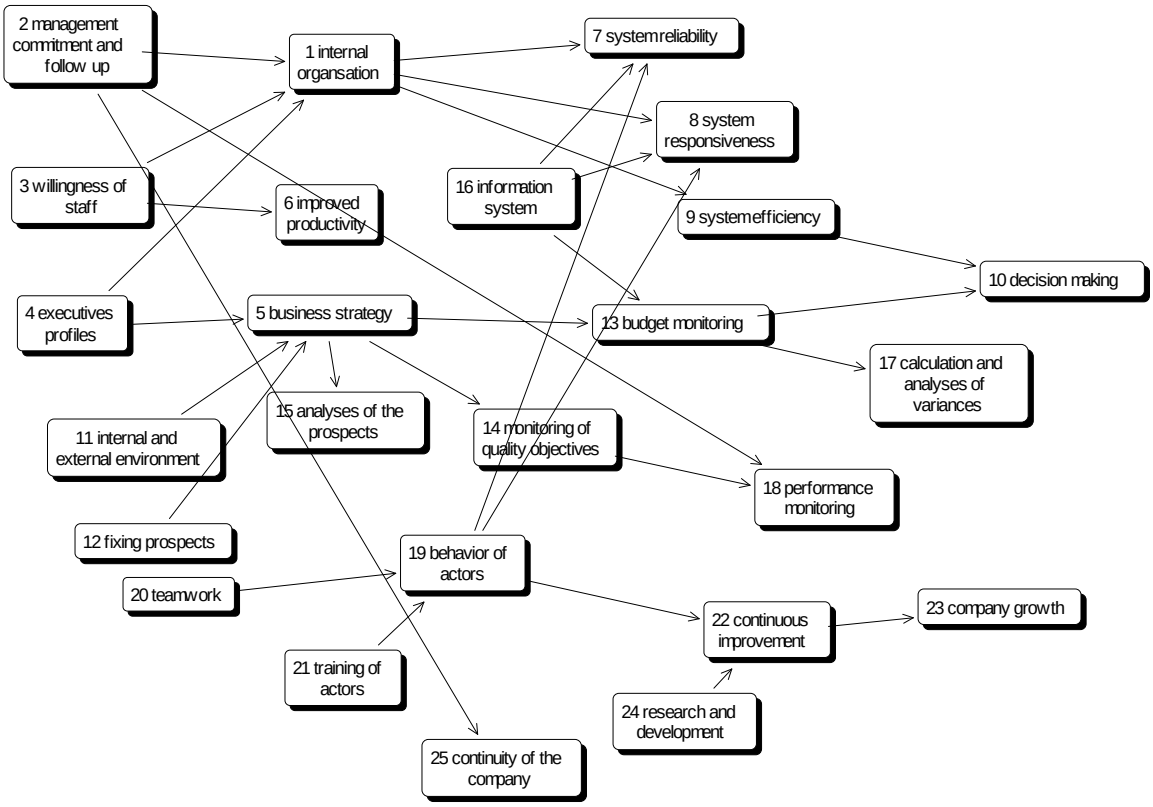

Figure 1. Cognitive map of « A »

Cognitive map of the controller was validated by email. Technically, I send him his map and I asked him if he wants to add other factors or modify links between the factors already mentioned. "A" has validated the map indicating that the map accurately reflects the ideas expressed by him.

The analysis phase is focused on the following four aspects:

- ***Relative importance of concepts***

Table 2 shows the relative importance of each of the concepts derived from scores of centralities for each variable. Looking at the variables considered most important, it seems that the strategic vision of the management controller is heavily focused on the quality of the information submitted to it (see in particular the variables 7, 8, 9).Indeed, reliability, relevance and effectiveness of the management control system determines the success of the management control function. It also seems that improving the quality of information is paramount for effective internal organization (variable 1) and behaviour of actors oriented towards the teamwork and the sharing of information (variable 19).

As you can see, two important concepts (variable 4 and 2) have a direct impact on the strategy and the internal organization of the company showing interest in the general direction in improving the management control function. Moreover, the profile of leadership and his commitment and monitoring have an impact on the development of management control function.

- ***Clustering analysis***

The clustering analysis has given rise to a single set of concepts (cluster 1). This means that the representation of the factors that influence the management control is simplified by predefined categories and the management controller will be influenced by several factors. These factors cannot be combined into groups.

- ***Explanatory factors and consequences***

Tables 3 and 4 respectively show factors influenced directly or indirectly by at least three other factors (consequences analysis) and the factors that influence directly or indirectly the other three factors (analysis of explanations)

Table 2. Centrality scores of concepts

5	Business strategy	12
1	Internal organization	12
4	Executives' Profile	11
2	Management commitment and follow-up	11
13	Budget monitoring	10
8	System responsiveness	10
7	System Reliability	10
16	Information system	9
19	Behavior of actors	8
9	System Efficiency	8
14	Monitoring of quality objectives	7
10	Decision making	7
3	Willingness of staff	7
18	Performance monitoring	6
17	Calculation and analysis of variances	6
15	Analysis of the prospects	6
12	Fixing prospects	6
11	Internal and external environment	6
25	Continuity of the company	5
22	continuous improvement	5
21	Training of actors	4
20	Teamwork	4
24	Research and development	3
23	CompanyGrowth	3
6	Improvedproductivity	3

Table 3. Influenced factors

• Business strategy	4
• Internal organization	3
• System Reliability	3
• Reactivity System	3
• Decision-making	3
• Performance Monitoring	3

Table 4. Influencing Factors

• Internal organization	4
• Management commitment and follow-up	4
• Company strategy	4
• Behavior of actors	3
• information system	4

It is worth mentioning that two factors are found in the two tables namely "business strategy" and "internal organization". These two factors must be considered as key factors in the strategic vision of the management controller "A". They are treated by him as both explanations and fundamental implications for the future management control of the company. To this end, the General Manager should address these

factors for the success of the management control function within the company. In addition we note that, in addition to the factors initially identified by the management controller (the internal organization of the company, the business strategy and the behavior and attitudes of the actors), the information system and management commitment and follow-up have an effect on the quality of information that is presented and the quality of information, in turn, will have an effect on decision-making and performance monitoring.

- ***Loops***

The cognitive map "A" has no loop. Moreover, according to Axelrod (76), the fact that cognitive map does not contain loops reveal a tendency for the subject to simplify its universe.

4.2 Analysis of cognitive map of management controller« B »

"B" is the management controller of a manufacturing company, located in the region of Sfax, whose main purpose the production of articles made of brass and who employs 500 employees. Mr. "B" has an MA in accounting studies, has held this position for twelve years. His experience as management controller is fifteen years.

The first phase of exploration was conducted with "B" within a single 45 minutes lasting meeting. Two important factors that have an impact on the management control of the company have been identified by him spontaneously and served as starting points for the development of two systematic exploration grids. These factors in order are: «business strategy" and "culture of the General Management."

From these materials as well as other concepts and links collected using grids during the exploration phase, I drew a cognitive map in hand and I am seized with the software "decision explorer" (See figure2)

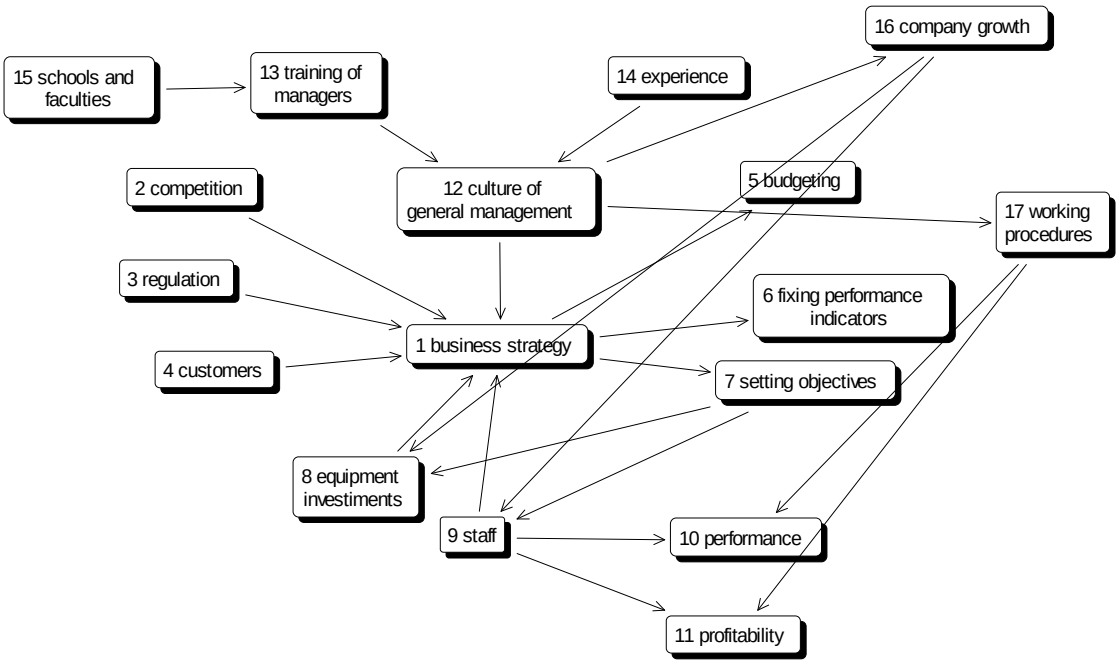

Figure 2. Cognitive map of « B »

The second phase of validation was made during a second meeting with the management controller "B" to ensure the validity of the card already drawn from grids systematic explorations. Technically, I have demonstrated for him his cognitive map on paper and I asked him if he wants to add other factors or modify links between the factors already mentioned. "B" has validated the map indicating that the map accurately reflects the ideas expressed by him.

After validation of the cognitive map, I realized analysis phase using the Decision Explorer software. The results of this analysis and the interpretation that I made were charged to the concerned management controller. Our analysis is focused on the following four aspects:

- ***Relative importance of concepts***

The software calculates the centrality score indicating the total number of concepts related to each concept. The score of a concept x is of the following form "P from q concepts"

Giving that p is the centrality score and q the total number of x-related concepts (directly or indirectly) concepts. Table 1 shows the relative importance of each of the concepts derived from scores of centralities for each variable.

Looking at the variables regarded as the most important, it seems that "business strategy" is the factor that has the greatest impact on the development of the management control function as perceived by the management controller "B". (See in particular the variables 1, 7 and 17). Indeed, a clear and well-defined strategy, which has among its objectives the improvement of the management control function, will have an impact on the practices of management control such as monitoring and achieving the objectives set by the General management and setting indicators to measure performance and budgeting. Based on this analysis, it seems also that the strategic vision of this controller is highly focused on personal variable (high centrality score). Indeed, a strategy can only be successful if the staffs of the company accept the notion control and working with the controller. We notice then that for the personal factor, even though it has not been identified by the management controller as an important factor, it seems to have an influence on the management control given its important centrality score.

Moreover, according to the perception of "B" executives' culture will influence the success of the implementation of a good strategy and this strategy will have a direct impact on the development of management control.

Table 5. Scores of concepts centrality

1	Business strategy	12
12	Culture of the General Management	10
9	staff	9
16	Company Growth	8
7	Setting objectives	8
17	Working Procedures	7
13	Training for executives	7
8	Equipment investments	7
6	Fixing performance indicators	7
5	budgeting	7
4	customers	7
3	regulation	7
2	competition	7
14	experience	6
11	profitability	6
10	performance	6
15	Schools and faculties	2

- ***Clustering analysis***

The clustering analysis has given rise to a single set of concepts (cluster 1). This means that the representation of the factors that influence the management control is not simplified by predefined categories and the management controller will be influenced by several factors.

These factors cannot be combined into groups.

- ***Explanatory Factors and Consequences***

Tables 6 and 7 respectively show factors influenced directly or indirectly by at least three other factors (consequences analysis) and the factors that influence directly or indirectly the other three factors (analysis of explanations)

Table 6. Influenced Factors

• Business Strategy	6
• Staff	4

• Equipment Investments	4
• performance	4

Table 7. Influencing Factors

• Business Strategy	3
• Staff	3
• culture	3

It is worth mentioning that two factors are found in the two tables namely "business strategy" and "Staff". These two factors must be considered as key factors in the strategic vision of the management controller "B". They are treated by him as both explanations and fundamental implications for the future management control of the company. To this end, the General Manager should address these two factors for the success of the management control function within the company. We also note that the control system of management influences the performance of the company. Therefore, the success of the management control system will have an impact on performance. We must therefore attach great importance to the system of management control.

- ***Loops***

The cognitive map "B" has three loops. Theoretically, the absence of negative relationships between concepts means that these three loops are positive and therefore the vision of the management controller is characterized more by the change in stability.

The company strategy is particularly important because it is one of the three loops node. Based on this observation, we must look to the business strategy in order to improve the system of management control of the company.

4.3 Analysis of the Cognitive map of the Management Controller « C »

"C" is the management controller of an industrial company in the mechanical and metallurgical sector employing 500 employees. "C" has a master's degree in finance, a master's degree in entrepreneurship and a master's degree in management of emergency situations and has held this position for four years.

The first phase of exploration was conducted with "C" within three meetings of one hour each. Three important factors that have an impact on the management control of the company have been identified by the management controller and served as starting points for the development of three systematic exploration grids. These factors in order are: "the information system", "the business strategy" and "Business Culture."

From these materials as well as other concepts and links collected using grids during the exploration phase, I drew a complete cognitive map with the "decision explorer software). (Seefigure3)

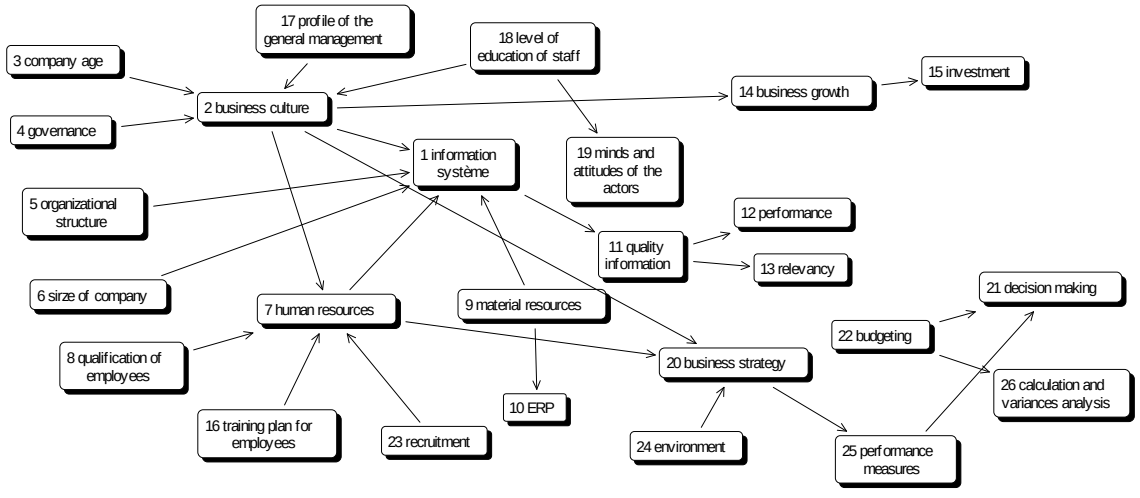

Figure 3. Cognitive map of « C »

The second phase of validation was made during a second meeting with the management controller "B" to ensure the validity of the map already drawn from systematic explorations grids. "B" has validated the map and he asked me to send him the analysis of this map. The results of this analysis together with the interpretation that I made were charged to the concerned Controller. Our analysis is focused on the following four aspects:

- ***Relative importance of concepts***

Table 8 shows the relative importance of each of the concepts mentioned by the management controller "C".

Looking at the variables that have significant centrality scores, it seems that the strategic vision of the management controller is heavily focused on the personal factor (variable 6 and variable 7).In addition to the factors set out spontaneously by the Controller and have significant centrality scores namely: business culture, information system and business strategy, there must be close attention to the recruitment, qualification and training of human resources and material resource planning (ERP), which according to him ,affects the success of the system of management control. Indeed, human resources and material resources have a direct impact on the information system and it will have an impact on the quality of the information provided by the management controller and then on the system of management control. The information system is in turn influenced by the business culture.

Table 8. Scores of concepts centrality

2	business culture	15
7	human resources	14
1	information system	14
20	business strategy	12
18	level of education of the staff	9
14	business growth	9
11	quality information	9
22	budgeting	8
17	Profile of the General Management	8
9	material resources	8
6	Size of business	8
5	organizational Structure	8
4	governance	8
3	company age	8
25	performance measure	8
23	recruitment	7
16	training plan for employees	7
8	qualification of employees	7
24	environment	7
21	decision making	6
13	relevancy	4
12	performance	4
26	calculation and variance analysis	4
19	minds and attitudes of the actors	3
15	investment	3
10	ERP	3

- ***Clustering analysis***

The clustering analysis has given rise to a single set of concepts (cluster 1). This means that the representation of the factors that influence the management control is not simplified by predefined categories and the management controller will be influenced by several factors.

These factors cannot be combined into groups.

- ***Explanatory Factors and Consequences***

Tables 9 and 10 respectively show factors influenced directly or indirectly by at least three other factors (consequences analysis) and the factors that influence directly or indirectly the other three factors (analysis of explanations).

Table 9. Influenced Factors

• information system	6
• Business culture	4
• Human Resources	4
• Business strategy	3
• Decision making	3
• Performance	3

Table 10. Influencing Factors

• Business Culture	4
• Human resources	3
• Material Resources	3
• Business Strategy	3

It is worth mentioning that two factors are found in the two tables namely "business culture ", “Human Resources” and "Business Strategy ". These three factors must be considered as key factors in the strategic vision of the management controller "C". They are treated by him as both explanations and fundamental implications for the future management control of the company. To this end, the General Manager should address these three factors for the success of the management control function within the company. Furthermore, we notice that, in addition to the factors initially identified by the management controller (information system, the business strategy and business culture) material resources also have an effect on the company's information system.

It also is noted that the system of management control will affect decision making and thereafter on performance; moreover, these two concepts are treated as consequences.

- **Loops**

The cognitive map "C" has no loop. Moreover, according to Axelrod (76), the fact that cognitive map does not contain loops reveal a tendency for the subject to simplify its universe.

4.4 Analysis of the cognitive map of Management Controller « D »

"D" is the management controller of an industrial company that provides packaging plastic articles and employing about 188 employees.

"D" has a master's degree and a postgraduate degree in finance and has no experience in management control.

The first phase of exploration was conducted with "D" within one meeting lasting for an hour and a quarter. Three important factors that have an impact on the management control of the company have been identified by the management controller spontaneously and served as starting points for the development of three systematic exploration grids. These factors in order are: "information system", " internal organization of the company" and "perception of the management controller on the part of management."

From these materials as well as other concepts and links collected using grids during the exploration phase, I drew a complete cognitive map with the "decision explore software. (See Figure 4)

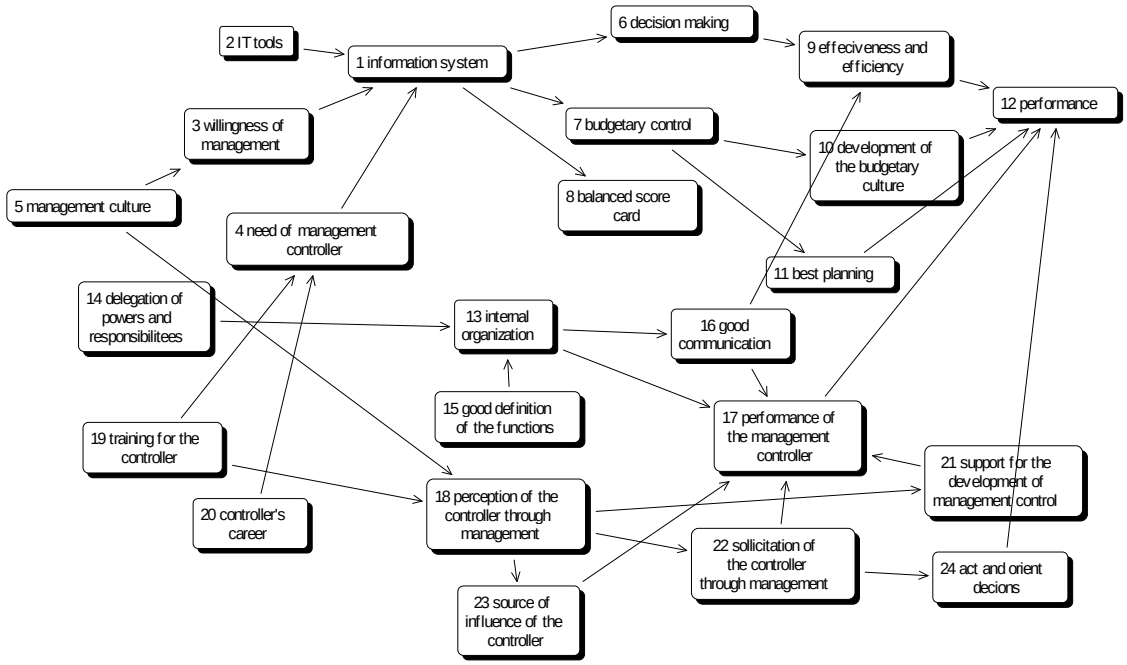

Figure 4. Cognitive map of « D »

Following the same procedure map validation of the management controller "A", cognitive map "D" has been validated.

The analysis phase also focused on the following four aspects:

- ***Relative importance of concepts***

Table 11 shows the relative importance of each of the concepts enumerated in the management controller "D"'. According to the result of the centrality of sores, in addition to variables already listed as important in the phase of data collection, perception of the management controller by management seems more important in this controller (variables 18, 22, 4.23, 21). Indeed, if the management still sees the management controller as a financial one and he cannot master the other commercial and industrial aspects, the controller cannot improve and control management remains oriented towards financial aspect.

This is the case this controller, even if the company is currently setting up a system of management control, think that this system will be successful if management changes its perception, supports and urges the controller, the controller will affect all teams, it will be empowered and able to act and guide the strategic decisions of the company. And all this comes to the training of the controller and the profile of the executive. On the one hand, if the management controller has a rather financial training, the manager perceives the management controller as financial and management control will be of a financial aspect and also the culture of leadership, its objectives, how to organize its management control affects perception which will result in an impact on the management control of the company.

Table 11. Score of concepts centralities

1	Information system	10
17	Performance of the management controller	10
12	Performance of the company	9
9	Effectiveness and efficiency	9
22	Solicitation of the controller through management	8
18	Perception of the controller through management	8
7	Budgetary control	8
4	Need of a management controller	8

23	Source of Influence of the controller	7
21	Support for the development of management control	7
19	Training for the controller	7
16	Good communication	7
13	Internal Organization	7
11	planning	7
10	development of the budgetary culture	7
3	willingness of management	7
24	Act and orient decisions	6
5	Management culture	6
8	Dashboards	5
2	IT Tools	5
20	Controller's career	4
15	good definition of the functions	3
14	Delegation of powers and responsibilities	3

- ***Clustering Analysis***

The clustering analysis has given rise to a single set of concepts (cluster 1). This means that the representation of the factors that influence the management controls not simplified by predefined categories and the management controller will be influenced by several factors. These factors cannot be combined into groups.

- ***Explanatory factors and Consequences***

Tables 12 and 13 respectively show factors influenced directly or indirectly by at least three other factors (consequence analysis) and the factors that influence directly or indirectly the other three factors (analysis of explanations).

Table 12. Influenced factors

•	Performance of the company	8
•	Performance of the management controller	6
•	Information system	4
•	Effectiveness and efficiency	4

Table 13. Influencing factors

•	Information system	5
•	Perception of Management controller through management	5
•	Solicitation of the management controller	3
•	Internal Organisation	3
•	Training for the controller	3
•	Management culture	3
•	Communication	3
•	Budgetary control	3

It is worth mentioning that the factor "information system" is found both among those factors influenced and influencing, data system is considered as a key factor in the strategic vision of the Controller 'D'. It is treated by him as both explanation and fundamental consequences for the future management control of the company. On the one hand, for this controller, his information system is constituted by the General Accounting, analytical accounting is almost absent which leads to a waste of time and difficulty of gathering information as if it has a strong information system, and whether the information they need exists, extraction from dashboards become easier, budgetary control will be better (better planning, adherence to

budgets and development budget culture) and the decision will be more effective and efficient. All this has the consequence of better performance of the company.

On the other hand, according to the controller, the information system can be influenced by the availability of computer tools such as ERP, the willingness of management (culture, priorities) and the willingness and needs of the controller management).

Analysis of explanations shows the profile of the Director (Culture of management solicitation and the perception of the management controller and the profile of the controller (the training) appear among the most important factors in the design of management control system for this controller.

For the analysis of the implications we notice that the variable company performance is influenced by a large number of factors (eight factors), this implies that the success of the management control function will affect the performance of the company.

- ***Loops***

The cognitive map "D" has no loop. Moreover, according to Axelrod (76), the fact that cognitive map does not contain loops reveal a tendency for the subject to simplify its universe.

5. Conclusion

Our research has helped to identify and explain the contingency factors that influence the management control system as perceived by Tunisian management controllers in midsize industrial enterprises adopting a qualitative approach through the method of cognitive mapping. This enabled us to analyze cognitive maps of four management controllers in Tunisian companies.

The analysis of individual cognitive maps showed the following results:

- First, the analysis of the cognitive map "A" showed that important factors that influence the management control are business strategy, internal organization and behavior and mentality of the actors. The strategic vision of the controller is based on the quality of information which is itself influenced by the internal organization and the behavior and mentality of actors. Another factor is considered important is the role played by the contractor;

- Then, the analysis of the cognitive map "B" showed that the business strategy, the culture of executives and staff are important variables that influence the management control system. The strategic vision of the controller is strongly focused on personal variable. In fact, a system of management control can be successful only if the staff of the company accepts the notion of control and works with the management controller;

- Also, the strategy of the company, the business culture, the human resources, information system and material resources are important factors that influence the control system according to the management and analysis of the cognitive map "C".

- The strategic vision of this controller is strongly focused on human resources and material resources that have a direct impact on the data system and it will have an impact on the quality of the information presented to the controller, and then, on control system management.

- Finally, the analysis of the cognitive map of the controller "D" indicates that information system, internal organization, controller‘s profile and contractor’s profile are the most critical in the design of management control factors. His strategic vision is rather based on the data system that must grant him a great importance through management.

If we collectively analyze the cognitive maps we obtain the following results:

- The contingency factors that influence the management control system are: business strategy, Management profile, company culture, human resources, material resources, internal organization, information system and controller’s profile.

By analyzing the explanatory factors and consequences, performance is treated as a consequence for our four controllers.

Thus, the system of management control will affect the performance of the company.

A more rigorous study can be conducted for the analysis of collective cognitive maps of all controllers interviewed since there are more rigorous methods of aggregation and comparison of cognitive maps (Grump & Alii, 1977 Eden & al, 1981; Ford &Hegarty, 1984 Stubbart & Ramaprasad, 1988, Fiol and Huff, 1992, Langfield-Smith, 1992).

More extensive studies may be developed on a larger sample of the same theme. Studies on current practices of management control in Tunisian companies and their strategic alignment with the contingency factors can also be developed.

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