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# The Impact of New Management Accounting Practices on Strategic Buyer–Supplier Relationship within the Supply Chain: An Empirical Analysis within the Tunisian Context

Habib Affes, Fatma Ayadi

Faculty of Economics and Management of Sfax-Tunisia

Email: Habib.affes@fsegs.rnu.tn, fatmasahbi@yahoo.fr

## Abstract

The literature offers little empiric evidence on the role of management accounting in inter-firm relationships. So, in the following research, we examined the effect of the use of a set of new management accounting practices namely the ABC, the balanced scorecard and the financial and accounting benchmarking as well as the effect of the investment in information and communication technologies (ICT) on the improvement of the features of strategic buyer-supplier relationships (SBSR) within supply chain while taking into account the moderator effect of ICT. The Results show that new management accounting practices and investment in ICT have a positive and significant effect on the improvement of the features of strategic buyer-supplier relationships (SBSR). However, the moderator effect of ICT on the relationship between the use of new management accounting practices and the improvement of the features of strategic buyer-supplier relationships (SBSR) is not demonstrated.

**Keywords:** Management Accounting Practices, Strategic Buyer-Supplier Relationships, Supply Chain, Information and Communication Technologies

## Introduction

During the last three decades, a number of new management accounting practices has been developed. The most notable new tools include techniques based on activity (ABC, ABM ...), the strategic management accounting and the Balanced Scorecard (Ittner and Larcker 2001).

These accounting practices has affected several management areas in companies, such as directors' control of their subordinates, optimization of decisions based on cost and especially the management and improvement of the features of strategic relations between the company and its suppliers within the supply chain. These strategic relationships have become important in industries due to cost pressure and corporate concentration on skills (Koufteros et al., 2007).

Indeed, companies have realized the importance of opening the borders of their business to their partners' upstream and downstream, in the context of forging new cooperation, targeting the optimization of strategic buyer-supplier relationships in the supply

chain. Besides, the advent and the widespread use of more and more efficient information and communication technologies (ICTs) contributed dramatically to this evolution of consciousness (Pichot, 2006).

However, these relationships introduce new challenges for management accounting in terms of the provision of relevant information to the coordination and control of activities through business and to solve problems of opportunism (Dekker, 2003) so as to lead to the amelioration of the characteristics of these strategic relationships within the supply chain.

But although the current research concerning the management accounting systems and practices has become well developed, empirical studies are based almost entirely on the review of these practices at the individual company level. In fact, the literature offers little empirical evidence on the role of management accounting in shaping inter-firm relationships (Kulmala, 2004). Due to the recognition of the implications of these relationships on the design of management control, the subject takes a growing interest in research (Anderson and Dekker, 2009; Dekker, 2003).

Thus, the importance emphasized in the literature of inter-firm strategic relationships and their contribution to total costs reduction (Slats *et al.*, 1995), the uncertainty about the effectiveness of management accounting practices as a monitoring tool to improve strategic inter-organizational relationships, the scarcity and the importance of studies concerned with the use effect of new management accounting practices at the inter-organizational level of companies in Tunisia are the main motivations of this research.

The objective of our research is to determine the effects of new management accounting practices use and information and communication technologies (ICT) investment on improving the features of strategic buyer-supplier relationship (SBSR) within the supply chain, taking into account the moderating effect of ICT investment on the relationship between the new management accounting practices use and the improvement of strategic buyer-supplier relationship (SBSR) features.

In what follows, we will present first, the theoretical framework that leads us to the hypotheses to be checked. We then will present the research methodology and subsequently the results to be discussed and finally, we will draw a conclusion.

### **The Theoretical Framework and the Development of Hypotheses**

Today, to raise profits, companies may be forced to seek external assistance through the development of strategic relationships in the supply chain (Daugherty *et al.*, 2006).

However, the management and the improvement of inter-firm strategic relationship features in a supply chain is a challenge for the partners in terms of availability of accounting information to control issues of opportunism and to coordinate activities. For this, the use of management accounting practices is studied within the context of inter-organizational relationships (Schmitz and Platts, 2004).

Besides, the advent and the widespread use of more efficient information and communication technologies (ICTs) favored the evolution and the amelioration of inter-firm relationships (Pichot, 2006).

#### ***a. Strategic Buyer- Supplier Relationship within the Supply Chain***

In our present-day world, the supply chain is seen as a process of adding value that directly supports the fundamental purpose of the company, which is to gain a competitive advantage (Chen and Paulraj, 2007; Perona *et al.*, 2001; Slats *et al.*, 1995).

The supply chain is a concept that has many facets and many definitions. Indeed, the supply chain is a network of several companies and relationships, inter-alia relations between the manufacturing company and its suppliers, offering the opportunity to capture the synergy of inter-organizational management (Lai et al., 2004).

Ellinger (2000) suggests that the supply chain involves all activities associated with the flow and the transformation of goods from the raw materials stage to the end user stage along with the information associated.

Essentially, the definitions of supply chain vary according to the limits set on enterprise boundary, on the main partners' boundary or can be extended to the global network. Particularly, the supply chain can be defined functionally by suggesting that it is composed of a network of installations that provide the following functions namely, raw material procurement, the transformation of these materials into components and then into finished products and the distribution of finished products to the customer (Pichot, 2006).

In this sense, the supply chain is constituted of links between the supplier, the manufacturer and/or customer. In our current research, the examined supply chain will be assimilated by the manufacturing company-supplier relationship along with the strategic buyer-supplier relationship, called from now on "SBSR", representing a specific supply chain.

Presenting a set of features, these relations have been attributed great importance. However, several control issues, such as opportunism and activities coordination are associated with these relationships. One solution proposed by researchers to alleviate these problems is the use of monitoring tools, such as the new management accounting practices.

#### ***i. SBSR Features within the Supply Chain***

The SBSR focuses on initiatives that enhance superior relational characteristics between the supply chain members and create a win-win situation for both buyers and suppliers (Paulraj and Chen, 2007).

Paulraj and Chen (2007) proposed three critical features for this relationship, namely the limited number of suppliers, a long-term relationship orientation and inter-firm communication. However, these authors also indicated the need to include other features, such as trust, to present the complex-construct of the SBSR. Van der Meer - Kooistra and Vosselman (2000); Egan and Mody (1992); Li and Lin (2006) also discussed the importance of trust as a characteristic of the SBSR.

Thus, trust is added in this search as a fourth feature of the SBSR within the supply chain. Several other researchers have also reported the financial aspect as an important characteristic of a relationship (Lee et al., 2010; Dubois, 2003). For this, the financial aspect will be proposed as the fifth characteristic of an inter-firm relationship.

To underpin the domain of strategic buyer-supplier relationship, a brief literature and theoretical foundation of the five features is presented below.

*"Increasingly, companies are emphasizing working closely and co-operatively with a limited number of suppliers that are trustworthy rather than using the traditional, arms-length, adversarial mode of conducting business with a large number of suppliers. Researchers have documented that this relational contracting approach is a required element of strategic buyer-supplier relationships. Apart from increasing trust and relational reliability, this approach provides benefits including (1) fewer suppliers to contact in case of orders given on short notice, (2) increased economies of scale based on order volume and the learning curve effect, (3) dedicated capacity and (4) better customer service and market penetration"* (Paulraj and Chen, 2007).

*“In addition, more and more supplier contracts are becoming long-term and many suppliers are providing information regarding their processes, quality performance and even cost structure to the buying firm. Such close relationships mean that channel participants share risks and rewards and are oriented for long-term relationship. It is suggested that companies gain benefits by placing a larger volume of business with fewer suppliers using long-term contracts. In addition, through a long-term relationship, the supplier will be part of a well-managed chain, which will have a lasting effect on competitiveness” (Paulraj and Chen, 2007).*

*“Effective inter-firm communication can be characterized as frequent, genuine, and involving personal interaction between buying and selling personnel. Numerous researchers have found that when buyers and suppliers communicate and share information relating to materials procurement and product design issues, they are more likely to (1) improve the quality of their products, (2) reduce customer response time, (3) reduce the costs of protecting against opportunistic behavior and (4) improve cost savings through greater product design and operational efficiencies” (Paulraj and Chen, 2007).*

Trust is also seen as an important variable for the explanation of the origin; formation and growth of linkages in a supply chain (Van der Meer - Kooistra and Vosselman, 2000).

Trust involves a moral contract and a long-term commitment that reflects a condition of mutual dependence where both parties (buyer and supplier) are in a position to influence each other by their behavior. Manufacturing companies find that trust is an important aspect of the relationship as it facilitates the exchange of information. It also encourages each side investments for which no immediate income is guaranteed. In addition, it allows partners to adapt to unexpected contingencies. If the buyer and the supplier work for the benefit of each other, over time, a system of mutual accountability and trust develops (Egan and Mody, 1992; Kooistra and Vosselman, 2000). Trust must also be developed to encourage the disclosure of sensitive information to partners of the relationship (Daugherty et al., 2006).

Finally, Damperat (2005) suggests that the economic dimension is the founding principle of any business and strategic relationship. The latter is characterized by material and cash flows. It is thus important to reduce transaction costs through strategic relationships with partners to ensure efficient exchange relationships. Lee et al (2010) also state that strategic alliances provide several economic and financial benefits. For his part, Dubois (2003) suggests that sound strategic relationship between the company and its suppliers can lead to benefits in terms of reduced costs in the production process and material flows.

Besides, high transfer costs urge the company to adopt a relational attitude and engage in a long-term relationship (Benamour and Prim, 2000).

## ***ii. Control Problems Associated with the SBSR within the Supply Chain***

SBSR within a supply chain raise two control issues. The first is the issue of opportunism control or the appropriation of the value. The second issue is related to the issue of controlling the coordination of interdependent tasks. These two issues are based on two different theoretical constructs, namely the theory of transaction cost economics (TCE) and the organization theory respectively.

Indeed, the first control issue relates to the concerns of the value's appropriation, as well as the potential opportunism in inter-firm transactional relationships (Dekker, 2003; Vosselman and Kooistra, 2004). Vosselman and Kooistra (2004) reported that according to Williamson (1985), one of the central concepts in his analysis of transaction cost economics

is opportunism. It states that the actors in a transactional relationship may behave opportunistically to seek a personal interest that may result in value appropriation.

Risks of opportunism can take many forms. First, there is a risk of opportunistic entry to the transactional relationship. For instance, a potential supplier may give false information about his skills or past experiences, while the potential buyer can give false information concerning the conditions under which the supplier will accomplish the tasks. Second, there is a risk of opportunistic execution of the agreement, such as the failure to implement a promise kept by a party after the execution of the agreement. Third, there is the risk of the private use of confidential information by leaking the expertise (know-how) of a company to its competitors by the other party. Or one party could exploit for its own benefits, the accounting information or cost structures, which were made accessible by open-book accounting. Fourth, there is a risk of opportunistic exit of a transactional relationship (Van der Meer and Kooistra, 2004).

The second problem of activities coordination is described by the theory of organization (Thompson 1967). It suggests that the need for coordination varies with the degree of interdependence and uncertainty of the tasks performed within the supply chain and inter-firm linkages. *“This control problem is essentially connected to the creation of value via inter-firm coordination. In fact, activities crossing or having an influence across organizational boundary need to be coordinated across these boundaries. The greater the task uncertainty and interdependence, the more coordination is required”* (Dekker, 2003). However, contrary to the intra-firm coordination, where hierarchical authority is the main instrument, the inter-firm coordination takes place between independent enterprises which entails the difficulty of utilization of the formal relationship of authority (Dekker, 2003).

In addition, Due to the limited rationality, it can be expected that management accountants and other decision makers do not possess all the required information to make an optimal decision. Indeed, it is important to think about, the appropriate way to coordinate inter-firm relationships within the supply chain and the management control mechanisms that can be used to sustain this coordination to reach a situation of value creation (Van der Meer - Kooistra and Vosselman, 2000).

#### ***b. New Management Accounting Practices and SBSR***

Dekker (2003) states that management accounting plays a key role in the management of inter-firm relationships. Indeed, the two issues mentioned above within the inter-firm relationships require the use of control mechanisms. At this level, the question of management accounting role's implication as a control mechanism in these relationships is raised.

#### ***i. The Role of New Management Accounting Practices in Solving Control Problems of Value Appropriation and Opportunism***

Potential opportunistic behavior seems to be the main control problem in inter-firm transactional relationships (Van der Meer-Kooistra and Vosselman, 2004). Therefore, the partners in these relationships need to preserve their interests against the opportunistic behavior of the others. The higher the opportunism concerns, the more partners need protection to increase their confidence that the other will not engage in malfeasance (Dekker, 2003).

The need to designate appropriate control mechanisms in inter-firm relationships, to be protected against opportunistic behavior, has been studied from the transaction cost

economics perspective (Caker, 2008; Dekker, 2003; Mee-Kooistra and Vosselman, 2000). For example, Dekker (2003) reported, in a case study of a strategic alliance between a buyer and a supplier relating to the innovation of safety equipment of the railway, that management accounting practices were an important part of the formal governance structure and were used to manage control issues.

Meer-Kooistra and Vosselman (2004) report that the transaction cost economics assumes that behavioral risks that may ensue from the opportunism of the parties can be calculated beforehand. Thus, tools that control opportunistic behavior and that prevent them from happening can be adopted. These authors suggest that the system of management accounting as a control system (example: balanced scorecard and benchmarking as performance measurement systems) serves as an increasingly bureaucratic tool to provide information (ex post) within the alignment of interests context helping to alleviate the risk of opportunistic behavior.

Ragatz et al (2002) reported that the Japanese use performance control mechanisms (the balanced scorecard and benchmarking) to monitor their suppliers. Seal et al (1999) also reported the use of ABC for an improved understanding of business processes and more accurate costs along with a balanced scorecard for a better understanding of non-financial benefits of partnership.

#### ***ii. The Role of New Management Accounting Practices in Solving the Supply Chain's Activities Coordination Control Issues***

The SBSR in a supply chain presents links that connect the parties. Indeed, whenever there is a degree of interdependence between activities a link arises (Shank and Govindarajan, 1992). This interdependence needs to be managed by the coordination mechanisms so as to achieve efficient and effective results (Thompson, 1967).

Thus, SBSR introduce a new challenge for management accounting, which is the provision of information for the coordination of activities across firms. Dekker (2003) suggests that the execution of a benchmarking between suppliers in the region to identify amelioration opportunities can initiate discussions between suppliers and manufacturers concerning the activities' cost performance and how a better management of links between activities may affect the performance.

Several authors have also reported that the cost and the cost driver information resulting from the utilization of ABC can be used to optimize and better coordinate the activities performance across the supply chain (Dekker, 2003; Seal et al., 1999).

Fayard et al (2006) reported that inter-organizational management accounting facilitates the coordination of cost reduction activities. Indeed, it helps to identify ways to make the interface between companies more efficient. In addition, it helps companies and their suppliers to find ways to reduce production costs.

Anderson and Dekker (2009) also reported the role of new management accounting practices in meeting the need of coordination of partner's activities and that of the supply chain that arises from the need to align and to adapt activities through the firm's boundary to create value.

#### ***c. The Effect of the Use of New Management Accounting Practices on SBSR Features Improvement within the Supply Chain***

Proponents of practices, such as balanced scorecard (Kaplan and Norton, 1996) and ABC (Cooper and Kaplan, 1998) aim at extending management accounting scope. Mouritsen and

Thrane (2006) state that management accounting constitutes a major force in establishing inter-firm relationships and that these practices can play a decisive role in the interaction between other players. Along with accounting as a basis to establish a relationship between partners in a supply chain, bureaucratic governance mechanisms can be experienced as positive in that it deepens the relationship (Caker, 2008) and improves its features.

In addition, according to Kulmala (2004), entering into a relationship with suppliers requires a high number of cost information that can be provided by management accounting.

For example, ABC helps to calculate the total cost of ownership and implement objectivity in the process of supplier selection, optimizing the choice of suppliers. Indeed, the use of management accounting information to make a choice decision of the supplier, with whom it's possible to establish a strategic relationship, can help to achieve substantial savings and to improve the relationship (Degreave and Roodhooft, 1999).

Petersen *et al* (2005) reported that several companies have sought with their suppliers a solution to meet the "target costing" in the product development. Such practices require partners to open their books and share their methods of cost allocation. This behavior is unlikely to occur without the commitment and confidence within the context of a strategic long-term relationship.

Thus, the utilization of new management accounting practices, such as balanced scorecard, ABC and benchmarking within the SBSR is obvious. Stressing the role of these practices, as control mechanisms of opportunism issues and inter-firm activities coordination that help to build trust between the parties of a transaction, we can assume that the use of these practices has a positive effect on improving the features of SBSR. Therefore, the following hypothesis:

*H1: The use of new management accounting practices has a positive effect on improving the features of SBSR within the supply chain.*

#### ***d. The Relationship between ICT Investment and SBSR Amelioration Features of within the Supply Chain***

Improvements in ICT provide several technological opportunities to increase the efficiency of the supply chain to become more competitive (Slats et al., 1995). Paulraj and Chen (2007) suggest that ICTs are essential to support the SBSR. They facilitate information sharing on the markets, materials requirements forecasts, and production and delivery schedules. Indeed, inter-organizational systems are based on ICT that transcend the enterprise boundaries. These inter-organizational systems may include direct computer-to-computer links with the suppliers, or simple Electronic Data Interchange systems (EDI).

However, EDI is the largest and most promising application of ICT. In logistics systems, EDI facilitates the exchange of automatic purchase orders and invoices, advice of delivery notices, the generation of status and financial reports (Ketikidis et al., 2008; Nicolaou, 2001; Paulraj and Chen, 2007; Slats et al., 1995).

Other important developments in the field of ICTs include electronic mail (e-mail) along with more complex transactions, such as integrated cash management systems, Internet and intranet (Paulraj and Chen, 2007). The Internet offers a real opportunity for more data to be visible for the employees and the partners throughout the supply chain activities (Elmuti, 2002).

Romano (2003) reports that ICT has enabled a better coordination of SBSR. In fact, companies strive to acquire and develop capacities to implement ICTs, so as to use the shared information between the company and its supplier effectively. Thus, managers should be



aware that information sharing is basic for the supply chain parties coordination and communication.

Some researchers have raised that SBSR can be improved by the use of ICT. They suggest that ICT can serve as a powerful mechanism in coordinating the company's activities with those of suppliers. Indeed, ICTs can provide real-time information of a product's availability, materials requirements forecasts, inventory level, requests for production and deliveries. ICT can greatly increase the ability to make adjustments to existing programs, improving subsequently the efficiency of SBSR (Paulraj and Chen, 2007).

Taking account of the foregoing, we can propose the following hypothesis:

*H2: ICT has a positive effect on improving SBSR features within the supply chain.*

***e. The Moderating Effect of ICT Investment on the Relationship between the Use of New Management Accounting Practices and SBSR Improvement Features***

ICT can facilitate frequent, accurate and rapid transfer of management accounting information among the supply chain partners. In this way, the distortion of information between partners can be avoided (Li and Lin 2006) consolidating, thus, the effect of using new management accounting practices on improving the features of the SBSR within the supply chain.

Thus, managers should be aware that the information sharing, using new management accounting practices is essential to improve the characteristics of the supply chain and that ICT accelerate such a practice. Indeed, ICTs can contribute to a better and more frequent use of new management accounting practices to improve the SBSR features by fostering the dissemination and the sharing of information through proximity, frequent exchanges and collaborative interdependencies (Chen and Paulraj, 2007).

More specifically, investment in ICT plays a vital role in improving the relationship between the new management accounting practices use and improving the SBSR features since they provide the means by which common, frequent, accurate and valuable (solid) management accounting information, can be compiled, processed and exchanged (Stump and Sriram, 1997, cited by Sriram and Stump, 2004).

In addition, it can be expected that ICT moderate the relationship between the use of new management accounting practices and SBSR features improvements for two reasons. First, ICTs facilitates information transfer and subsequently facilitates relationships control, in order to reduce opportunistic behavior. Besides, sharing information reduces information asymmetry between companies, which brings an atmosphere of trust that can improve SBSR features. Thus, we can assume that when ICT investment is important, an enterprise is more likely to be willing to use management accounting practices to improve the features of the supply chain. Therefore, ICT consolidate and moderate the relationship between the use of new management accounting practices and SBSR features improvements.

Hence, the following hypothesis is proposed:

*H3: Investment in ICT has a moderating effect on the relationship between the use of new management accounting practices and SBSR features improvement within the supply chain.*

Thus our conceptual model is as follows

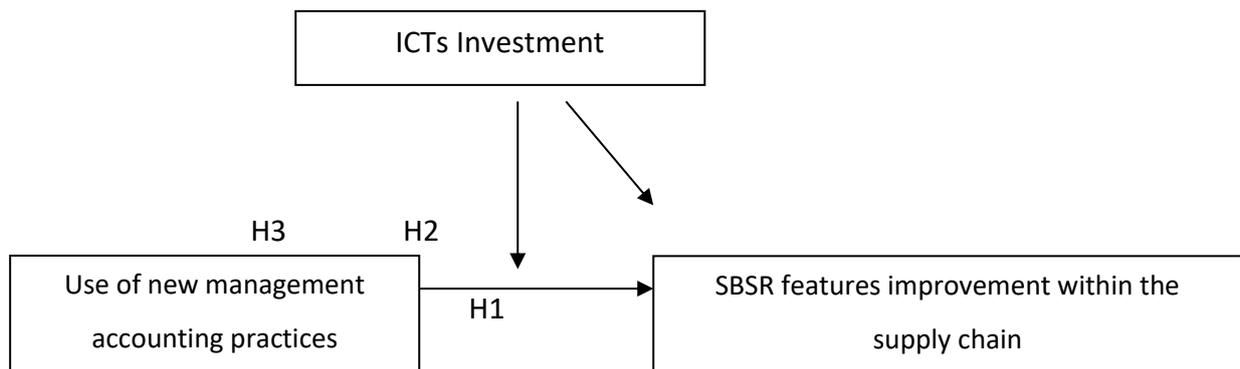


Figure 1: The conceptual model of the relationship between the use of new management accounting practices, ICT investment and SBSR features improvement within the supply chain

### The Research Methodology

In what follows, the paper presents first, the instruments used, the description of the sample and the adopted method of data collection.

#### *f. The Operationalization of Variables*

To generate items that can measure our findings, we referred firstly, to the theory and secondly, to discussions with some professionals to generate some other items and guide others inspired by this theory, in view of the fact of the variety of contexts.

In this research, “SBSR features improvement within the supply chain” variable is a multidimensional second-order construct which measurement is related to five dimensions. These five dimensions are namely, limited number of suppliers, long-term relationship orientation, inter-firm communication, trust and the financial aspects of the relationship. They are measured on a seven-point Likert scale with end points from 1 = strongly disagree to 7 = Strongly Agree (Paulraj and Chen, 2007).

*Items tapping the construct “Limited Number of Suppliers” measure the extent to which firms increasingly emphasize close, relational contracting with a smaller number of dedicated suppliers.*

*The construct “Long-Term Relationships Orientation” is operationalized by indicators reflecting the extent to which the buying firm (a) expects its relationships with key suppliers to last a long time, (b) works closely with key suppliers to improve product quality, and (c) views the suppliers as an extension of the company; in turn, (d) suppliers see their relationship with the buying firm as a long-term alliance.*

*“Inter-firm Communication” is operationalized to include the extent to which the firm and its key suppliers (a) share critical, sensitive information related to operational and strategic issues, (b) exchange such information frequently, informally and/or in a timely manner, (c) maintain frequent face-to-face meetings and (d) closely monitor and stay abreast of events or changes that may affect both parties” (Paulraj and Chen, 2007).*

Trust dimension measures the extent to which: (a) Employees of the purchasing company and those of the key suppliers tend to trust each other, (b) There is no information asymmetry between the company and its key suppliers, (c) There is a possibility of skills and knowledge transfer, (d) There is a risk-taking reduction concerning the implementation of the

commitments by key suppliers and (e) company employees and those of the key suppliers negotiate or deal fairly with each other.

Finally, the financial aspect relationship dimension is operationalized by the following items: The relationship with key suppliers enables reduction of (a) significant transfer cost, (b) production cost and (c) commercial transactions cost.

On what concerns the variable “use of new management accounting practices”, the literature has identified a set of new inter-organizational management accounting practices. With reference to the Tunisian context, we chose the most widely used and best known practices of Tunisian companies. Thus, this variable is measured (on a 7 point Turnstone scale ranging from 1 = never, to 7 = very often ), by the frequency of use of strategic cost calculation practices by the ABC, financial and non-financial performance indicators of the balanced scorecard and financial and accounting benchmarking (Abdel-Kader and Luther, 2006; 2008). Finally, the variable “investment in ICT” is measured (on a seven-point Likert scale with end points 1 = strongly disagree to 7 = strongly agree) by seven items indicating whether there is an investment in a set of ICT by the company. These items relate to investment in remote communication with key suppliers, investment in EDI, investment in the electronic transfer of funds for payment, the use of the Internet, the use of information technology for the processing of transactions, the use of e-mail and use of fax.

#### ***g. The Description of the Sample***

The sample contains 100 industrial enterprises operating in different Tunisian business areas and scattered over different regions of Tunisia, namely Tunis, Ben Arous, Nabeul, Zaghouan, Sousse, Monastir, Gabes, Sfax and Beja.

#### ***h. Data Collection***

The data collection tool for our investigation is a face-to-face and an online questionnaire.

This questionnaire is composed mainly of closed-ended multiple choice questions and relates to four axes. The first axis is the presentation of the company profile. The second relates to the use of new management accounting practices. The third, relates to the improvement of the SBSR features. And the fourth, relates to the ICT investment. The questionnaire was tested before being communicated to the companies surveyed. To test this, we conducted a pre- survey of some companies belonging to our sample. The information gathered during the pre-survey allowed the evaluation of the relevance of the issue, different measures’ adaptation to the Tunisian context and the development of the final questionnaire.

The Phase of data collection allowed us to gather one hundred questionnaires. In particular, out of 300 questionnaires sent via the Internet, we were only able to recover 18 questionnaires with a response rate for this type of data collection of 6%. While for data collection through face-to-face tool, we distributed 150 questionnaires and we could only recover 96 questionnaires with a response rate of 64%. Some of the observations which were not completely filled were removed which led to a reduction of the number of observations from 96 to 82. This is due to the fact that many managers have not wished to communicate financial and accounting information under the pretext of confidentiality. Note also that some officials preferred to answer the questionnaire on their own because of their occupations or for other reasons.

The majority of respondents belong to the accounting department, financial and general management. In fact, we interviewed 35 accountants, 31 administrative and financial directors, 20 Chief Executive Officers, four purchasing managers and 3 human resource managers.

Data collection lasted nine months. It started in May 2011 and ended in January 2012.

### ***i. Methods of Data Analysis***

First, we had recourse to the Principal Component Analysis (PCA) using the SPSS18 software to ensure that the chosen items produce a perfect representation of the constructs. During this phase, we had to use the methodology of Churchill (1979) and the criteria of purification measures proposed by (Evrard *et al.*, 2003).

Then, we used AMOS18 software to make the structural equations method. First, we made a confirmatory factor analysis to determine the internal consistency and the convergent and discriminant validity of the measurement scales. Second, a confirmatory factor analysis of second-order was used to determine the internal consistency of the first-order factors measuring "improvement of SBSR features". During the second-order CFA, items that remained at the PCA phase were used as first-order factors indicators, which in turn were used as second – order constructs indicators of "SBSR features improvement" construct. Finally, to check our hypothesis, we tested the structural models by using the structural equations method. This choice was justified by the fact that the structural equations method is the appropriate statistical method to test moderator effects and to analyze the multidimensional second-order constructs (Akrouf, 2005; Hair *et al.*, 1998; Lacroux, 2009; Roussel *et al.*, 2002; Baron et Kenny, 1986).

## **2. The Analysis and Interpretation of Research Results**

Prior to the interpretation of results, it is necessary to purify, confirm and validate our measurements to improve the interpretation of results.

### ***a. The Presentation of the Measurements' Purification Results***

The Purification of the measuring instruments was made via two different tests, namely dimensionality and reliability tests. Dimensionality test was carried out by the principal Component Factor Analysis (PCA) of the variables' measuring scales. The second test of reliability analysis was completed on the remaining items from the first analysis, using Cronbach's alpha coefficient (Churchill, 1979; Nunnally, 1978).

Purification analysis helped establish the dimensionality and reliability of the measurement scales of the variables of the research model. The PCA performed on these variables, enabled us to establish a one-dimensional variable (use of new management accounting practices), a two-dimensional variable (investment in ICT) and a four-dimensional variable (SBSR features improvements) (see table 1).

It should be noted that, for the construct "SBSR features improvements", the PCA phase eliminated the long-term relationship orientation dimension because of the factors' low loadings.

Table 1

*Validation of the Variables' Measuring Scales*

Research variables	Code	Dimensionality and % of the explained variance	Internal validity ( $\alpha$ Cronbach)
Use of new management accounting practices	UNMAP	One dimensional 66.888% (2.007)	0.741
Strategic Buyer-supplier Relationships features improvement	SBSRFI: -Inter-firm comm - Financial aspect - Trust -LimitedNbrSplir	4 dimensions 72.887% 26.678% (4.002) 18.705% (2.806) 16.024% (2.404) 11.480% (1.722)	0.889 0.927 0.776 0.729
ICT Investment	ICTinvst telecominvst	2 dimensions 69.896% 40,779% (2.039) 29.117% (1.456)	0.745 0.590

***b. The Presentation of the Results of the Confirmatory Factor Analysis (CFA)***

A confirmatory factor analysis (CFA) was also conducted on the measuring scales. This analysis shows that "new management accounting practices" variable have a fairly satisfactory internal consistency ( $\rho$  Jöreskog = 0.782 > 0.7) (Roussel *et al.*, 2002), an acceptable convergent validity ( $\rho$ vc = 0.566 > 0.5) (Fornell and Larcker, 1981) and a highly correlated items to their common factor and values of critical ratio above 1.96. However, the standardized factor loading of Item2 (financial and non-financial indicators of performance of the balanced scorecard) is an outlier (> 1) (Akrouf 2010). For this reason, this item is eliminated.

However, the CFA has reached a new three-dimensional structure for the construct "SBSR features improvement". Indeed, the four-dimensional measurement model of this construct is not specified correctly since the items relations of the fourth dimension "limited number of suppliers" with the latent variable associated with it are not significant. Furthermore, the factor loading of the item SBSRIns2 to the factor to which it belongs is an outlier because it is greater than 1 (Akrouf, 2010). That is why; we eliminated the "limited number of suppliers" dimension. Thus, the remaining dimensions are inter-organizational communication, the financial aspect of the relationship and trust. Each dimension has an internal consistency and a fairly satisfactory convergent validity ( $\rho$  Jöreskog1 = 0.896;  $\rho$ VC1 = 0.594;  $\rho$  Jöreskog2 = 0.929;  $\rho$ VC2 = 0.813 and  $\rho$  Jöreskog3 = 0.784;  $\rho$ VC3 = 0.539). In addition, all items are highly correlated with their Common factors and the squared multiple correlations are acceptable.

A second-order CFA was also applied to the three dimensions of the construct "SBSR features improvement" after checking the passage conditions from the first-order factors to a second-order construct (Strong correlation between the first-order factors and the comparison of the first-order model to the second-order one in terms of data adjustment quality by means of the target coefficient Index calculation (TCI)) (Roussel *et al.*, 2002, Akrouf, 2010). This analysis confirmed the strong contribution of the three-dimensions to the second-order construct which was associated with it (SBSR features improvement). The measurement model has shown a rather satisfactory adjustment quality (see Table 3).

On what concerns the variable "investment in ICT", the exploratory factor analysis identified two factors. The first factor showed good internal reliability ( $\alpha$  = 0.745), whereas for the second factor, the reliability is not satisfactory ( $\alpha$  = 0.590). The CFA

conducted on these two factors confirmed the results found by the CPA for the second factor. Indeed, the results yielded no significant relationships between items of this factor on the one hand and the latent variable they were supposed to represent on the other hand.

Therefore, we kept only the first factor for the construct of “ICT investment”. This construct has an internal consistency and a fairly satisfactory convergent validity ( $\rho$  Jöreskog = 0.754;  $\rho$  VC = 0.511) and a strong correlation of items to their common factor and critical ratio greater than 1.96 ratio.

Table 2

*Results of the CFA measuring scales variables*

<b>Variables de recherche</b>	<b>Coeff Std</b>	<b>SMC</b>	<b>c.r (t)</b>
<b>The New Management Accounting Practices Use:</b>			
- Strategic cost calculation by the “ABC”	0.513	0.263	4.802
- Financial and non-financial indicators of the performance by the Balanced Scorecard	1.015	1.031	8.214
- Financial and accounting benchmarking	0.636	0.405	5.775
<b>Information and Communications Technology Investment</b>			
- We invest in “EDI”	0.864	0.747	7.650
- We invest in electronic transfer of funds for the payment	0.621	0.386	5.800
- We use information technology-enabled transaction processing	0.634	0.402	5.906
<b>SBSR features improvement:</b>			
<b>1- Inter-firm communication:</b>			
- We share sensitive information with our key suppliers	0.568	0.322	5.936
- Suppliers are provided with any information that might help them.	0.785	0.616	9.088
- Exchange of information takes place frequently, informally and/or in a timely manner	0.765	0.586	8.765
- We keep each other informed about events or changes that may affect the other party.	0.890	0.793	11.060
- We have frequent face-to-face planning/communication	0.781	0.610	9.032
- We exchange performance feedback	0.797	0.635	9.296
<b>2- The financial aspect of the relationship:</b>	0.878	0.772	11.020
- The relationship with key- suppliers allows important transfer cost reduction	0.892	0.796	11.193
- The relationship with our key-suppliers allows production cost reduction.	0.934	0.873	12.078
- The relationship with our key- suppliers allows trade transaction costs reduction	0.731	0.534	7.791
<b>3-Trust:</b>	0.656	0.430	6.669
- Employees in our company and those of our key- suppliers tend to trust each other.	0.759	0.575	8.020
- Absence of information asymmetry between our company and our key suppliers.	0.610	0.372	6.101
- A reduced risk-taking concerning the commitments achievement by our key-suppliers			

- Employees in our company and those of our key suppliers negotiate or deal fairly with each other			
$\chi^2/ddl=2.246 (\leq 5)$ ; GFI= 0,941 (>0.9) ; AGFI= 0.862 ; TLI=0.878 ; CFI= 0,904 (>0.9) ; RMR= 0,114 ; RMSEA= 0,092; BIC=275.133 Ms (419.070)			

Table 3

*Second-order CFA analysis of the first-order of constructs « SBSR features improvement »*

First-Order factor	Coef.Std.	SMC	c.r (t)
- Inter-firm communication	0.677	0.459	4.405
- The financial aspect of the relationship	0.728	0.530	5.967
- Trust	0.782	0.612	5.399
$\chi^2/ddl=2.246 (\leq 5)$ ; GFI= 0,941 (>0.9) ; AGFI= 0.862 ; TLI=0.878 ; CFI= 0,904 (>0.9) ; RMR= 0,114 ; RMSEA= 0,092; BIC=275.133 Ms (419.070)			

The internal consistency of the global measurement model and its convergent validity are checked. Indeed, Jöreskog rho and the coefficients of the Rho of convergence of the global measurement model are satisfactory. In addition, discriminant validity is checked since all squared multiple correlation coefficients are inferior to the extracted average variance.

**c. Research Hypotheses Test and Results Interpretation**

After purifying and validating each variable as well as the global measurement model of our research we will present the test results of our hypotheses.

**i. The Presentation of the Structural Test Model**

The structural model that we are about to test is composed of two exogenous variables that help explain the SBSR features improvement within the supply chain (endogenous variable).

$$\eta = \zeta + \gamma_1\xi_1 + \gamma_2\xi_2 \tag{1}$$

With:

- $\eta$  = endogenous dependent variable: SBSR features improvement;
- $\xi_1$  = exogenous independent variable: use of new management accounting practices;
- $\xi_2$  = exogenous independent variable: investment in ICT;
- $\gamma (1, 2)$  = standardized structural coefficients to be estimated;
- $\zeta$  = error term of the dependent variable

**ii. Goodness of Fit of the Structural Model**

The analysis of the structural model showed a fairly satisfactory data goodness of the fit. Indeed, the absolute fit indices are satisfactory (GFI = 0.900, AGFI = 0.800, RMR < 0.1, RMSEA < 0.1). Furthermore, comparison adjustment indices with the saturated model are also acceptable (TLI = 0.908, and CFI = 0.870).

These indices show that the proposed model fits quite well the observed data compared to the free or independent model.

And Parsimony indices are inferior to those of the saturated model and thus, indicates a parsimonious model ( $X^2/ddl < 5$  and  $BIC < BIC$  saturated) (Akrouf, 2010; Hadoussa et Baile, 2010) (table 4).

Table 4  
Structural model Goodness of fit indices

$X^2$	$X^2/ddl$	GFI	AGFI	RMR	RMSEA	TLI	CFI	BIC
49,856 ddl=18 p = 0,000	2,770	0,900	0,800	0,093	0,094 (0,090 ; 0,179)	0,908	0,870	132,750 Ms (165,786)

**iii. H1 and H2 Hypotheses Test and Results Interpretation**

Table 5 presents the regression coefficients, standardized coefficients, the critical ratios (t) and the squared multiple correlations of the relations proposed in the model

The two proposed relations are significant with a critical ratio superior to +/-1, 96.

We can thus, conclude that the use of new management accounting practices has a positive and significant effect on “SBSR features improvement ( $\gamma = 0.741$ ,  $t = 2.986$ ,  $p = 0.003$ ). This may induce us to draw, that the new management accounting practices as control mechanisms constitute a force or a determinant of SBSR features improvement within the supply chain. Thus, hypothesis H1 is confirmed.

On what concerns, the effect of ICT investment on improving the SBSR features improvement, the results have generated a positive and significant effect ( $\gamma = 0.325$ ,  $t = 2.690$ ,  $p = 0.007$ ). Hence, we can say that investment in ICT is a means that helps improving SBSR features.

Table 5  
Results of the structural model of direct effects

Hypothetical relations	Coeff.Sd.	S.E.	t (c.r.)	P	Coeff.	SMC
SBSRFI<--- UNMAP	0,741	0.212	2.986	0.003	0.634	0.655
SBSRFI<--- ICTinvst	0.325	0.051	2.690	0.007	0.138	

Standardized coefficients are presented in figure 2.

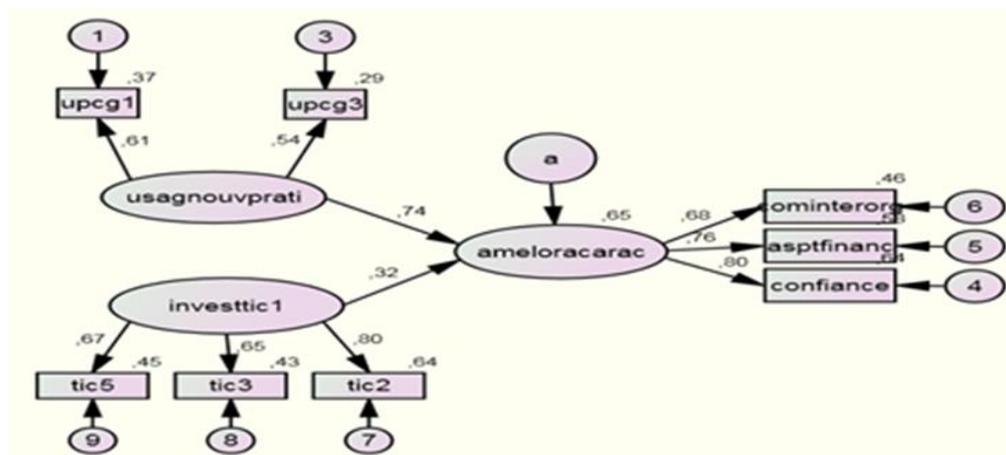


Figure 2. Structural model of the model’s direct effects



While referring to the SMC, we can notice that the proposed model helps to explain a substantial proportion of SBSR features improvement (65.5%). Alternatively, 34.5% of the variation of the variable remains unexplained.

***iv. Analysis of the moderating effect of ICT investment in the relationship between the use of new management accounting practices and SBSR features improvement***

The purpose of this section is to verify the moderating role of ICT investment in the relationship between new management accounting practices use and SBSR features improvement within the supply chain. At this level, we try to test the validity of the hypothesis H3.

The analytical method used is the multi-group method (Baron & Kenny, 1986). First of all, groups of individuals should be identified according to their level of investment in ICT.

**1. Groups Identification**

SPSS 18 software allowed us to identify two groups, based on the median relating to the variable "investment in ICT": each group includes 50 companies. The first group represents companies that have the lowest level of investment in ICT. While the second group includes companies that have a higher level of investment in ICT.

**2. The Stability Test Measurement Models between Groups**

Stability testing measurement models can be done through a multi-group Confirmatory Factor Analysis.

**a. The Multi-group Confirmatory Factor Analysis**

To test the contributions differences by the level of investment in ICT, several actions are performed:

- Create an identical test model for both samples;
- Link each model with its appropriate database;
- Create a fixed or constrained model, which assumes that the factor contributions for the two groups are the same; and an unconstrained or free model, within which it is assumed that the factor contributions vary according to the group;
- Test the difference of factor loadings between the two groups.

**b. The Analysis and Results Interpretation**

The unconstrained group has a non-significant chi-squared test, which is equal to 10,500 ( $df= 8, p = 0.232 < 0.05$ ), while the constrained model has a chi-square of the order of 14.873 with a degree of freedom of 11, which is also non-significant ( $p = 0.188$ ). The following table shows the two models goodness-of-fit:

Table 6

*The two measuring models' goodness-of-fit indices of the two groups*

Model	X <sup>2</sup> /ddl	GFI	AGFI	RMR	RMSEA	TLI	CFI	AIC
Unconstrained	1,313	0,961	0,855	0,097	0,056	0,954	0,981	54,500 Ms (60,000)
Constrained	1,353	0,940	0,837	0,111	0,060	0,948	0,971	52,873 Ms (60,000)

The goodness-of-fit indices of the two models show a good fit quality for most of the goodness-of-fit indices, expect for the index (Adjusted Goodness of Fit Index) (slightly inferior to 0.9) and RMR (slightly greater than 0, 1) for the constrained model. Presenting these results, we cannot conclude what is the most appropriate model to be used. To do this, we will compare the chi-square difference between the two models. This difference is not significant with  $p = 0.224$ . Thus, the constrained model is more appropriate for the interpretation of the estimation. By analyzing the difference between the chi-square free and constrained model (Table 7), we notice that the difference is not significant ( $p = 0.128$ ). Thus, we can conclude that the variable ICT investment exerts no moderating effect on the relationship between the use of new management accounting practices and SBSR features improvement in the supply chain.

Table 7

*The moderating role test of investment in Information and Communication Technology*

Assuming that the constrained model is correct							
Model	DL	CMIN	P	NFI	IFI	RFI	TLI
Constrained model	1	2,321	0,128	0,015	0,016	0,010	0,012

Thus, we reject H3 hypothesis. This leads us to conclude that the use of new management accounting practices do not contribute to the SBSR features improvement through sub-groups, taking into consideration the moderating variable of investment in information technology and communication.

### Conclusions

Currently, management accounting has been a subject to a continual alteration and has become more involved in the strategic management of companies and their inter-firm relationships. Hence, apart from understanding how to establish and handle strategic initiatives, such as new management accounting practices, management controllers should also know what are the consequences of this measure in terms of assessing their strategic and financial results for the companies.

The objective of our research is to test the effect of the use of new management accounting practices and investment in ICT on improving SBSR features within the supply chain.

This research was motivated by the importance emphasized in the literature, of inter-firm strategic relationships and their contribution to meet the challenge of the increasingly competitive environment and to reduce total costs. In addition, there are considerable doubts

about the effectiveness of management accounting practices as a monitoring tool to improve inter-firm strategic relationships.

The results identified a significant positive effect of the use of new management accounting practices on SBSR features improvement within the supply chain. Indeed, a close positive relationship between these two constructs has been demonstrated, reflecting the effectiveness and the importance of the use of new management accounting practices at the inter-firm level, as a controlling tool of opportunism issues and of inter-firm activities coordination, in SBSR features improvement within the supply chain.

Besides, we identified a direct positive effect of ICT investment on improving the SBSR features within the supply chain, which confirms the effectiveness and the importance of these investments in improving the supply chain features.

Finally, the moderating effect test of ICT investment has shown that it has no significant moderating effect on the relationship “use of new management accounting practices – SBSR features improvement”. Consequently, we can conclude that the use of new management accounting practices do not contribute to the SBSR features improvement through subgroups, while taking into consideration the moderating variable of investment in information technology and communication

On what concerns the theoretical contributions, this study demonstrates the research current relevance using inter-firm management accounting practices. The results reinforce the theoretical and conceptual foundations of previous researches. We have also tried to add other dimensions to measure the multidimensional construct of improving SBSR intangible capital features within the supply chain, following the recommendations of (Paulraj and Chen, 2007). At the methodological level, this research has validated a number of scales borrowed from previous researches within the Tunisian context. In addition, the conceptual model is tested by structural equations using “AMOS 18 software”. This method has several advantages compared to the conventional statistical approaches. In terms of practical implications, our research provides empirical evidence of the importance of inter-firm new management accounting practices and ICT in achieving inter-firm strategic relationship features improvement within the supply chain. Such a result may encourage managers and business leaders to undertake such practices to improve their strategic relationships within the supply chain and make profits.

However, like any investigation, this research presents a set of limitations caused by the fact that we cannot explore everything at once. A very important limitation of our study relates to the limited number of our sample. Indeed, the quality of our global modal of measurement and our research as a whole can be significantly improved by increasing the sample size.

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