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## RESEARCH ARTICLE

### IT alignment and firm performance: contingency approach

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#### Abstract

This study aims to analyze the effect of strategic, structural and technological alignment of IT on the Tunisian firms' performance. Although the strategic alignment is very crucial, more attention is needed for structural and technological alignment.

The method of structural equation was adopted to conduct our exploratory and confirmatory analysis. The results obtained from the questionnaire sent to 211 employees affirm that both strategic and structural alignment influence the Tunisian firms' performance.

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## INTRODUCTION

Strategic alignment is an important concept that captures the interest of scientists (Jampurazmey and *al.*, 2011). It helps the company to ensure efficient use of information technology (IT). Although many papers have confirmed the value of this concept and the strong relations "alignment - performance", there are some controversies (Luftman and Ben-Zvi, 2010; Chen, 2010; Lu and *al.* 2011; Mithas and *al.*, 2012). However, the principal interest of these works is to achieve alignment between business strategy and IT strategy and / or between organizational structure and IT structure. They focused on a binary approach using contingency relations between two or three areas, without trying to consider all the areas together (Henderson et Venkatraman, 1993; Hirschheim and Sabherwal 2001; Chan and Reich, 2007). The alignment of IT results of consistency between strategic choices (strategic alignment), the design of the organization (structural alignment) and the use of technology (technological alignment). From this limit, the objective of our work is to better understand the relationship between IT alignment and performance of Tunisian firms by considering the strategic alignment, structural and technological IT.

### 1. DEFINITIONS OF THE ALIGNMENT CONCEPT

In recent years, a great deal of research and analysis focused on the concept of alignment. The ambiguity of this notion comes from the various definitions which have been assigned. The alignment concept is rooted in the contingency theory which states that the company's performance is the result of the congruence between one or more factors. In that sense, Miles and Snow (1984, p11) have defined the "Fit" as "a dynamic search that seeks to align the organization with its environment and to arrange resources internally to support this alignment." Drazin and Van de Ven (1985) also defined the fit as the coherence or internal consistency between multiple contingencies (strategic, technological, structural and social) that affect performance. Chan and Reich (2007) argue that strategic alignment is the result of harmonization strategy with its IS. Similarly, Henderson and Venkatraman (1993) defined alignment as the overall relationship, two-way between the four dimensions of alignment: the business strategy, IS

strategy, business structure and structure of the IS. Certainly, the impact of strategic alignment on performance is a concern that has attracted and still attracts the interest of many researchers for several years [Venkatraman (1989), Henderson and Venkatraman (1993), Raymond and al.,(1995); Luftman (2000); Sabherwal and *al.* (2001), Croteau and Bergeron (2001), Cragg and *al.*, (2002), Raymond and *al.*, (2004), Mithas and *al.* (2012)]. Hirschheim and Sabherwal (2001) proposed a similar definition of Henderson and Venkatraman (1993), they argue that the strategic alignment of IS is a continuous process of adaptation to achieve harmony between IS strategy and strategy of firm. As for Reich and Benbasat (1996), they consider the alignment as "the degree to which the mission, objectives and plans of IT support and are supported by the mission, objectives and business plans of company." In the same idea, Luftman (2000, p 6) approved that the "alignment focuses on the activities that management performs to achieve cohesive goals across the IT (Information Technology) and other functional organization organizations and apply IT in a direction appropriate while being in harmony with business strategies, goals and business needs". In this vision, the alignment is considered the right mix for harmonization between the strategic choices of the business and technological resources to provide the support deployment (Bergeron et al., 2001). In a more detailed definition of Chan and Reich (2007), alignment is an ongoing dynamic process ensuring harmony between all components of the related IT / business operations to improve business performance. Nevertheless, the concept of alignment has often been associated with integration. Henderson and Thomas (1992) reported that the alignment is more than just a connection between IT and business strategy. The success of this integration depends on the linkage with the processes, structures and skills to achieve strategic alignment. For Jorfi et al (2011) strategic alignment is the appropriate use of IT in the integration and development of organizational strategies in order to improve the firm's performance.

## **2. CONCEPTUAL FRAMEWORK**

### **2.1. THE RELATIONSHIP BETWEEN IT AND THE PERFORMANCE: THE ALIGNMENT CONCEPT EXPLICATION**

For many years, management science, economics and industrial sociology have taken over this issue by trying to apprehend the potential links between IT and firm performance (Lu et al, 2011) .After analyzing several researches made on this topic, one result seems to be shared by all: there is no universal rule but a set of possible combinations to transform the potential of IT in real gains for the firm. Since Solow (1987) raised the "productivity paradox" that stated that "we see computers everywhere except in productivity statistics", the debate on the impact of IT on firm performance has continued to grow.

Several studies have been conducted to try to explain this "productivity paradox". Divergent and sometimes contradictory results have emerged. Some have tried to show that IT does not help to improve the productivity of firms as they create dysfunctions in organizations because of their unreliability (Hirschheim and Sabherwal, 2001).Thus, the researchers realize increasingly that the relationship between IT and business performance is complex and multidimensional. Therefore, results on performance are of particular interest to justify IT investments. Literature in information systems (IS), especially in information systems strategy (Chen, 2010), led us to adopt a theoretical perspective widely used in research in information systems: the perspective of "fit" or "strategic alignment". This perspective state that performance is the result of the congruence ("fit") between two or more factors such as strategy, structure, technology or environment (Olson et al., 2005).So that the notion of alignment is an imperative for firms concerned about their performance. Thus, our first research hypothesis is as follows:

- H1: "IT alignment has a positive impact on firm performance"

Moreover, in the IS management literature, several dimensions of alignment are highlighted: strategic, structural and technological. Although much attention is paid to the strategic alignment, both the structural alignment and technology alignment may influence the performance (Reich and Benbasat, 1996; Chan, 2002). Moreover, it should be noted that the only presence of information technology, is not satisfactory to ensure the firm's performance. It is through the alignment of IT to strategy, structure and technology infrastructure that firm can improve its performance (Baker et al., 2011).The alignment of IT results of consistency between the joint strategic choices (strategic alignment), the design of the organization (structural alignment) and the use of technology (technological alignment).

### **2.2. STRATEGIC ALIGNMENT OF IT AND FIRM PERFORMANCE**

Jorfi et al., (2011) stressed the importance of the strategic value of IT. Reich and Benbasat (2000) define strategic alignment as "the degree to which the objectives, projects and tasks IT are aligned with those of the firm". With this perspective, it is difficult that the alignment occurs if the strategies lack a formal and documented (Wan and Tai, 2003). Kearns and Lederer (2000) argue that a distinction exists on the one hand, between business strategy and IS

strategy, on the other hand, between patterns of alignment of business strategy and IS strategy. Aligning IT with the business strategy means that the management of IS supports the strategic management of the firm (Reich and Benbasat, 1996). Furthermore, the alignment model between business strategy and IS strategy, guarantees strategic management that reflects the experience and knowledge of organizations using the based- resources on IT, and means better management and commitment of senior managers (Chen, 2010). Venkatraman and Henderson (1993) explained the possible relationships between business strategy and IT strategy. They defined IT strategy in terms of three components: the scope of technology, skills and IT governance. Kivijärvi and Saarinen (1995), and Mingfing and Richard (1999), in their empirical research have demonstrated the moderating effect of strategic alignment in the relationship between IT and firm performance. Raymond and al., (1995) identified two ways to examine the relationship between business strategy and IT strategy: the dependent approach and the impact approach. Dependent approach means that the IT strategy must support the business strategy as any other function of the firm, such as marketing, finance or production. While the impact approach means that the IT function could lead the firm to achieve its goals.

As explained by Brown and Sambamurthy (1999), the IT supports business strategies by offering a stronger competitive maintenance. While previous studies focused on the fact that the IT strategy and business strategy should be aligned, more recent studies has found various types of fit and confirmed that the performance of firm may depends on it.

Among the various types of alignment, Raymond and al.,(1995) stressed that the model of moderation is the best to explain the impact of the alignment of business strategy and IT strategy on firm performance. Similar3 results were obtained by Chan et al., (1997) relating to the strategic alignment and strategic direction of SI.

Moreover, Johnson and Lederer (2010) referred to the strategic dimensions of the model STROBE (Strategic Orientation of Business Enterprises) of Venkatraman (1989) to measure the impact of IT on firm performance. The relationship between strategic alignment of IT and firm performance has been verified in many studies (Raymond and al., 1995; Sabherwal and Chan, 2002; Baker and al., 2011; Minthas and al., 2012). So we advance our second hypothesis:

- H2: “The strategic alignment of IT has a positive impact on firm performance”.

### **2.3. STRUCTURAL ALIGNMENT OF IT AND FIRM PERFORMANCE**

The structural alignment refers to the degree of structural adjustment between IT and organizational structure. The structural alignment is influenced by the level of decision-making related to IT, reporting relationships, the (de) centralization of IT, and IT staff deployment (Chan 2002). In particular, the structural alignment between IT and organizational structure has long been regarded as a factor explaining the performance of the firm. In a decentralized organization, IT allows the delegation of authority and decisions by facilitating the dissemination and sharing of information across the enterprise (Chan, 2011).Brown and Magill (1994) proposed a simple structural typology involving IT structures that are centralized, decentralized, or hybrid. They provided evidence that each structure can be effective in certain situation. In their study, the choice of a decentralized IT structure is influenced by an independent diversification strategy, a global decentralized structure, a culture of strong autonomy. Bergeron and al. (2001) found that only the increase of structural complexity has no impact on firm performance. However, by increasing its structural complexity along with a stronger IT management, firms can increase its competitive capabilities in terms of growth and profitability. Researchers have conceptualized the structure of IT as a component of the alignment in three dimensions. The first dimension is the organizational architecture of the IT, which includes the responsible department for the IT function and the degree of decentralization of the organizational structure of IT (Allen and Boynton, 1991; Brown and Magill, 1994). The second dimension is the technology architecture, involving the degree of integration and application data, calibration technology, and nature of the deployment of equipment (Fiedler and al., 1996). The third dimension is the dimension of the process and qualifications, including mechanisms for planning and standardization of application development approaches (Allen and Boynton, 1991).Some researchers consider the alignment as the result of the structure alignment between IT and organizational structure, since they predict that the structure of IT is a reflection from the characteristics of the structure of the organization. Studies that have adopted this conceptualization of alignment are mainly interested in determining whether such relationships exist (Brown and Magill, 1995). Another line of research considers the alignment as a goal, and specify the way which the IT function should be aligned with the organizational structure (Allen and Boynton, 1991; Fiedler and al., 1996).Other researchers consider the alignment as an adjustment to the emerging common organizational structure and capabilities of IT (Henderson and Venkatraman, 1993; Croteau, 2004). However, Croteau and Bergeron (2001) explored the results of the alignment between the structure of the organization and structure of IT by adopting a perspective of co-variation. They founded that a better alignment between organization and IT enable the company to higher growth and increased profitability. Similarly, Hirschheim

and Sabherwal (2001) reported that the structure of IT reflects the configuration of IT function and responsibility of IT in decisions. Thus, they distinguish three possibilities: centralization, decentralization and sharing. Therefore, the congruence between IT strategy and organizational structure improves firm performance (Bergeron and *al.*, 2001; Jouirou and Kalika, 2004). Thus, we try to test the following hypothesis:

- H3: The structural alignment of IT has a positive impact on firm performance

## 2.4. TECHNOLOGICAL ALIGNMENT OF IT AND FIRM PERFORMANCE

The coherence use of IT is an essential element to achieve a satisfactory level of performance (Bergeron and *al.*, 2001, Croteau and Bergeron 2001). It reflects the congruence between IT strategy and technology infrastructure related to IT (Broadbent and Weill, 1993; Henderson and Venkatraman, 1993). Also by observing three factors, Jouirou and Kalika (2004) show that the strategic management of IT must be made according to, the strategic choice of the SME and its organizational structure to achieve better performance. The model of Henderson and Venkatraman (1993) does not limit the alignment relationships between pairs of variables, but simultaneously incorporates all of the links between strategy, organization and technology infrastructure. However, Chen, 2010 has shown that integration is necessary to maintain unity and coherence in the functioning of the company. It allows taking into account the horizontal nature of the relationship between services. The integration of IT in organizations is made by progressive way, but trying to achieve company goals. According to Markus and Tanis (2000), the degree of integration of IT in your organization into a company is performing better than another. One of the first requirements of an effective organizational structure is the ability of different people or units to process and transmit information within and across organizational (Mithas and *al.*, 2011). However, IT must become routine element in the activities of the value chain and business strategy in order to increase the performance of the firm (Brynjolfsson and Hitt, 2003). Armstrong and *al.*, (1999) introduce the notion of assimilation of IT within the organizational structure. Indeed, they define it as the degree of diffusion of IT in the organization and efficiency use. The sophistication of IT, as characterized in the work of Bergeron and *al.*, (2001), occurs and is measured through the organizational structure and information technology.

Moreover, investing in IT does not automatically increase the financial performance of the company. The impact of IT on business performance depends on contextual variables such as the degree of IT's maturity (Chen, 2010). Coherence between IT strategy and IT structure also promotes the firm's performance (Bergeron and *al.*, 2001; Nejati and *al.*, 2010; Raymond and *al.*, 2010, McLaren and *al.*, 2011). Therefore we will test the following hypothesis:

-H4: "The technological alignment of IT has a positive impact on firm performance".

The figure bellow shows the Alignment IT model: (Figure 1)

## 3. DESIGN RESEARCH

To study the impact of the alignment of IT on the performance of Tunisian firms, we opted for firms of different sizes and operative in different business sectors (service sector, banking sector, industrial sector). We have collected 211 responses from 650 questionnaires sent which presents a final rate of responses of 32.46% (Table 1). We note that we had to mail the questionnaire more than once to get a satisfactory number of respondents.

### 3.1. MEASURES OF VARIABLES

The variables used in our model are measured by items from previous research, in particular those of Venkatraman (1989) and Rival (2008) and adapted to our problem, or items created for the purpose of our research. These items were measured by Likert scales with 5 points. To analyze data, we have proceeded on two stages. Firstly, we have done a descriptive analyze by using SPSS software (Statistical Package for the Social Sciences) which has allowed us to describe our sample and to analyze measurement scales. This factorial analyze is used to verify scales validity and to confirm factors researched. Secondly, we have used AMOS 16.0 (Analyses Moments Structures) software, of modeling by structural equations, to test our research model. This method allowed us to evaluate, simultaneously, our propositions and measurements for the model in question.

### 3.2. ANALYSIS MODEL

The principal aim of factor analysis consists on structuring items and summarizing them in a small number of variables named factors (Evrard et *al.*, 2000). This method allows us to select from a set of initial items those which predominate in describing phenomena.

For our first construct "strategic alignment" we got three factors. The first is the "implication of managers from different departments in developing IT strategy" (IMP\_DIR), the second is the "implication of the IT managers in the management of firms" (IMP\_TIC) and finally, the last factor corresponds to the "Valuation of IT" (VAL\_TIC). The two factors obtained to measure built our second "structural alignment of IT". They correspond to

“organizational evolution” (EVO\_ORG) and the “degree of integration of IT” (DEG\_INT). As for construct “technological alignment”, two factors were identified which are “complementarily investments» (COMP\_INVNTIC) and «technological evolutions” (EVO\_TECH). The last two factors obtained to measure the construct “firm performance” are “growth” (PERF\_CROIS) and “profitability” (PERF\_RENT).

### 3.3. ESTIMATED MODEL

We propose to verify that the constructed alignment of IT emerge from the co-variation between the built strategic alignment, structural alignment and technology alignment in determining the performance of the company.(Figure 2)

After testing the model using structural equations, it appears that the conditions tested model fit to the data is generally followed:  $\chi^2/dl$  value is less than 5, it equals 3.29. The coefficients GFI and AGFI are above the standard exploratory research mentioned ( $> 0.9$ ). The GFI and AGFI = 0.950 = 0.918, reflect a good “fit” between model and data. The index is equal to 0.076 CMA and the RMSEA is equal to 0.089, the side of indices to judge the quality of model fit such as NFI and CFI, they have respectively the following values of 0.902 and 0.924. According to the results of assessment indices used, we can conclude that the proposed model fit is acceptable. Therefore, we can retain the estimates of regression coefficients and percentages of explained variance  $R^2$  for variables, which will allow us to affirm or refute our main research hypothesis.

The regression coefficient between the alignment of IT and firm performance of 0.36 is significant (Student t test of | 2.232 |). This result allows us to confirm H1 supposing “the alignment of IT positively affects firm performance.”

In order to verify the other assumptions of our model, we proceed to test the direct model to take into account the relationships between the exploratory factors. (Figure 3)

The fit of the model to the data is satisfactory according to the main fit measures.  $X^2/dl$  value is less than 5, it equals 3.023. The coefficients GFI and AGFI values are respectively 0.970 and 0.930. The index is equal to 0.065 CMA and the RMSEA is equal to about 0.096 NFI and CFI, they have respectively the following values of 0.912 and 0.941. Estimates of regression coefficients and percentages of explained variance  $R^2$  allow us to verify other hypotheses to explain the different relationships that may exist between the components of the alignment and firm performance.

The regression coefficient between the strategic alignment of IT and firm performance is significant ( $t = | 2.916 |$ ). This result allows us to confirm our first hypothesis. Similarly, the regression coefficient between the structural alignment of IT and firm performance is significant ( $t=|2.076|$ ). Therefore, our third hypothesis is confirmed. On the contrary, the regression coefficient between technology alignment of IT and firm performance is not significant ( $t=|0.658|$ ). This result allows us to reject our fourth hypothesis.

## 4. DISCUSSION OF RESULTS

Our results confirm those of previous work in IT that have highlighted the close link between the alignment of IT and performance [Chan and Huff, 1993; Brown and Magill, 1994; Chan and *al.*, (1997); Croteau and *Bergeron* (2001); Leede and *al.*, (2002), Kearns and Lederer (2003)].

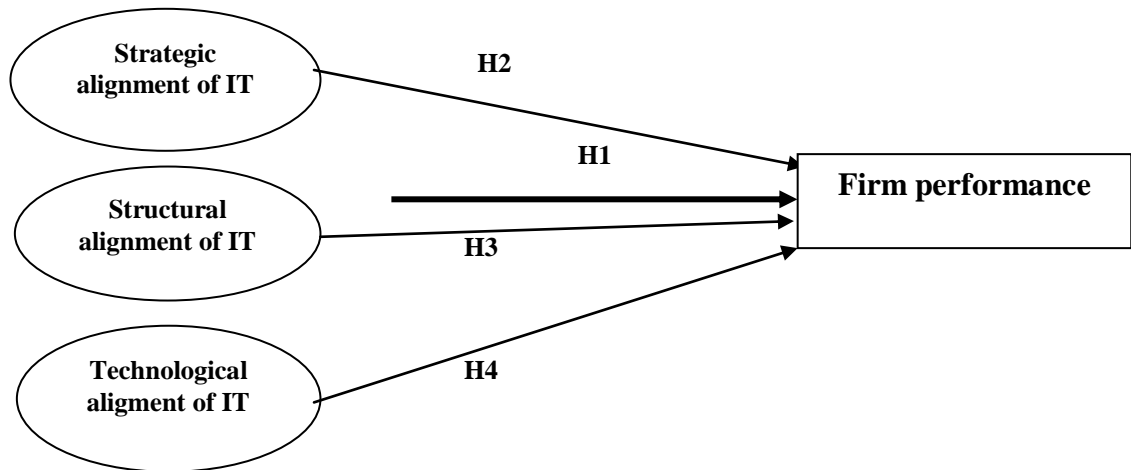


Figure1: IT alignment model

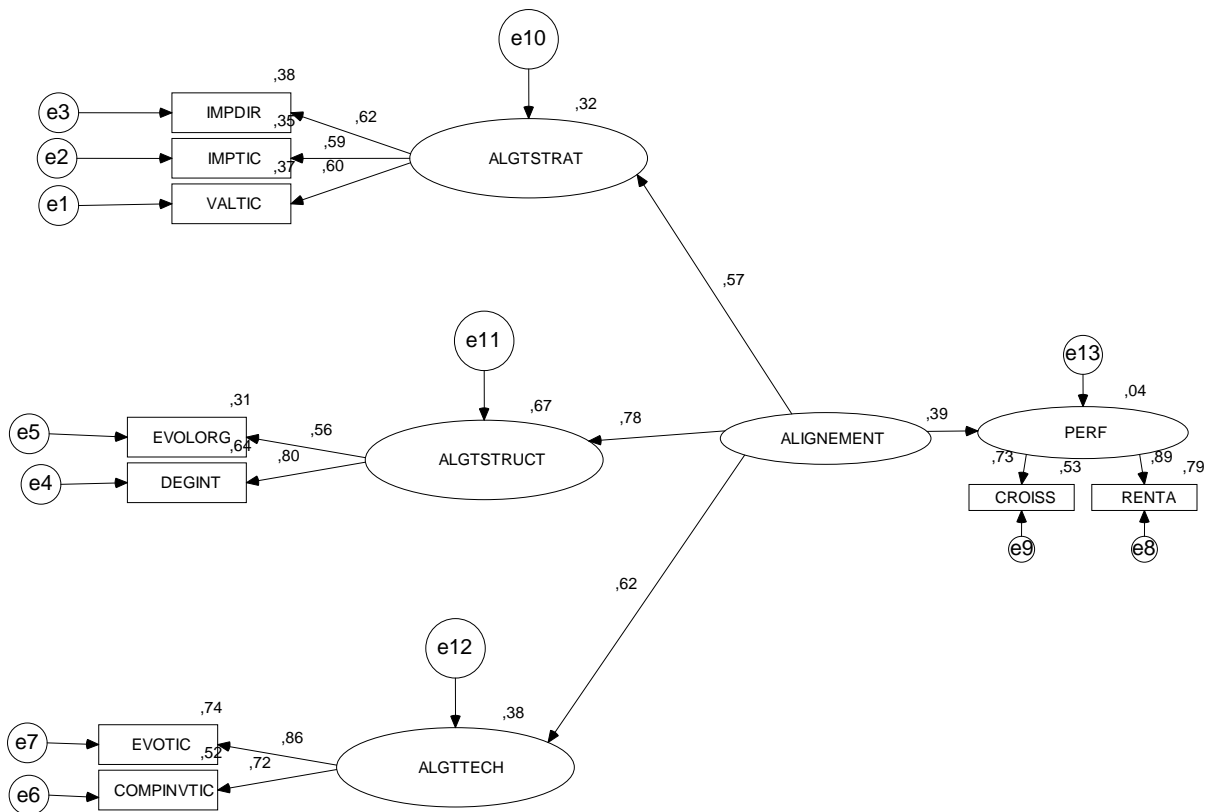
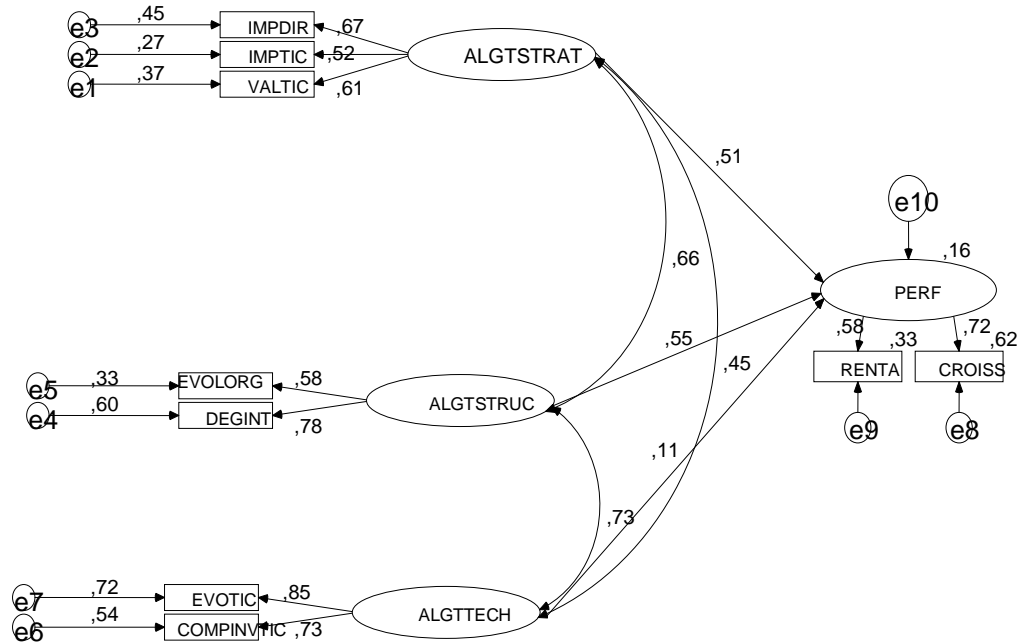


Figure 2: The structural additive model



**Figure 3: The structural direct model**

#### 4.1. STRATEGIC ALIGNMENT AND FIRM PERFORMANCE

From the results obtained, we found that strategic factors are crucial in enhancing the firm's performance. More precisely, "the implication of managers from different departments in developing IT strategy" has an important role in the contribution of IT to firm performance. Certainly, more managers participate in IT project, more they are recognizing the importance of the strategic role of IT. Subsequently, they provide continuous tracking of the evolution of their business. They organize monthly review meetings with the department, for a general account of technological activity. Chan and Reich (2007) and Luftman (2000) also highlighted the importance of the participation of leaders in the IT strategy to ensure firm performance. Moreover the implication of managers, we emphasize that the contribution of the strategic alignment of IT to firm performance is closely linked to the principal role of the IT department and valuation of IT. First, the performance observed can be explained by including the central role taken by the IT department. This can be explained by the central role that was given to the IT department at various functions within the company and thus improving firm performance. Furthermore, we also emphasize that the relationship of IT managers with managers of firms determines the importance of IT. They work together to improving business objectives, thus proves the conscience of the leaders of the central role of IT. IT becomes the fundamental element in the development and consolidation of the business strategy of the firm. The impact of the strategic alignment of IT on firm performance has been proven in various IT researches such as Bergeron *et al.*, (2001), Croteau and Bergeron (2001), Rival (2008) .

#### 4.2. STRUCTURAL ALIGNMENT AND FIRM PERFORMANCE

Improving performance through organizational evolution can be explained by the fact that IT has improved the way to work. There is a better flow of information. It has become accessible to all levels and available at any time. Coordination between services is greatly increased. Decision making are greatly improved thanks to the IT they have become clearer, more efficient and faster. The second factor is the integration of IT within the company. In fact, IT can create a common database, a very fast access to information, better sharing and better communication between the various services. Information has become automated, updated and instantly available. As an explication to this result we can stress that during the phase of the IT implementation, there's a collaboration of all members working. Therefore, the company is able to, identify and integrate in the system all the information needed. Moreover, integration and transparency of data and increased accessibility to information in real time have to constantly assess the value added of each activity. The work of Yu Yuan Hung and *al.* (2010) stressing that technology integration is the most important factor to explain the value delivered to the firm, confirm our results.

#### 4.3. TECHNOLOGICAL ALIGNMENT AND FIRM PERFORMANCE

The result of structural equation has concluded that no link exists between technological alignment and firm performance. Most respondents noted that they don't have received formation on technologies that their firms have

developed. This leads a lack of motivation of employees. Therefore be a leader in IT investment does not always means having a better performance. It seems contradict some previous researches that consider the technological alignment of IT as key to improving firm performance [(Chen2010, Bhatt and *al.*, (2010), Toms and *al.*, (2005), Bergeron and *al.*, (2001)].

#### CONCLUSION

Our research focused on the IT alignment and firm performance. Previous researches about IT alignment are few in developing countries. Therefore, our work has contributed to address the lack of research recorded at this level. The major practical contribution of our research is the possibility for firms to analyze their IT evolution, to determine the level of alignment between their strategic, structural and technological dimensions. More importantly, the concept of alignment is a very useful tool for management of IT. This research can continuously guide these directions in the alignment process. It can also allow them to have a technological and strategic vision of firms. Currently, the crucial question for any business leader is not only why we must invest in a particular technology and what technology should be chosen, but what is the real capacity of organization to ensure its coherence, in a complex technology context.

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