

## Modeling the Impact of Information System on Organizational Culture and Business-IT Strategic Alignment

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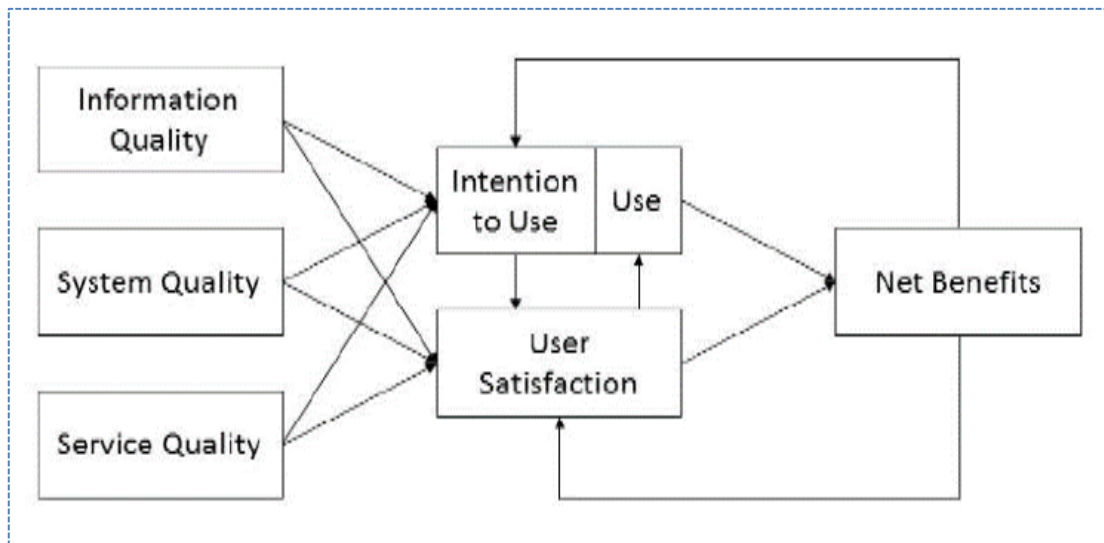
*This paper proposes a model which explores how enterprises in Lebanon recognize the role of information system in fostering the quality of knowledge and information shared among its organizational members. Principally, it seeks to investigate the significance of organizational culture in promoting the main attributes of information, the impact of cultural factors and info system factors on the level of info sharing, and the leading enablers of Business-IT Strategic Alignment in SMEs compared to Large Enterprises.*

**Keywords:** *Information System Success Model, Information Quality, Organizational Culture, Strategic Alignment, Information Sharing*

### 1 Introduction

In 1992, the Information System Success Model (ISSM) was developed by DeLone and McLean to be a model of IS success measures. In the ten years ranging between 1992 and 2003, 285 papers were published in refereed journals which “*have referred to and made use of this IS Success Model*” [1]. Thus, DeLone and McLean updated their model in 2003 in response to the additional research findings. The ISSM model, the original and then the updated one (Figure 1), has been used by most of researchers as a theoretical basis or a base model useful to investigate the role of six correlated constructs or dimensions in achieving IS success being the “dependent variable” [2], [3]. The constructs or dimensions of the D&M model formed a solid ground for nearly all following researchers who have developed frameworks used to evaluate the success of IS in improving organizational performance (e.g. Wang & Liao, 2008; Gorla et al., 2010). On the other side, there is no consensus on the definitions of organizational culture, specifically its

elements or components and thereafter the optimal measurement of its role in organizations. However, Tsoukas et al. (2011) state that organizational culture refers to institutional memory and argue that this memory is represented by a set of formal rules, informal norms, and memories shared among members of organizations [4]. Similarly, Tsai (2011) defines organizational culture to be the collection of common values and beliefs shared among employees in an organization [5]. Nevertheless, in IS research, the concept of organizational culture has been serving as the context useful to investigate the relationships between three core ISSM constructs, which are perceived information quality, system use and net benefits of system, and to recognize how changes in this factor influence the correlation between these constructs. In addition, literature reveals that measuring information sharing attitudes and perceptions of information system strategy is a significant way to recognize the role of organizational culture in the field of information system (IS) research [6], [7].



**Fig. 1.** The ISSM (DeLone & McLean, 2003) updated

Moreover, Strategic Business-IT Alignment (BITA) which is relatively a contemporary concept, has been always considered as one of the top three confrontations which face scholars, organizations executives, and IT practitioners (Luftman et al., 2013) [8]. Literature on strategic alignment asserts that there is no unanimous definition of its concept. None the less, Chan and Reich best defined strategic alignment as the common work and striving of IT and business towards accomplishing common goals and objectives (2007a) [9], while Henderson and Venkatraman defined BITA earlier as the integration level between business strategy & infrastructure and IT strategy & infrastructure (1993) [10]. Also, relevant literature shows that a lot of organizations have not succeeded in taking long-term advantage of IT; this is because of failing to minimize inhibitors and to maximize enablers (Luftman et al., 1999a). Luftman et al. (1999a) asked 1051 executives from a wide variety of US industries and ranked “Senior executive support for IT” and “IT involved in strategy development” as the number one and two enablers of BITA consecutively which represent, in turn, important aspects of organizational culture [11].

**2 Problem Statement And Evolution**

The problem exists in that the majority of previous studies have explored the effectiveness of ISSM dimensions in

maximizing the net benefits of applied IS and consequently ensuring the IS success (DeLone & McLean, 2003; Wang et al., 2007; Ramdan, 2014; Weerd, 2018). Researchers have strongly believed in the principal conclusion of the original article of DeLone & McLean (1992) stating that “IS success is a multidimensional and interdependent construct - and that it is therefore necessary to study the interrelationships among, or to control for, those dimensions” [12]. Many of following studies have empirically tested the correlation among the different constructs or measures of IS success. For instance, Jaafreh (2017) surveyed 145 employees performing jobs in the banking sector in Saudi Arabia. He reached significant findings such as a strong positive impact of quality dimensions of ISSM model (i.e. info quality, system quality and service quality) on both dimensions of user satisfaction and use, and a strong positive impact of user satisfaction, intention to use and use on the net benefit construct [13]. Additionally, Edmondson argues that an organizational culture, which fosters a psychologically safe workplace, can provide a significant support for internal collaboration and effective communication among employees (2019) [14]. Edmondson asserts that “Psychologically safe employees are more interested in learning, excellence, and genuinely connecting with others than in looking good” (2019). She adds that such type of organizations enjoying a “climate of

directness make it clear that anyone can voice a good observation or idea independent of his or her position in the hierarchy” (2019). Whereas one of the main objectives of this article is to develop a theoretical framework (Figure 2) based on relevant literature, where it goes further by researching the antecedents to those dimensions. To be precise, this framework seeks to identify the correlation between organizational culture, mainly *Information Sharing Attitudes & Perceptions of IS Strategy* aspects, and Information Quality being a major dimension of the updated ISSM model of DeLone and McLean (2003). Then, this paper concentrates on testing the potency of organizational culture in being an antecedent or a real enabler to high information quality in terms of the core features of information that are accuracy, completeness, currency, and format. *Intention*

to use IS is the intermediary between organizational culture and information quality, as the relationship between information quality and intention to use was strongly supported in literature unlike that between information quality and *Use* [15], while *social influence* construct of the Unified Theory of Acceptance and Use of Technology (UTAUT, Venkatesh et al., 2003) [16] was integrated as a direct influencer on behavioral intention to use IS due to strong support presented by the meta-analysis of Dwivedi et al. (2011) [17]. Furthermore, the authors intend to model the contribution of IS in improving the role of organizational culture in sharing high quality information among organizational members as well as the effect of IS and culture factors on the maturity level of strategic alignment and the level and quality of information exchanged.

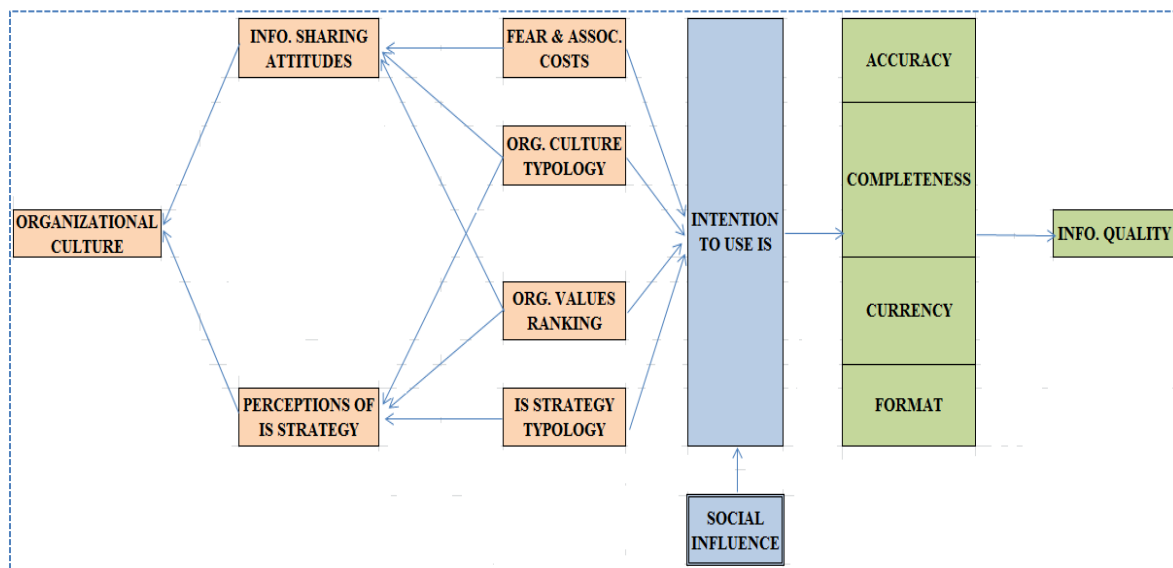


Fig. 2. The proposed theoretical concept (self-developed)

### 3 Research Methodology

The Competing Values Framework (CVF) of Cameron & Quinn (1999) comprises four types of organizational culture that are: clan, adhocracy, market and hierarchy cultures [18]. Each type is characterized by a certain level of knowledge sharing; sharing of information is compulsory in hierarchy culture, encouraged by intelligent leaders in market and adhocracy cultures, and adopted as an organizational strategy in clan culture. This has proven to be very beneficial in

boosting the tendency of employees to provide assistance and information to others, which refers to their information sharing attitudes. In addition, investigating a system's benefits, some researchers have highlighted organizational contextual factors like the nature and size of organization (e.g. Fichman, 2004). In addition, Petter et al. (2013) analyzed all antecedents to ISSM variables and concluded that support of management is the number one researched and advocated organizational feature which can expect the

success of an IS [19]. This managerial support is manifested whenever management is willing to devote various types of resources including time, training and motivation toward the use of IS in organization. Whilst employees' realization of the organizational viewpoint regarding investing in IS and spread, use, and direction of IS according to culture and other values of organization best defines the perceptions of IS strategy [20]. Chen et al. (2010) add that literature of IS strategy classifies it into aggressive or conservative strategy.

Regarding the other factors in the proposed framework, fear and associated costs are the main factors why employees might display negative attitude toward information sharing. Where an organization ranks the value of information sharing in its hierarchy of values influences the sharing process a lot. For instance, organizations which prioritize information sharing over other values are expected to have employees who display positive attitudes toward information sharing and the opposite is true.

Accordingly, a number of hypotheses are posed based on the suggested theoretical concept which, in turn, has been subject to validation. Hypotheses have been empirically tested through a questionnaire targeting 250 respondents occupying senior managerial positions in 250 companies in Lebanon, operating in several industries of different sizes. Meanwhile, it is worth mentioning that Small and Medium-sized Enterprises account for 95% of companies doing business in Lebanon where 50% of employment is operating [21]. The questionnaire was designed based on a self-developed set of questions as follows:

1. General questions about: gender, age, experience and whether it is a mandatory or voluntary use of IS.
2. General question about the size of organization: SME (e.g. family business) or large enterprise?

3. In which department does the respondent work (i.e. IT, HR, finance or any business unit other than IT)?
4. Does the organizational culture support sharing of information?
5. Is info sharing ranked as a priority value above other values?
6. Does the organizational culture support sharing of accurate information?
7. Does the organizational culture support sharing of complete information?
8. Does the organizational culture support sharing of up-to-date information?
9. Does the organizational culture care only about content, or format too?
10. Does IS provide accurate information?
11. Does IS provide complete information?
12. Does IS provide up-to-date information?
13. Does IS provide information in a good and easy to understand format?
14. Is IS strategy perceived as aggressive or conservative?
15. Does managerial culture reward employees for sharing accurate, complete and updated info in an easy form?
16. Do business executives understand all aspects of IT department such as its current resources, infrastructure, strategy, etc.?
17. Do IT executives understand all aspects of business cycle like processes and procedures, customers, competitors, etc.?
18. Is there an effective and efficient form of communication and information sharing between business and IT senior managers?
19. Could the maturity level of strategic alignment be ranked as high enough to contribute to achieving common business and IT goals?
20. Is the presence of a committee, formed by business and IT senior managers, which holds regular meetings to discuss shared issues and make necessary decisions, a necessity?

Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
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1	2	3	4	5	6
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The authors decided to follow a 6-point Likert scale. These scaled-response format questions have been answered by the survey respondents in a way that “1” represents a complete disagreement of respondent toward a specific question; whereas moving from “1” till “6” reflects the inclination of a respondent to show a certain degree of agreement till reaching a complete agreement at “6”.

Hypotheses are as follows:

1. Fear and associated costs have a negative impact on information sharing, consequently on information quality.
2. Typology of organizational culture has a positive impact on information sharing, consequently on information quality.
3. Ranking of organizational values has a positive impact on information sharing, consequently on information quality.
4. Typology of IS strategy has a positive impact on information sharing, consequently on information quality.
5. Organizational culture, precisely *information sharing attitudes* and *perceptions of IS strategy*, has a positive impact on information sharing and consequently on information quality.
6. Size of company has a significant influence on the role of organizational culture in motivating information sharing and consequently influencing the information quality.
7. Size of company has a significant influence on the role of strategic

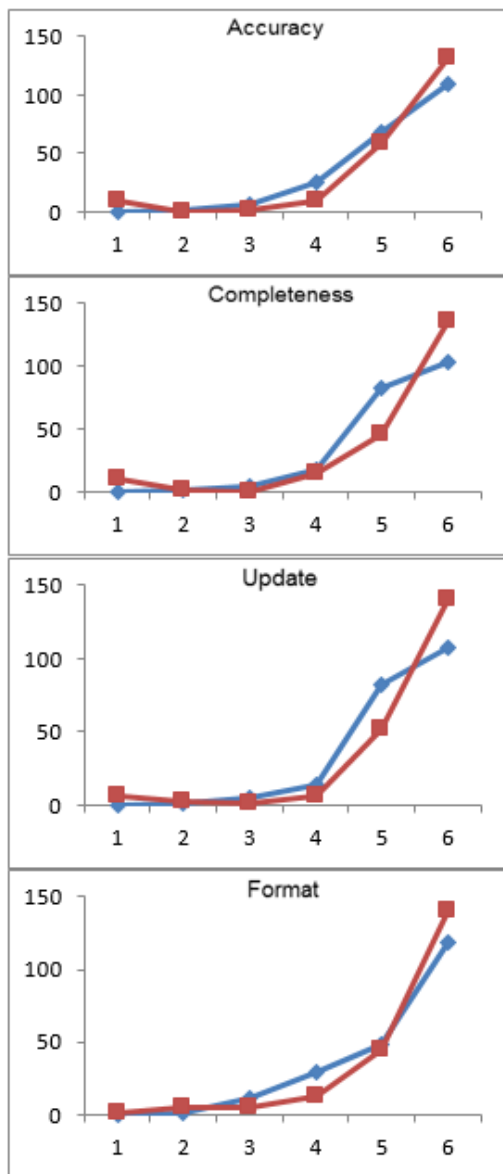
alignment in motivating information sharing and consequently influencing the information quality.

8. Business-IT Strategic Alignment’s maturity level has a favorable impact on information sharing and consequently on information quality.

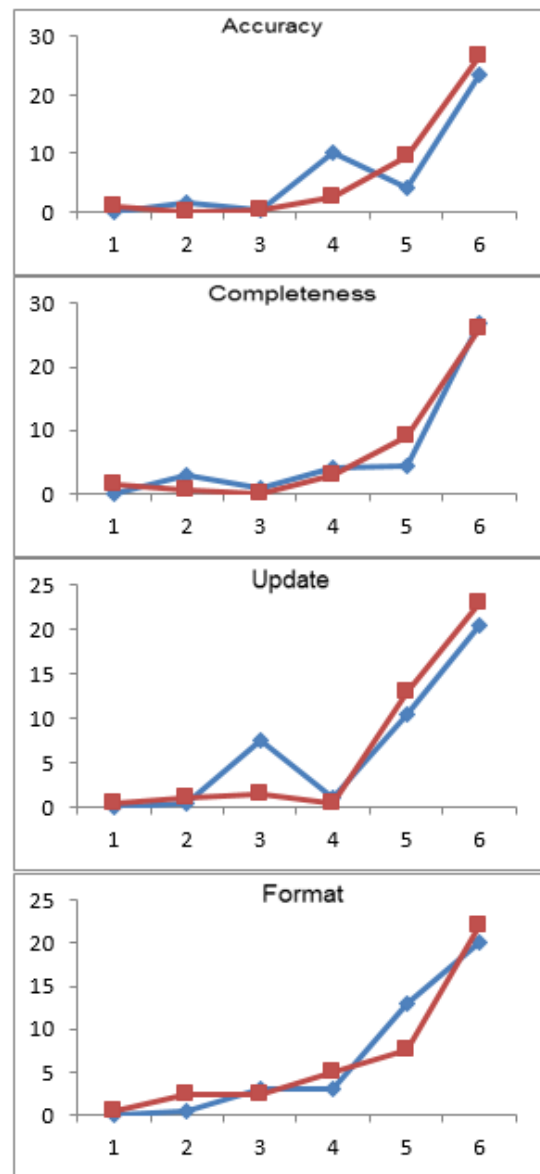
The conducted survey has a number of specified objectives. It pursues the identification of how companies, of different sizes, recognize the role of recent technology and information system in supporting the spreading of internal culture which favors information sharing and cooperation and in improving the quality of shared information in terms of completeness, accuracy, up-to-date information and presentation in easy to understand format. This means to test the leverage of organizational culture in being a good antecedent to information quality dimension leading, together with other dimensions of ISSM, to the success of IS. Likewise, it looks forward to determining the direction of relationship between organizational culture and BITA; does the powerful causality arise from organizational culture toward BITA or vice versa?

#### 4 Findings and Interpretations

In each aspect of the tested hypotheses, we differentiate between the findings concluded from the survey conducted in SMEs compared to big organizations in Lebanon.



**Fig. 3a.** Matching IS features (dotted Red) with organizational culture expectations (dotted Blue) in SMEs



**Fig. 3b.** Matching IS features (dotted Red) with organizational culture expectations (dotted Blue) in Big Organizations

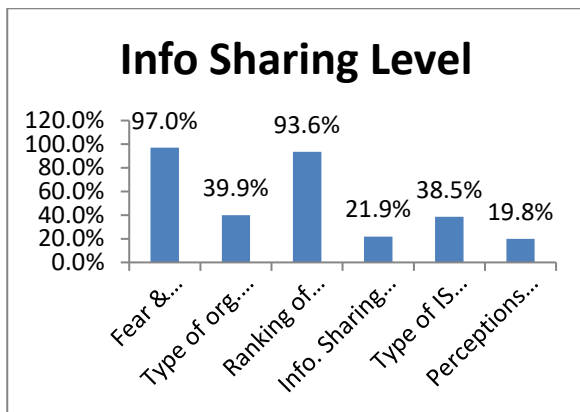
In both categories of surveyed organizations, SMEs and big enterprises, the spreading of information system is somehow alike (Figures 3a & 3b).

First group, containing few companies, benefits of IS support to implement their strategies; however they do not recognize the significant role of information sharing within organizational culture. There is another group of companies for which the expectations from IS in terms of spreading internal culture are not achieved. Lastly, most of surveyed companies understand perfectly the

importance of new technology or information system, not only in supporting the spreading of internal culture which favors information sharing and cooperation, but also in improving the quality of shared information in terms of completeness, accuracy, up-to-date information and presentation in easy to understand format.

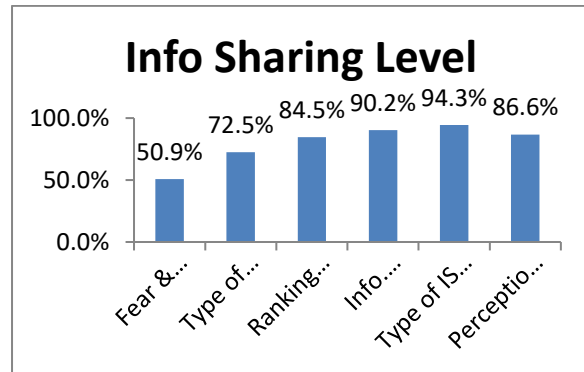
Looking into details of the four information attributes in SMEs, *Completeness* seems to work in tandem with *Updating* and *Accuracy* with *Format*. Attributes of the first couple are much more similar and closer to each other

than those of the second pair; so for further analysis we can give up to *Update*. In big companies however, *Updating* seems to work in tandem with *Format* but *Accuracy* and *Completeness* work independently; accordingly, we can give up to *Update* in the coming analysis.



**Fig. 4a.** Correlation % between the level of info sharing & the factors/enablers impacting that level in SMEs

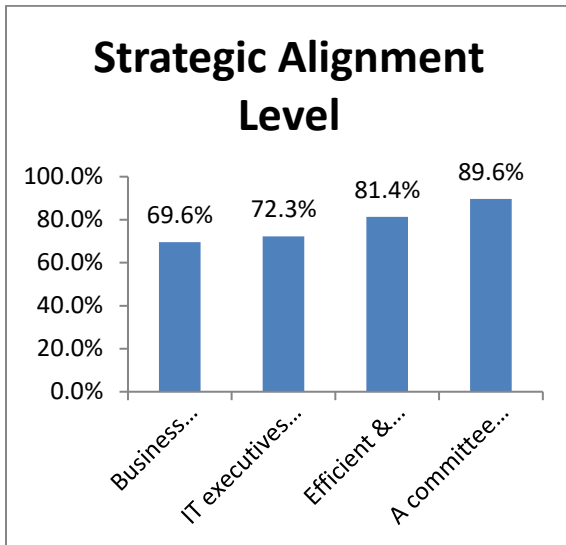
Regarding the six factors included in the proposed theoretical framework, findings show that 94% of SMEs see that the level of information sharing is dependent on four main factors directly related to organizational culture that are: fear and associated costs, type of OC, ranking of organizational values and information sharing attitudes. However, only 15% of SMEs think that this level is dependent on IS factors which are type of IS strategy and perceptions of IS strategy. More interestingly, fear and associated costs and ranking of organizational values (OC factors) are the top first and second ranked enablers impacting the level of information sharing in SMEs working in Lebanon consecutively (Figure 4a).



**Fig. 4b.** Correlation % between the level of info sharing & the factors/enablers impacting that level in Big Organizations

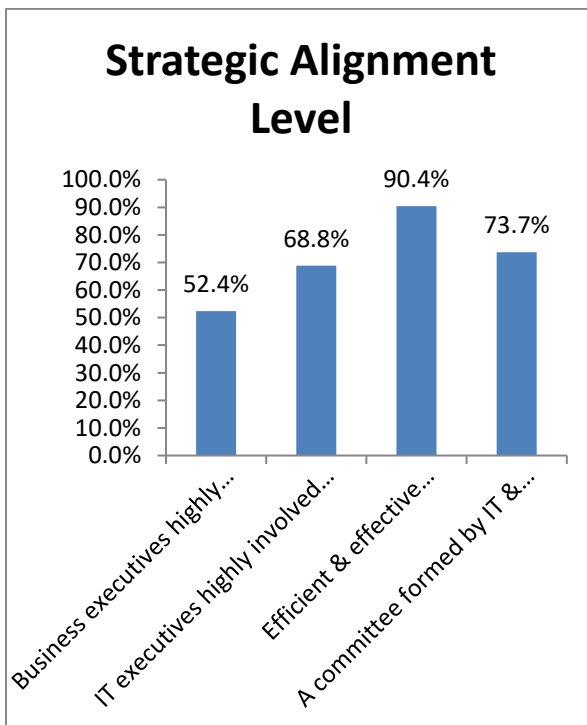
On the other side, 88% of big organizations believe that the level of information sharing is dependent on OC factors and 95% of them see it dependent on IS factors. Moreover, type of IS strategy (IS factor) and information sharing attitudes (OC factor) are the number one and two enablers impacting the level of information sharing in big enterprises doing business in Lebanon consecutively (Figure 4b).

Last findings answer the last two hypotheses concerning the Business-IT Strategic Alignment in the surveyed organizations. Four enablers or factors were tested for their potential influence on the maturity level of BITA; these enablers are *Business executives' involvement in IT*, *IT executives' involvement in business*, *Efficient & effective communication between business & IT*, and *Committee formed by business & IT executives*. In SMEs, the maturity level of BITA is 85% dependent on these factors where the joint committee and efficient communication between business and IT are the top two enablers affecting BITA maturity level. This implies, in turn, the important contribution of a highly mature BITA in sharing high quality information among executives across various departments within SMEs (Figure 5a).



**Fig. 5a.** Correlation % between the maturity level of BITA & the factors/enablers impacting that level in SMEs

Similarly, the maturity level of BITA is 85% dependent on these factors but efficient communication between business & IT and a joint committee are the first and second most influencing enablers on the maturity of BITA in big organizations (Figure 5b).



**Fig. 5a.** Correlation % between the maturity level of BITA & the factors/enablers impacting that level in Big Organizations

Information system - organizational culture dependencies work in cross directions; an information system, supported by the latest facilities, contributes to the spread of a highly performing and efficient organizational culture. Simultaneously, a healthy organizational culture boosts and motivates online organizational communication. Yet, the authors adopted the premise stating that the most powerful causality emerges from information system toward organizational culture which successively helps to validate the mapping of information system in to the organizational needs.

To test the goodness of fit between IS progress and OC perceptions under a CHI Square paradigm, the authors took the technological changes (more stable and easier to have more precise measures) as expected values for OC, in terms of accuracy, completeness, updating and data format. For actual perceptions of OC over the same characteristics, we conclude that  $391.64 \gg 30.6$  critical value at 0.01 significance for 15 degree of freedom; this shows a major improvement of OC based on IS developments. Consequently, null hypothesis (no influences of IS on OC) is rejected with a rate over 99%.

**5 Conclusions**

This paper represents a comparative investigation of the impact of IS on both OC and BITA in SMEs vs. large enterprises. It provides a privilege concerning the exploration and modeling of the influence of organizational culture on *Information quality*, being a critical success dimension or factor of the ISSM model, contributing to the success of IS implemented in organizations.

Also, through reviewing the available literature on organizational communication and cooperation, the authors succeeded to produce a theoretical concept encompassing a group of six interrelated factors which have shown to have important impacts on organizational culture. These factors are fear and associated costs, organizational culture typology, organizational values ranking, IS strategy typology, information sharing attitudes, and perceptions of IS strategy.



Additionally, the conducted survey tested the influence of the six factors on the level of information shared and thereafter ranked the top two enablers of that level while segregating these factors into OC and IS dimensions.

Over and above, this paper aims to rank the enablers of strategic alignment due to its vital role in the success of numerous organizational sides such as communication, culture and performance.

At last, as the current survey has taken place in Lebanon, it should attract other scholars to undertake future studies focusing on countries that enjoy a different social and business culture like Romania or concentrating solely on organizations doing business in the same industry (e.g. manufacturing, banking sector, tourism).

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