Moderating Effects of Human Factors on IT-Business Alignment and IT Effectiveness in Modern Firms

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Information technology (IT) emerges as an essential asset of modern firms' competitive advantage, because it connects all business functions and supports managerial decision processes - both essential conditions for the attainment of the organization agility level. However, many modern firms experience difficulties on attaining its competitive edge, mainly because of a deficient IT-Business managerial role that, either deliberately or involuntarily, ignores the moderating effects of human factors - social determinants that are common elements to all hierarchy levels, of every business unit, within any modern firm. This work emphasizes the importance studying the IT-Business management function, as the organization's main trigger for the attainment of the IT-Business Competitive Advantage, through an appropriate management of the moderating effects of human factors. This research paper also proposes a business conceptual model - "The Five-Level Triad of IT-Business Competitive Advantage" - which predicts the achievement of a modern firm IT-Business Competitive Advantage, through the advancement of five progress levels - IT-Business Managerial Role Efficiency, Employee Alignment, IT-Business Alignment, IT Effectiveness, and Firm's Agility. The rationale of the model is supplemented by the referenced literature and the application of a measuring instrument, which assists in the examination of the alignment maturity level, between IT and Business organizational objectives. The model acts as a guide to any modern firm IT-Business managerial function, which aims for the successful design of an effective IT strategy, on the road to the conquering of the IT-Business competitive advantage.

Introduction

Although the objective of any Information Technology (IT) business unit is the enhancement of modern firm's performance - through the improvement of the quality of managerial decisions - in the absence of an adequate alignment between IT and Business objectives, the attainment of the firm's agility status is jeopardized, and consequently, the chances of achieving the IT-Business competitive advantage are reduced. Managerial decisions are essential judgments for the development and implementation of business strategies, and as suggested by the literature review presented herein, an underperforming IT-Business managerial role, indeed fails on the task of efficiently managing the moderating effects of human factors, acting as an inhibitor of the alignment between IT and Business objectives, and jeopardizing the firm's overall performance toward the attainment of its IT-Business competitive edge.

Human factors are social determinants with dual nature - enablers or inhibitors of modern firms' technological objectives – that produce main challenges to the IT-Business managerial role, which shall execute timely and efficient management decisions, on the way to achieve the firm's ultimate objective, the IT-Business competitive advantage. Since social determinants are common elements to all hierarchy levels, of every business unit, within any modern firm, it is vital its adequate addressing by the management function, as a fundamental and initial strategy toward an efficient managerial role. The procrastination of many IT-Business managerial functions, either deliberately or involuntarily, toward the potential and real effects of human factors, leaves to the fortune the fulfillment of technological objectives and the achievement of the firm IT-Business competitive advantage. The paper highlights the relevance of the IT-Business management function in addressing, on a timely and efficient basis, the moderating effects of human factors, on the pursuit of the firm's IT-Business competitive advantage.

This work presents a business conceptual model, "The Five-Level Triad of IT-Business Competitive Advantage", which predicts the achievement of IT-Business Competitive Advantage in modern firms, through the advancement of five progress levels - *IT-Business Managerial Role Efficiency,*

Employee Alignment, IT-Business Alignment, IT Effectiveness, and *Firm's Agility*. The rationale of the model is supplemented by the referenced literature as well as the application of an alignment measuring instrument, which assists in the examination of the alignment maturity level, between IT and Business organizational objectives. The model acts as a guide to a modern firm IT-Business managerial function, which aims for the successful design of an effective IT strategy, on the road to conquering the IT-Business competitive advantage. This work considers whether the act of modeling the moderating effects of human factors - by the IT-Business managerial role - is the right approach to solving the dilemmas faced by modern firms toward the attainment of its IT-Business competitive advantage. This research addresses the following discussion topics.

1. Strategic Management: Foundation of the IT-Business Competitive Advantage
2. The Influence of Social Determinants in Corporate Alignment
3. Corporate Alignment Measuring Schemes
4. The IT-Business Competitive Advantage Conceptual Model

Understanding how to model the moderating effects of human factors - by the IT-Business management function - on the way to achieve corporate alignment, highlights a solution to the common struggle experienced by most modern firms, toward the achievement of its IT-Business competitive advantage.

Strategic Management: Foundation of the IT-Business Competitive Advantage

The efficiency of the IT-Business managerial role has its origins on the doctrines of strategic management. Strategic management is defined as the art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its objectives.[8] A strategic management process is driven by the belief that organizations should continually monitor internal and external events and trends, so that timely changes can be made as needed. (For the purpose of this research, the monitoring activity is only referred to the internal events produced by the moderating effects of human factors.) A strategic management process calls for a timely and efficient intervention of the IT-Business management function, headed for the deployment of organizational strategies that take a modern firm to its IT-Business competitive advantage. The strategic management process

is represented as Level 1: *IT-Business Managerial Role Efficiency*, a business conceptual model denoted by Figure 1 - "The Five-Level Triad of IT-Business Competitive Advantage". Level 1 pursuit the goal of an agile enterprise, one that is able to adapt rapidly, because of bad economic conditions and advances in mobile technology [9].

A strategic management process deals with the enforcement of policies and practices that enable the organization to astutely identify, and effectively adapt to change, in order to survive the competition. Three stages distinguish the strategic management process: *strategy formulation*, which includes developing a vision and mission and identifying an organization's external opportunities and threat, while determining internal strengths and weaknesses; *strategy implementation*, which requires a firm to establish annual objectives, devise policies, motivate employees, and allocate resources so that formulated strategies can be executed; and finally, *strategy evaluation*, which is the primary means for obtaining information about why particular strategies are not working well. Three activities are included in *strategy evaluation*: reviewing external and internal factors that are the bases for current strategies, measuring performance, and taking corrective actions [8]. This research discusses further on the application of a measuring instrument that determines the alignment maturity level between IT and Business objectives, assisting in the improvement of the quality of managerial decisions.

The strategic management activity is not merely a formal system for control, but a system that facilitates learning processes; avoids bureaucratic mechanisms to successfully familiarize managers and employees with key strategic issues; use numbers to support words (instead of words to support numbers) when explaining strategic issues and organizational responses; and practices good business ethics that shall be applicable to society, the organization, and the natural environment. The involvement of IT-Business managers and employees, as active participants, in the strategic management processes, gives the opportunity to develop and grow the organizational culture based on open communication, trust, transparency, team work, collaboration, and encouragement for an easy flow of ideas and different points of view, resulting in a sense of loyalty to the firm.

The IT-Business management function – ultimate facilitator of the strategic management process - must exhibit the attributes (aptitudes and attitudes) necessary to perform the effective leadership role, on the way to the successful administration of the moderating effects of human factors. A fact is

that the individuals, who perform IT-Business management functions, possess her/his set of managerial tools, designed and applied, according to her/his attitudes and aptitudes. (For the purpose of this paper, the terms "attitude" and "aptitude" are applied on the merits of the following definitions.)

"Attitude is a predisposition or a tendency to respond positively or negatively towards a certain idea, object, person, or situation. Attitude influences an individual's choice of action, and responses to challenges, incentives, and rewards (together called stimuli)." [1]

"Aptitude is acquired or natural ability (usually measurable with aptitude tests), for learning and proficiency in a specific area or discipline. Aptitude is expressed in interest, and is reflected in current performance which is expected to improve over time with training." [2]

Once the necessary social determinants (adequate attitudes and aptitudes) of the IT-Business management function are displayed at all hierarchy levels, of every business unit, within the organization, the Level 1 – IT-Business Managerial Role Efficiency – is achieved, the strategic management function is fulfilled, and the firm is ready to evolve from Level 1 to Level 2 – Employee Alignment, as is established by the business conceptual model, denoted by Figure 1 – "The Five-Level Triad of IT-Business Competitive Advantage". This process acknowledges that strategic management is the foundation of the IT-Business Competitive Advantage.

The Influence of Social Determinants in Corporate Alignment

Since Information Technology (IT) is generally considered an enabler of a firm's agility [3], the harmonization between IT capability and Business activities – IT-Business alignment - ensures speedy, effective, and efficient translation of innovative organizational responses. This harmony is dependent to a significant extent on moderating the effects of human factors, which influence on the alignment success, and consequently, on the IT effectiveness level.

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1 http://www.businessdictionary.com/definition/attitude.html
2 http://www.businessdictionary.com/definition/aptitude.html

According to empirical and theoretical literature few circumstances that influence corporate alignment are: IT characteristics, connections between IT and business planning systems, communication between IT and business executives, and implementation of previous IT plans.5 The literature defines "alignment" fundamentally affirming the same judgment:

• "The degree to which the *information technology* mission, objectives, and plans support and are supported by the *business mission*, objectives, and plans. The determinants of alignment are likely to be processes, for example, communication and planning."[5]

• "The process and goal of achieving competitive advantage through developing and sustaining a symbiotic relationship between business and IT."[1]

• "Alignment focuses on the activities that management performs to achieve cohesive goals across the organization."[4]

The "alignment" definition involved the presence of social determinants as the common element of this organizational process. *Human factors* such as: *communication*, which deals with information exchange among the different actors (people) within the organization; *planning*, which relates to the strategy for the execution of the firm mission; *symbiotic relation*, which implies an agreement that benefits two or more parties (people, business units); and *cohesion* between IT and Business management functions, which implies a synergic collaboration on the way to attain a common goal, are few of the essential elements required to achieve the IT-Business competitive advantage.

The maturity of the IT-Business alignment produces a link that drives the organization to its firm's agility – requirement for the IT-Business Competitive Advantage [2].

Since human activities have the potential to influence the harmonization between IT capability and Business activities, it is also envisioned the fact that IT implementers' responses to IT user resistance certainly influence the IT-Business alignment too [6]. The literature firmly establishes there are two sides of the same coin - IT user resistance and IT implementer's responses to user resistance – that potentiate or impede IT-Business alignment.

The "user resistance" factor is classified into five categories: *manifestations of resistance*, which is generally defined as a set of behaviors – such as apathy, sabotage, destructive behavior, denial, persistence of former behavior, and formation of coalitions - enacted by users to manifest some discontent with the implementation of a new IT; *subject of resistance*, which

refs to the actor or actors – such as group or an organization - exhibiting resistance behavior; *object of resistance*, which is associated with the significance that the system has to the user, such as a loss of power or a loss of status; *perceived threats*, which corresponds to the negative assessment that users make on the IT implementation, and *initial conditions*, which refers to the characteristics of the environment that interact with the object of resistance and influence the assessment that users make of the situation.

The "IT implementers' responses" factor is mainly responsible for the attainment of the harmonization between IT and Business objectives - IT-Business alignment [6]. IT implementers - business managers, functional managers, IT professionals - can assume attitudes such as inaction, acknowledgment, rectification, dissuasion, to user resistance. IT implementers is defined as "those responsible for the introduction of the technology to prospective users" and "those responsible for the successful use of the system implemented". The literature suggests that key interventions made by implementers may influence how resistance evolves and mentions that some actions taken to prevent resistance are: analyzing contextual factors, creating and communicating a vision, determining the optimal pace of change, and providing training and emotional support.

Identifying root causes and remediating/preventing the manifestation of new occurrences shall be an efficient strategy for the IT-Business managerial role to practice. Although the literature recognizes the importance of user resistance, it establishes that it has been paid little attention to IT implementers' responses and their effect on the IT-Business alignment effort, when resistance occurs. The research literature implies the importance of a timely and efficient intervention of the IT-Business managerial role in moderating the effects of human factors, and the examination of positive human factors as determinants for the firm's agility.

A main reason to focus the research objective on the employee perspective (user resistance) is because managers often know the IT-Business organizational strategies, but they flunk to effectively communicate (a social determinant) important information to other employees within the organization, resulting in the failure to achieve "*IT-Business Managerial Role Efficiency*", Level 1 of the business conceptual model. Miscommunications between IT-Business managers and employees leaves room for perception (a social determinant) errors between both parties, reducing not just the chances of achieving Level 1, but also Level 2 – "*Employee Alignment*", of the business

conceptual model denoted by Figure 1 – "The Five-Level Triad of IT-Business Competitive Advantage".

The literature states that *Employee Alignment* is particularly affected by the employees "perception" (a social determinant), which promotes positive reactions (like synergic ones) or negative reactions (like uncooperative employees) that ultimately influence the attainment of IT-Business Competitive Advantage [1]. It also demonstrates that human factors associated to the employee, such as *perceived* organizational trust, *perceived* communications on IT-Business strategies to employees, and perceived knowledge on IT-Business strategies, have a positive and significant relationship on IT-Business Alignment [1].

Perceived organizational trust is a necessary human factor since it assists in the organization's success. Every organization requires the trust factor, including trust between managers and employees, as well as trust between employees and the organization. The trust factor occurs when an employee willingly becomes vulnerable to another, in exchange for a mutually beneficial outcome. *Perceived* communications on IT-Business strategies to employees refers to the benefits of a good communication, which is necessary for the successful implementation of a strategy. The communication factor is relevant for alignment and is considered successful if the transferred information from the sender to the receiver, its being fully understood by the receiver. *Perceived* knowledge on IT-Business strategies refers to the knowledge factor, which is a key foundation of the competitive advantage for an organization. The achievement of *Employee Alignment* can be affected by the moderating effects of the "perception" factor. The alignment of the employee is only achieved when the employee's behavior is compatible to the organization's strategy.

Since previous discussion dealt with employee-related human factors that influence the achievement of *Employee Alignment*, Level 2, however, further literature discussion evidences the occurrence of IT-Business management function-related human factors, which affect the achievement of *IT-Business Alignment,* Level 3 of the business conceptual model denoted by Figure 1 – "The Five-Level Triad of IT-Business Competitive Advantage".

The literature establishes that *IT-Business Alignment* can be enabled or inhibited [4]. Achieving alignment between IT and Business objectives is and evolutionary and dynamic process that requires strong support from senior management, good working relationships, strong leadership, appropriate prioritization, trust, effective communication, as well as a thorough

understanding of business environment. In general, the achievement of *IT-Business Alignment* demands focusing on maximizing the enablers and minimizing the inhibitors.

Some enablers of *IT-Business Alignment*, Level 3, are: senior executive support for IT; IT involvement in strategy development; IT understanding of business; IT and business close relationship as partners; IT strong leadership; well prioritized IT projects; IT meeting commitments; IT achieving strategic goals; IT and business good communication. Inhibitors of the IT-Business alignment are social determinants that represent the opposite to all human factors previously stated. Also, factors related to "understanding" and "commitment" - such as shared knowledge, implementation success, communication, and convergence of planning objectives - influence the social dimension of alignment between IT and Business objectives [5].

In order for IT and Business objectives to harmonize and reach a common goal – IT Effectiveness, Level 4 of the business conceptual model denoted by Figure 1 – "The Five-Level Triad of IT-Business Competitive Advantage" - it is required the alignment of business units at both the planning (strategy) and execution (tactic) levels [7]. Alignment at the planning or strategic level ensures that IT plans and business plans are synchronized. Alignment at the execution level ensures that planned applications are successfully implemented, maintained and used, supporting the organization strategic goals. At both levels – planning and execution – social determinants emerge as a common element and require the modeling of a timely and efficient managing of the IT-Business managerial role.

Modern firms' performance depends on its agility. The importance of Firms' Agility is to be able to adapt rapidly to the competitive environment. It is essential for a modern firm to be an agile enterprise because of bad economic conditions and advances in mobile technology that may jeopardize its competitive edge [9]. Firm's Agility is represented by the last progress level, Level 5, of the business conceptual model denoted by Figure 1 – "The Five-Level Triad of IT-Business Competitive Advantage".

Once a modern firm achieves the corporate alignment – the fulfillment of the five progress levels (IT-Business Managerial Role Efficiency, Employee Alignment, IT-Business Alignment, IT Effectiveness, and Firm's Agility) of the business conceptual model, denoted by Figure1 – "The Five-Level Triad of IT-Business Competitive Advantage", signifies that the social determinants to all hierarchy levels, of every business unit, have been adequately addressed

and modeled by the IT-Business management function. The IT-Business managerial role has been successful in its intent to modeling the moderating effects of human factors throughout the organization.

The achievement of the IT-Business Competitive Advantage is a dynamic process that requires continuous monitoring - of the alignment maturity levels – by the IT-Business management function, in order to get support for the managerial decision processes that lead to the corporate continuous improvement and the development of innovative business strategies – vital elements for the attainment of the Firms' Agility.

Corporate Alignment Measuring Schemes

As stated earlier in this research paper, the strategic management process is driven by the belief that organizations should continually monitor internal and external events and trends, so that timely changes can be made as needed [8]. In this intent, the discussion of a measuring scheme is available to the IT-Business management function.

The literature suggests a measuring instrument that assists the IT-Business management function in the determination of the IT-Business alignment maturity level, through the use of a survey instrument, that addresses the alignment gaps between IT and business. This specific instrument is based upon the Strategic Alignment Maturity Model (SAMM). SAMM proposes that IT-Business alignment can be captured according to six areas of maturity: *communication maturity,* which ensures ongoing knowledge sharing across the organization and the understanding of business by IT and vice versa; *competency/value measurement maturity*, which demonstrates the value IT is contributing to the business; *governance maturity*, which ensures that the appropriate participants of business and IT are reviewing the priorities and allocation of IT resources; *partnership maturity*, which reflects the level of trust developed among participants of IT and business in sharing risk and rewards; *scope & architecture maturity*, which signifies the level of flexibility and transparency the IT is providing to business; and *skills maturity*, which reflects the level of innovation, change readiness, hiring, and retaining, and how they are contributing to the overall organizations effectiveness.

SAMM describes the various attributes that contribute to each of the six areas. Collectively the six areas have thirty-eight attributes defined, and for each attribute, SAMM defines the characteristics at various levels of maturity.

For each of these areas, this maturity model classifies the alignment between IT and Business into five levels: initial, committed, established/focused, improved/managed, and optimized. With the application of this measuring instrument the IT-Business management function may discover interesting findings which lead to alternative remedial strategies for better alignment, and for a sustainable IT-Business Competitive Advantage.

The IT-Business Competitive Advantage Conceptual Model

Figure 1 shows a business conceptual model built on the author's interpretation of the referenced literature. The conceptual model predicts the likeliness of a modern firm to attain its IT-Business Competitive Advantage, through the advancement of five progress levels, which are triggered by the timely and efficient intervention of the IT-Business managerial role, when the management function addresses and models the moderating effects of human factors at every hierarchy level, of every business unit, within the organization.

(*)The higher the progress level achieved the more likely for the organization to conquer its competitive edge.
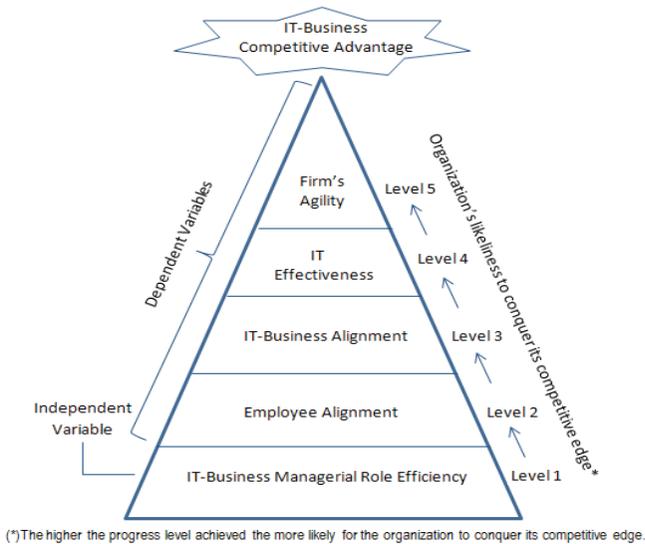
Figure 1: The Five-Level Triad of IT-Business Competitive Advantage

The model suggests the study of five variables that are positively correlated when analyzed in the forward direction (from Level 1 to Level 5): *IT-Business Managerial Role Efficiency (Level 1)* is considered the independent

variable, while *Employee Alignment (Level 2), IT-Business Alignment (Level 3), IT Effectiveness (Level 4), and Firm's Agility (Level 5)* are identified as dependent variables. The paper suggests that the attainment of each progress level is the result of timely and efficient administration of the variables, made by the IT-Business management function, resulting in a positive impact on the conquering of the organization's IT-Business competitive advantage.

The accomplishment of *IT-Business Managerial Role Efficiency* is founded on strategic management processes with the main objective of attaining the *Firm's Agility*.

This research paper highlights the relevance of the IT-Business management function in addressing, on a timely and efficient fashion, the moderating effects of human factors, on the way to move from one progress level to the next, until finally attaining the IT-Business competitive advantage, and sustaining the accomplishments of all five progress levels.

According to the model, the IT-Business management function must have the attributes (i.e. aptitudes and attitudes) to execute a leadership role and administer each one of the objectives defined at the progress levels by moderating the effects of human factors all hierarchy levels, of every business unit, within any modern firm. The model suggests that there is an accumulative effort to go from one level to the next since the accomplishment of the levels must be sustained all the way through. In order to keep moving from one level to the next - increasing the organization's likeliness to conquer the IT-Business competitive edge – it is required to sustain of objectives from previous levels. The accomplishment of Level 3 requires a sustainable accomplishment of Level 1 and Level 2. Once an objective is not accomplished on a sustainable fashion, IT-Business Competitive Advantage is at risk.

The proposed business conceptual model, *"The Five-Level Triad of IT-Business Competitive Advantage"*, predicts the organization's likeliness to attain IT-Business competitiveness, and its concepts and rationale are applicable, not just to modern firms with Internet-based business models (e-commerce), but also to modern firms with traditional business models (not Internet-based).

The approach stated by the business conceptual model, highlights the fact of the moderating capacity of the independent variable (Level 1) over the dependent variables (Level 2 thru 5), but disregards the reality that the independent variable is also actively moderated, especially by social determinants that are inherent to it.

In general, the independent variable is strongly moderated by

inherent social determinants, such as managerial attitudes and aptitudes. (This phenomenon is not object of study of this work and is being excluded from the scope of the paper.)

Conclusions

Human factors - social determinants that possess the potential to prevent and promote the achievement of the organization technological objectives to attain the IT-Business Competitive Advantage - are frequently ignored, either deliberately or involuntarily, by the IT-Business management function, producing moderating effects that obstruct the IT-Business competitive edge.

The IT-Business managerial roles are the ultimate responsible for the accomplishment of these objectives, through the diligent address of the moderating effects of "human factors" – common element to all hierarchy level, of every business unit, within any modern firm.

The proposed business conceptual model, *"The Five-Level Triad of IT-Business Competitive Advantage"*, predicts the organization's likeliness to attain IT-Business competitiveness, through the achievement of five progress level represented by one independent variable and four dependent variables, which are ultimately administered by the IT-Business management function.

The concepts and rationales proposed by the business conceptual model, are applicable, not just to modern firms with Internet-based business models (e-commerce), but also to modern firms with traditional business models (not Internet-based).

The *IT-Business Managerial Role Efficiency* (Level 1) is based on the doctrines of Strategic Management, which aim for the *Firm's Agility* (Level 5) as the ultimate organizational objective.

The measuring instrument identifies alignment areas that relate to benchmarking, business metrics, strategic business planning, inter / intra organizational learning, architectural integration, and the impact of IT on business processes, evidencing that the alignment maturity level between IT and Business, is function of particular variables that closely relate to social determinants - human factors.

The independent variable - *IT-Business Managerial Role Efficiency* - is also affected by human factors, both external and internal, but mostly influenced by those inherent to it, resulting in a management performance

driven as well by its own moderating effects.

References

[1] Chong, A., Ooi, K., Chan, F., Darmawan, N. (2011). Does Employee Alignment Affect Business-IT Alignment? An Empirical Analysis. *Journal of Computer Information Systems*. 10-20.

[2] Khaiata, M., Zualkernan, I.A. (2009). A Simple Instrument to Measure IT-Business Alignment Maturity. *Journal of Information System Management*. 26(2): 138-152.

[3] Lu, Y., Ramamurthy, K. (2011). Understanding the Link between *Information Technology* Capability and Organizational Agility: An Empirical Examination. *MIS Quarterly*. 35(4): 931-954.

[4] Luftman, J., Papp, R., Brier, T. (1999). Enablers and Inhibitors of Business-IT Alignment. *Communications of the Association for Information Systems*. 1(11): 1-33.

[5] Reich, B.H., Benbasat, I. (2000). Factors that Influence the Social Dimension of Alignment between Business and Information Technology Objectives. *MIS Quarterly*. 24(1): 81-113.

[6] Rivard, S., Lapointe, L. (2012). Information Technology Implementers' Responses to User Resistance: Nature and Effects. *MIS Quarterly*. 36 (3): 897-920.

[7] Tarafdar, M., Qrunfleh, S. (2009). IT-Business Alignment: A Two-Level Analysis. *Journal of Information System Management*. 26(4): 338-349.

[8] David, F.R. (2002). Strategic Management: Activebook Version 1.0. Upper Saddle River, New Jersey: Prentice Hall.

[9] Turbam, E., Volonino, L. (2011). Information Technology for Management: Improving Strategic and Operational Performance. 8th ed. Wiley. USA.