An Empirical Study of Antecedents and IT-Business Strategic Alignment in Jordanian Public Shareholding Firms: A Structural Equation Modelling Approach

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ABSTRACT

Preceding research attributed the lack of direct causal impact of Information Technology (IT) on firm performance to numerous missing links including antecedents of IT-business strategic alignment (also known as strategic alignment), and intermediaries between alignment and firm performance. Furthermore, recent reviewers [44] have called for more research into the factors that affect strategic alignment, and the coupling process between alignment and performance. In this paper, we develop and empirically test specific forms of management structures and processes which are required to drive strategic alignment. Further, we propose a causal-chain model to examine the impacts of six antecedents on strategic alignment. The data, from over 180 Jordanian public shareholding firms, using structural equation modeling generally support the hypotheses. Furthermore, the study's findings suggest that leadership, values and belief, IT managerial resources, and IT implementation successes impact significantly IT-business strategic alignment; whereas no relationships found between structure and process, and service quality on strategic alignment.

Keywords

Information Technology; IT-Business Strategic Alignment.

1. INTRODUCTION

Over the past decade, information technology has progressed simultaneously with the rapid global development, and emerged as a very important part of most business firms. For organizations to stay competitive in a dynamic business environment, they have to understand how to manage IT strategically.

Moreover, one of the most widely cited quote, [42] once asserts that "we see computers age everywhere except in the productivity statistics". This phenomenon is commonly known as the 'Productivity Paradox' which states that IT investments do not affect on productivity growth. Indeed, earlier studies in 1980s found no significant, direct relationship between IT investment and productivity at the level of firms, industries, and the economy [41]. However, later research has generated mixed and inconclusive findings. Against this, economists, MIS researchers and management scientists have encouraged more research at a finer-level of analysis of the causal links between IT and productivity.

In the field of IS, the focus is on the identification of the missing links as part of the causal chain between IT and firm performance [8, 23]. [20] argue that the way in which business strategy aligns with IT strategy in the real world still remains unanswered. [29, p. 185] states that "strategic managers clearly need a better understanding of the impact of IT investment on organizational strategic and economic performance". This view is reiterated by many IS researchers that IT-business alignment can help organizations improve the positive impact of IT on their performance [10, 17]. Despite a growing body of research [5], recent scholars [7, 22, 37] have continuously called for further investigation to examining the factors that affect IT-business alignment; and the coupling processes from alignment to enhanced business performance. Indeed, since little research has been approved on this area, and in an effort to respond to several calls from well-known scholars on this issue, we present a causal model to quantitatively testing the impacts of six antecedents that could lead to strategic alignment. The rest of this paper is organized as follows. The next section discusses the theoretical background of this research. Then, in line with the study's research framework, propositions are developed on the direct impact of antecedent factors on strategic alignment. The following section describes the research design, and then the subsequent section presents the results and implications for both research and practice. The paper ends with a number of conclusions and recommendations.

2. THEORETICAL BACKGROUND

Numerous articles have been written about how IT affects organizational performance [11]. A major concern is how to assess the IT-related business value and organizational impacts. Broadly,

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there are two main approaches. The first approach examines the direct and multiple linkages between IT investment and organizational performance across economy, industry and firm. The second approach examines the indirect linkages between IT investment and organizational performance through identifying important intermediaries. These two approaches often lend themselves to contradicting results. Some research shows no significant correlation whereas others indicate a positive relationship between IT investment and firm performance [36]. The challenge is not only to identify the crucial factors that affect firm performance but also to build a credible causal chain between IT and firm performance. Most of the MIS research has started with IT-business alignment as an important missing link between IT and organizational performance [17].

2.1 IT-Business Strategic Alignment

Alignment of IT or IS strategy with business strategy has been ranked as one of the most important issues facing business and IT executives [25]. Alignment has been defined as the extent to which the IT mission, objectives and plans support and are supported by their business counterparts [38]. Further, IT-business alignment concerns the degree of correspondence of an organization's IT strategy and IT infrastructure with the organization's strategic business objectives and infrastructure. Since the late 1980s, alignment has been an important concern to the business community as it not only helps firms realize the potential benefits from investments in IT [43], but also enhances business performance through aligning the organizational and technological infrastructures [10]. However, despite various types of alignment, our main focus here is on investigating the impact of several strategic alignment antecedents on strategic alignment. We hope this study will provide better insights into the conditions of alignment in terms of the antecedent variables. Next section displays our research framework.

3. RESEARCH PROPOSITIONS

In this section, we formulate our research propositions based on the extant literature of strategic alignment. The study's model comprises main effects of six antecedents (i.e. leadership, structure and process, service quality, value and belief, IT managerial resource, and IT implementation success) on strategic alignment.

3.1 Leadership

Research on strategic alignment underlines the importance of reciprocal relationship between business and IT executives to facilitate synergy between business and IT. [24] found that business managers seldom assist IS managers in formulating their plans. They asserted that two-way communication between business and IT executives is essential if business and IT plans are to be coordinated. [12] found that the CIO's role and actions are vital to ensure that IT is positioned for strategic advantage. The CEO and CIO should collaborate to create a vision and establish IT's contribution to the business. This is achieved by increasing the level of mindfulness in a reciprocal and informal relationship between senior business executives and IT executives. Also, some scholars argued that the relationship between business and IT strategy can be viewed as intellectual and social exchanges [38]. The intellectual exchanges concern the content of plans and planning tactics whereas the social exchanges relate to the human agents in the alignment process. The bilateral communication between business and IT executives through formal and informal channels are more likely to increase knowledge sharing, leading to an exploration of existing IT assets and capabilities to identify new business opportunities. This leads to the following proposition:

Proposition 1. *Performing leadership function by both business and IT managers is positively related to IT- business strategic alignment.*

3.2 Structure and Process

Structures and processes are the mechanisms through which organisational activity takes place. Structures and processes are concerned with how the organisation organises for IT, including IS/IT strategy development, delivery of IT benefits, structures for service delivery, mechanisms for business and IT organisation to come together [33]. Further, Inadequate or inappropriate structures and processes can severely impinge on the success of IT in an organisation. Traditionally structures in relation to IT have been devised around the concept of technology delivery with a reactive IT organization developing products (i.e. applications) in response to business requests or worse to what it thinks the business requires. To facilitate IT/business integration, appropriate structures and processes are necessary. [5] have gone some way in developing a model of antecedents in alignment of the IS function with the enterprise. Yet this exclusive focus on structural dimensions ignores the importance for total organisational involvement in IS/IT. Therfore, we formulate the following proposition:

Proposition 2. *Performing structures and processes mechanisms is positively related to IT- business strategic alignment.*

3.3 Service Quality

IT service quality is necessary to assess user satisfaction with application or system as well as the service provided for IT functions. Previously, the marketing and quality literature have devoted reams to the issue of service quality and delivery. Within the quality movement there are the notions of the internal customer and service level agreements which are often devised to set parameters around the expected relationship. The development of IT outsourcing has also seen the development of legally enforceable agreements specifying the level of service, which the client can expect from the vendor. Recently there has been some interest in applying the concept of service management and quality to IT [35, 45]. This is to be expected in much of what is now provided by the IT organisation that can be characterized as a customer–supplier exchange. The traditional role of the IT organisation as the developer and maintainer of IT systems has been usurped by a variety of factors and its function now includes a significant service component. IS research has tended to focus on products rather than service and only recently has this service aspect been addressed. What can be difficult for IS specialists to appreciate is that service quality is customer defined and is assessed based on perceptions. It is founded on a comparison

between what the customer feels should be offered and what is actually provided [32]. This has led to our third proposition:

Proposition 3. *Performing better service quality standards is positively related to IT- business strategic alignment.*

3.4 Values and Beliefs

Values and beliefs can significantly shape how attitudes develop and hence behaviour and practices. These beliefs are shaped throughout ones career based on the experiences which one has with IT. For instance, inadequate structures and processes can impinge on the effective delivery of IT services even if there are congruent values and beliefs between the IT organisation and the rest of the business. Furthermore, the importance of value and beliefs to strategic alignment was also acknowledged. [28] assured that value and beliefs will improve strategic alignment. [18] mentioned that value and beliefs affect the decision making ability of partners. This research proposed the following:

Proposition 4. *Acknowledging superior values and beliefs is positively related to IT- business strategic alignment.*

3.5 IT Managerial Resource

This factor concerns the level of mutuality in knowledge sharing and transfer. [8] argued that reciprocal exchanges of business and IT knowledge between business and IT executives [43] not only improve shared understanding but also promote common vision. [46] argued that top managers that lack IT knowledge will invariably inhibit alignment. Hence it is important that business executives should be familiar with IT and technologies, and use that knowledge to augment their business knowledge. [30] defined shared knowledge construct as the understanding and appreciation among IT and business managers for the technologies and processes that influence their mutual performance. [38] described shared domain knowledge as the ability of IT and business executives to understand each other perspectives; contribute to each other's input processes; and respect the contributions and challenges made by one another. Therefore, we formulate the following propositions:

Proposition 5. *Performing IT managerial resource is positively related to IT- business strategic alignment.*

3.6 IT Implementation Success

Successful history of IT unit gives reliability to the IT unit and creates complimentary perceptions of IT in top management [8]. Also, it gave essential determinant to the involvement of business managers in the planning process. The assurance of top management in the IT department efficient and reliable services are found to be important critical success factors for aligning IS plans with business plans [28]. On the other hand, lack of IS management credibility discourages top executives from communicating their requirements and problems, and more importantly, from communicating their goals, objectives and plans, thus inhibiting strategic alignment [26]. Clearly and successfully, the IT history itself won't impact IT-business alignment directly. However, the increased confidence of top management and the higher credibility of the IT unit are likely to facilitate IT unit to participate effectively in the strategic planning process and communicate effectively with business managers. This has led to our sixth proposition:

Proposition 6. *Performing IT implementation success is positively related to IT- business strategic alignment.*

4. RESEARCH METHODS

4.1 Pilot Test and Data Collection

Three Jordanian IT managers and two MIS academic professors participated in a pilot test. They completed the survey in the presence of the senior author. Then, they commented on the contents, length, and overall appearance of the questionnaire. Changes and modifications were made to the survey. Further, in order to ensure adequacy of response, a cover letter accompany each questionnaire to emphasize to respondents the importance of their participation. Moreover, the researchers have chosen the country of Jordan to carry out the data collection since scholars [8] called for such research in different cultures; and as this may open the gate to further research opportunities. Data for this research was obtained from IT managers of Jordanian public shareholding firms. The research population consists of all Jordanian banking, insurance, services, and manufacture companies that have a registered website, and which engage in business and IT activities. In the absence of any official lists, various government databases were reviewed; according to the Amman Stock Exchange, and the Jordanian Securities Depository Center, the total number of companies stood at 200. A total of 180 managers returned the survey with high response rate of 90%.

4.2 Measures

We developed a field survey for IT managers. All the research constructs were measured using closed-end seven-point Likert-scale items, with scales ranging from 1= "strongly disagree" through 4= "neither agree nor disagree" to 7= "strongly agree". Business and IT managers leadership variable was measured using six items which were drawn from [48]. Structure and process mechanism was measured using six items which were adapted from [49]. Service quality variable was measured using five items which were drawn from [13]. Values and beliefs was measured using six items were drawn from [15]. IT managerial resource was measured using four items were adapted from [30]. IT implementation success was measured using five items were adapted from [40]. Strategic alignment was measured using six items which were drawn from [34].

5. DATA ANALYSIS AND RESULTS

In order to examine whether the antecedents discussed above could impact IT-business strategic alignment in Jordanian public shareholding firms, a number of statistical tests were carried out. Indeed, the relationship between six strategic alignment antecedents and strategic alignment were tested empirically using Structural Equation Modeling (SEM) techniques using the AMOS (Analysis of Moment Structures) software package version 6. Table 1 in the appendices displays different types of goodness of fit indices in assessing our initial specified model. It shows that the

research constructs fits the data moderately according to the absolute, incremental, and parsimonious model fit measures, comprising chi-square per degree of freedom ratio (x^2/df), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA).

Further, we examined the standardized regression weights for the research's indicators and found that some indicators had a low loading towards the latent variables. In particular (SP1 = 0.484, SQ3 = 0.391, SQ5 = 0.476, MR1 = 0.438, MR3 = 0.451, IS5 = 0.419). Moreover, since all of these items did not meet the minimum recommended value of factor loadings of 0.50 [31], and because the initial fit indices were moderately fit the sample data, then they were all removed and excluded from further analysis. Consequently, the measurement model was modified and showed a better fit to the data (as shown in Table 1 in the appendices), although x^2/df and RMSEA did not change for the final model, the IFI = 0.81, TLI = 0.79, and CFI = 0.81 indicated better fit to the data after deleting the low factor loading items.

5.1 Analysis of the Measurement Model

After modifying the final measurement model for the twelve constructs, the next stage is to assess them for unidimensionality, reliability, and validity. The results of the measurement model are presented in Table 2, in the appendices, which summarizes the standardized factor loadings, measures of reliabilities and validity for the final measurement model.

5.1.1 Unidimensionality

Unidimensionality refers to the extent to which the research indicators form their latent variable. An examination of the unidimensionality of the research constructs is essential and an important prerequisite for establishing construct reliability and validity analysis [9]. According to [6] the evaluation of unidimensionality involves the assessment of the standardized factor loadings. Table 2 in the appendices shows strong evidence for the unidimensionality of the six constructs that specified in the measurement model. All values of the different parameter estimates met the minimum recommended value of 0.50 [31].

5.1.2 Reliability

Reliability of the research scales have to be investigated to see the degree to which these scales indicate the research latent constructs. Cronbach alpha and composite reliability are seen as useful tests to measure construct reliability [16]. Table 2 indicates that all cronbach alpha values for the six constructs exceeded the recommended value of 0.60 [1] indicating that the instrument is reliable. In addition, as shown in Table 2, composite reliability values ranged from 0.80 to 0.97, and were all greater than the recommended value of more than 0.60 [1] or greater than 0.70 as suggested by [19]. Consequently, according to the above two tests, all the research constructs in this study are considered reliable.

5.1.3 Convergent and Discriminant Validity

While convergent validity test is essential in the measurement model to determine if the indicators in a scale load together on a single construct, discriminant validity test is another important one to verify if the items that developed to measure different constructs are certainly evaluating different constructs. As shown in Table 2 (see the appendices), all items were significant and had loadings more than 0.50 on their underlying constructs. Also, the standard errors for the items ranged from 0.043 to 0.361 and all the item loadings were more than twice their standard error. Indeed, discriminant validity was investigated using several tests. First, it could be examined in the measurement model by investigating the shared average variance extracted (AVE) by the latent constructs. Also, the correlations among the research constructs could be used to assess discriminant validity by examining if there is any extreme large correlations among them which imply that the model have a problem of discriminant validity. In addition, if the AVE for each construct exceeds the square correlation between that construct and any other constructs then discriminant validity is occurred [14]. As shown in Table 2, in the appendices, we showed that all the constructs explained 50 percent or more of the variance and ranged from 0.82 to 0.92 which met the recommendation that AVE values should be at least 0.50 for each construct [1, 19]. However, as shown in Table 3 in the appendices, discriminant validity was demonstrated since the AVE values were more than the squared correlations for each set of constructs. Therefore, the measures significantly discriminate between the constructs.

5.2 Analysis of the Structural Model

In order to test the structural model it is essential to investigate the statistical significance of the standardized regression weights (i.e. *t*-value) of the research propositions at 0.10, 0.01, 0.05, and 0.001 levels (see Table 4 in the appendices); and the coefficient of determination (R^2) for the research endogenous variables as well. Indeed, the coefficient of determination for strategic alignment was 0.506, indicating that the model moderately accounts for the variation of the model.

6. DISUCUSSION AND IMPLICATIONS

This paper contributes to the strategic alignment literature by developing and empirically testing a causal chain model of alignment including the specification of six antecedents. Table 4 indicates the path coefficient and t-value of each proposed path. Consistent with [38], performing leadership by business and IT managers found to be positively but not strongly correlated with strategic alignment (P1). Indeed, [38] found that higher levels of formal communication between business and IT executives had a positive influence on short-term alignment. A recent study conducted by [21] argued that frequent communication between CEO and CIO could not only promote mutual trust and enhance convergence, but also guarantee that IT resources would be used to support daily organization operations. Further, they found that when the CEO and CIO communicate more frequently with each other, then the degree of exploration about the IT role is higher.

Surprisingly, although great attention was made by several researchers regarding the correlation between structure and process

mechanisms, there was no relationship between the association between such mechanisms and strategic alignment, indicating that (P2) was not empirically supported. Indeed, [47] subscribes to a design with IS roles played by both a central IS organisation and the business units, prescribing a "centrally decentralised" IS organisation, with strong dotted-line reporting relationships. In addition to structural issues, there are also processual mechanisms such as the involvement of business management in IS/IT strategy formulation which can impact the overall ownership of that strategy; alignment of the IS/IT strategy with business objectives; and responsibility for delivering business benefits. Yet our results failed to show that firms perform better service quality could impact strategic alignment, showing that (P3) was not empirically supported. Indeed, this was not in line with [27] who argued that a customer is the ultimate arbiter of quality and no matter how good the service provider feels they have been in providing a service it is the perception of the customer that is important in assessing its quality. [27] suggested that internet service providers should prioritize technology acquisitions and build appropriate infrastructures. All in all, more research is needed to clarify and explain the lack of support of (P2 and P3) bearing in mind that the research field based on the country of Jordan, thus, cultural context could be occurring. A possible explanation is that Jordanian IT-managers are not mindful of the importance of exploring such mechanisms. Thus, more research is required to understand how firms' structures and processes, and service quality activities affect strategic alignment, and further validate the study construct.

In line with previous studies, superior values and beliefs affected strategic alignment. Thus, (P4) was supported strongly. For instance, [2] have introduced the concept of credibility in relation to IT specialists. They contend that expertise alone does not inspire trust and credibility, concluding that the successful IT specialists work on their trust worthiness while at the same time build good relationships with clients. To foster this credibility, IT specialists must therefore believe that trustworthiness and relationship building are necessary practices to engage in. Largely consistent with the literature [3, 30], IT managerial resources in terms of shared knowledge between business and IT managers was found to have a positive influence in strategic alignment. Therefore, (P5) was supported. Proposition 6 found that highly level of IT implementation success experience a high level of strategic alignment. This result appears to provide support to the arguments and findings made by [39] in which a successful IT track record improves of business relationships at all levels. Successful IT implementation may develop the relationship between IT and other functional areas [4]. [38] also found prior IS project success to assist short-term alignment. Thus, *prior IS success* and important predictor of existing levels of alignment. The past suggests and the credibility gaps cannot be ignored by managers but must be addressed as a high priority and must use new successes to improve its track record should facilitate the IS organization to better align itself, as a trusted partner, with the rest of the organization.

7. LIMITATIONS AND CONCLUSIONS

There are some limitations of the study. The first limitation is the use of the same informant for our independent, intermediary, and dependent variables. Even though we tried to reduce data incorrectness by asking the best positioned to answer the questionnaire (IT manager), consequently, further research should consider both IT managers and business managers not only to avoid depending on a single source of information as a way of testing the research model from several perceptions, but also as an attempt to evidence the source of any differences between them. Another limitation is that the proposed conceptual model is based on the cross-sectional data from the Jordanian public shareholding firms. Therefore, longitudinal investigations are preferred for better implications of the strategic alignment. In addition, although the response rate of this study was sufficient for the condition of statistical analysis, the percentage of those who did not respond was still observable. In other words, even though the research results could be representative, it is reasonable to be watchful in its generalization. Thus, to increase statistical validity, then further research should consider higher response rates. Also, the data and results reported in this paper were based on a single country, Jordan, and in turn are applicable specifically to the Jordanian context. Thus, this raises inquiries regarding the gerneralisability to other cultures and different contexts. Consequently, further research is needed with regards to several countries since this would help to advance understanding of the IT-business strategic alignment issue and the conditions and outcomes of achieving it from different nationwide origins in different contexts. All in all, although this paper investigated several propositions and offered empirical support for the acceptance and refusal of some of these propositions; more generalizations on the application of the theoretical premises that developed in building the research model will be needed to enrich and building the alignment theory. This is to say, a more generalized research model that compensate the current research limitations by adding further impacting variables to the model and obtain a more representative sample from different sectors will be required.

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9. APPENDICES

Table 1. Measurement Model Fit Indices

Model	x^2	df	p	x^2/df	IFI	TLI	CFI	RMSEA
Initial Estimation	1203.119	449	0.00	2.68	0.77	0.74	0.77	0.09
Final Model	884.181	335	0.00	2.63	0.81	0.79	0.81	0.08

Table 2. Properties of the Final Measurement Model

Constructs and Indicators	Standard Loading	Standard Error	Square Multiple Correlation	Error Variance	Cronbach Alpha	Composite Reliability	AVE
Leadership					0.88	0.97	0.92
LS1	0.851	0.054	0.724	.019			
LS2	0.934	0.066	0.872	.014			
LS3	0.621	0.094	0.386	.048			
LS4	0.762	0.090	0.581	.038			
LS5	0.559	0.103	0.312	.061			
LS6	0.858	0.073	0.736	.020			
Structure and Process					0.83	0.96	0.87
SP2	0.526	0.083	0.276	.044			
SP3	0.687	0.107	0.471	.063			
SP4	0.829	0.086	0.687	.033			
SP5	0.742	0.096	0.550	.047			
SP6	0.824	0.056	0.679	.030			
Service Quality					0.68	0.88	0.78
SQ1	0.671	0.165	0.450	.044			
SQ2	0.636	0.141	0.405	.044			
SQ4	0.604	0.147	0.365	.051			
Value and Belief					0.90	0.97	0.90
VB1	0.700	0.089	0.490	.050			
VB2	0.816	0.113	0.666	.034			
VB3	0.787	0.109	0.619	.035			
VB4	0.790	0.114	0.625	.038			
VB5	0.822	0.114	0.676	.034			
VB6	0.752	0.108	0.566	.038			
IT Managerial Resource					0.62	0.80	0.85
MR2	0.586	0.090	0.343	.022			
MR4	0.781	0.361	0.610	.058			

IT Implementation Success					0.86	0.97	0.92
IS1	0.935	0.043	0.874	.024			
IS2	0.953	0.045	0.908	.023			
IS3	0.617	0.048	0.381	.032			
IS4	0.501	0.068	0.251	.065			
Strategic Alignment					0.83	0.95	0.82
SA1	0.531	0.096	0.282	.046			
SA2	0.547	0.116	0.299	.067			
SA3	0.571	0.143	0.326	.100			
SA4	0.810	0.107	0.656	.040			
SA5	0.804	0.123	0.646	.053			
SA6	0.800	0.215	0.640	.028			

Table 3. AVE and Square of Correlations between Constructs

Constructs	LS	SP	SQ	VB	MR	IS	SA
Leadership (LS)	**0.92**						
Structure and Process (SP)	0.55	**0.87**					
Service Quality (SQ)	0.28	0.57	**0.78**				
Value and Belief (VB)	0.38	0.62	0.60	**0.90**			
IT Managerial Resource (MR)	0.25	0.22	0.33	0.37	**0.85**		
IT Implementation Success (IS)	0.50	0.51	0.37	0.44	0.25	**0.92**	
Strategic Alignment (SA)	0.44	0.46	0.41	0.49	0.15	0.63	**0.82**

Note: Diagonal elements are the average variance extracted for each of the twelve constructs. Off-diagonal elements are the squared correlations between constructs.

Table 4. Summary of Proposed Results for the Theoretical Model

Research Proposed Paths	**Coefficient Value**	**t- value**	**p- value**	**Empirical Evidence**
P1: Leadership → Strategic Alignment	0.114	1.733	0.083	Supported
P2: Structure and Process → Strategic Alignment	0.011	0.144	0.885	Not Supported
P3: Service Quality → Strategic Alignment	0.100	1.420	0.156	Not Supported
P4: Value and Belief → Strategic Alignment	0.206	2.705	0.007	Supported
P5: IT Managerial Resource → Strategic Alignment	0.141	2.411	0.016	Supported
P6: IT Implementation Success → Strategic Alignment	0.513	7.446	0.000	Supported