E-Business Alignment and Performance Impact: A Survey of Small and Medium-sized Enterprises (SMEs)

Rosli Mohamad[1, a], Noor Azizi Ismail[2, b] [1] +

[1] College of Business, Universiti Utara Malaysia, 06010 Sintok, Kedah Malaysia

[2] Othman Yeop Abdullah Graduate School of Business, Universiti Utara Malaysia, 06010 Sintok, Kedah Malaysia

Abstract. Considering inherent resources constraint of many SMEs, the firm becomes more selective to invest on Internet-related technologies (e-business). Consequently, for effective e-business deployment, firm needs to align it to support the most strategic business areas. Therefore, this study investigates the extent that e-business technology aligns with various SMEs functions. A survey of 140 Malaysian SMEs indicated that e-business generally more aligned with information searching, sales, after sales services, and internal operation activities. The cluster analysis further revealed three profiles with distinct e-business alignment characteristics. Finally, the results showed positive association between e-business alignment and e-business impact to the firm. These findings ascertain applicability of fit perspective to explain effective use of e-business to the firms.

Keywords: E-Business; Alignment; Small and Medium-sized Enterprises (SMEs), Malaysia

1. Introduction

E-business has vast capabilities to transform many aspects of business operation for both large firms and SMEs. Nevertheless, due to limited financial resources, e-business practices amongst SMEs have progressed in relatively slower speed as compared to their larger counterpart [1,2,3]. Considering vast e-business capabilities at one hand, and resource constraints on the other, firm becomes more selective to invest in e-business related applications. As such, priority should be given to the applications that support the strategic functions of the firms. Properly aligning the e-business technology to accommodate firm needs ensures effective deployment of e-business [4].

IT/IS alignment has been considered as one of the crucial issues in mid 1990s due to firm failure to optimize IT/IS values [5]. While the alignment issues receive constant debates among larger organizations, there had been limited evidences of similar issue amongst the SMEs [6,7]. Furthermore, the issue had been previously investigated in IT/IS domain in general [6, 8], while scarce studies investigated the issue from a specific IT/IS domain such as e-business [9]. Investigation on the e-business context is essential as it has capabilities to transform many aspects of firm operation in relative to other conventional types of IT/IS [10].

The concept of fit that was initially employed in strategic management domain has been adapted to understand firm IT/IS practices. Specifically, the Strategic Alignment Model (SAM) becomes a useful framework to understand IT/IS alignment [11]. SAM indicates alignment to take place either at strategic level i.e. IT strategy vs. business strategy or at process level i.e. firm infrastructure vs. IT infrastructure [14]. However, most studies mainly concentrate on strategic level alignment [12, 13] while there are limited attempts to investigate process level alignment, particularly within the SMEs context [14]. This is salient, as implementing firm strategies require effective interactions of interrelated business processes [15].

+ Corresponding author
 E-mail address: [a]roslim@uum.edu.my, [b]azizi833@uum.edu.my

Finally, from IT/IS alignment perspective, firm should design its IT/IS structure somehow to match (fit) with the business context to ensure greater effectiveness and performance [16]. Therefore, this study predicts that firms that successfully align e-business capabilities across various business functions would realize greater values from their e-business investment. This is obviously possible considering unique e-business capabilities that extend beyond inter-firms interaction [17]. In response to the above discussion, this paper has three main objectives. First, to investigate the current state of e-business alignment (fit) across various business processes, (ii) to explore profiles of firms with distinct e-business fit characteristics, and (iii) to ascertain positive impact of e-business fit to performance. Figure 1 outlines the proposed research model.
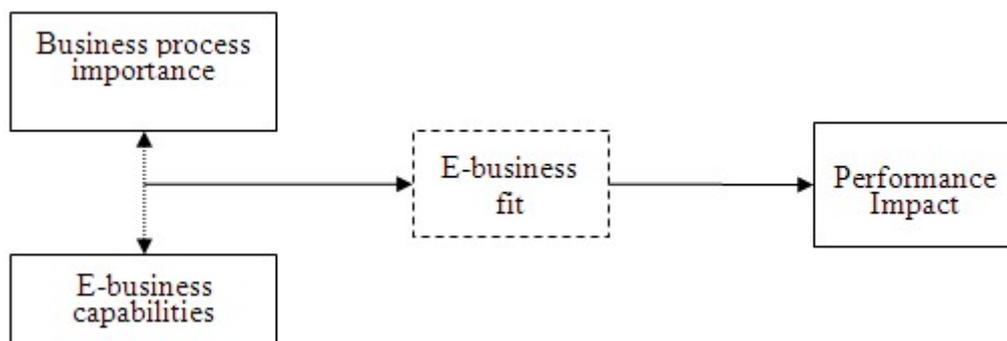

Fig. 1: Research Model

2. Method

The research instrument has three major parts. The first part solicits firm perception on current state of e-business alignment. For this section, authors initially compiled 36 Internet-supported business processes from extensive literature review. Academic experts and several SMEs representatives were then reviewing the items pool to ensure its validity and clarity. Two sets of questions are constructed based on the finalized items pool. The first set of question captures perceived strategic importance of each of the business process [18]. While, the second set of question specifically assesses the extent of Internet technology support to the respective business process. Thus, part one captures two set of data i.e. perceived 'business process importance' and perceived 'e-business capabilities'. Meanwhile, the second part assesses e-business impact to firm performance. Specifically, this study defines performance as realized e-business values in three operational aspects namely, commerce, coordination, and efficiency [17]. Items in the first two parts are measured using five-point scales. Meanwhile, the last part solicits firm information and respondents profiles.

Finally, e-business fit value is derived based on an interaction between 'e-business capabilities' and 'business process importance' of each business process item. Venkatraman [19] suggested six perspectives of conceptualizing fit namely: moderation, mediation, matching, co-variation, profile deviation, and gestalt. Nevertheless, the moderation perspective appeared as most commonly used in previous works [6,7] More recently, Hooper et al. [20] refined the measure by incorporating both matching and moderation perspectives of fit. Therefore, this study measures e-business fit using the following equation:

E-business fit = (4 - | x − y|) * ((x + y)/2)[1].

Selection of samples for this study had taken into account several considerations. First, the study focused only on e-business adopters. Secondly, the present study excluded micro firms due to its unique nature of operation and limited use of e-business applications. Based on these considerations, initial survey involved mailing of the questionnaire to 1600 owner/manager of Malaysian SMEs. After about three months, authors received only 140 usable responses (9% responses rate) for analysis.

---

[1] Where x represents the rating of 'business process importance' and y represents the rating of 'e-business capabilities' of a particular process. The score assumes values ranging from 0 (very low fit) to 20 (very high fit)

3. Results and Discussion

Initially, a principal component analysis (PCA) was executed to identify possible underlying structure to simplify 36 business process items. The PCA results reveals five business process dimensions with 32 items are being retained. Table 1 reports number of items retained and reliability of each dimension. As the Cronbach's Alpha indicates, all the construct dimensions are considered as reliable.

Table 1. Reliability of business process dimensions

Dimension (no. of items)	Business process importance	E-business capabilities
Sales and after sales (13)	.945	.925
Purchase related (8)	.847	.849
In-house operation (4)	.912	.881
Information searching (4)	.945	.922
Financial related (3)	.882	.859

Table 2 reports mean product of 'business process importance' rating, 'e-business capabilities' rating, and 'e-business fit' score for each process dimension respectively. Overall, the results showed somewhat greater level of fit for information searching, sales and after sales services, as well as in-house functions. Earlier studies suggest that these are the business areas with considerable use of Internet-based solution [16, 17]. Nevertheless, as the fit scores indicated, the degree of e-business supports was somewhat lower then perceived importance of those functions even for the most important functions. This gap indicates there are still wide opportunity for firms to improve their e-business capabilities particularly in the areas of procurement and financial-related functions.

Table 2. E-business fit components by process dimensions

Dimensions	Business process importance	E-business capabilities	E-business fit score
Information searching	4.09	3.58	12.89
Sales and after sales service	3.82	3.16	11.16
In-house operation	3.55	3.05	10.95
Procurement/purchase related	3.26	2.71	9.37
Financial related	3.15	2.46	8.67

Next, authors employed cluster analysis (Ward method) to explore e-business fit characteristics among firms. The clustering results (based on agglomeration schedule) suggest three clusters as most appropriate to represent the data. Comparative analysis in Table 3 shows that firms in the first cluster had the highest fit scores for all dimensions. In contrast, firms in the third cluster reported the lowest scores for all process dimensions. ANOVA result further ascertains the mean differences among clusters as significant (p-value < .01).

Table 3. Comparative mean score by clusters (mean score)

Process dimensions	Cluster 1 (n=35)	Cluster 2 (n=62)	Cluster 3 (n=43)	F-value
Sales and after sales	14.17	11.29	7.26	74.94*
Procurement	11.77	9.53	6.16	54.48*
Accounting and financial	12.07	8.20	5.35	39.34*
Information searching	16.63	12.22	9.51	63.15*
In-house operation	14.65	10.99	6.37	58.73*

* *Significant at 99% confidence level*

Line graph in Figure 2 charts e-business fit scores for all business process among clusters. The diagram denotes two important alignment characteristics across clusters. First, a vertical comparison indicates that

firms across clusters consistently rated higher level of fit for information searching, in-house operation, and sales-related functions. Meanwhile, a horizontal comparison shows that firms in the first cluster had comparatively higher fit scores while firms in the third cluster had consistently lowest fit scores for all process dimensions. Hence, the most obvious differing characteristic among clusters is their overall e-business alignment characteristic (horizontal comparison) instead of perceived level of e-business alignment at different business process dimensions (vertical comparison). Therefore, it is appropriate to propose that firms in the first cluster perceived e-business as highly aligned across their business operation (high fit group). Meanwhile, firms in the second cluster report comparatively moderate fit scores than other groups (moderate fit group). Finally, the third cluster groups all firms that perceive lower e-business support in all aspects of firm operation (low fit group).
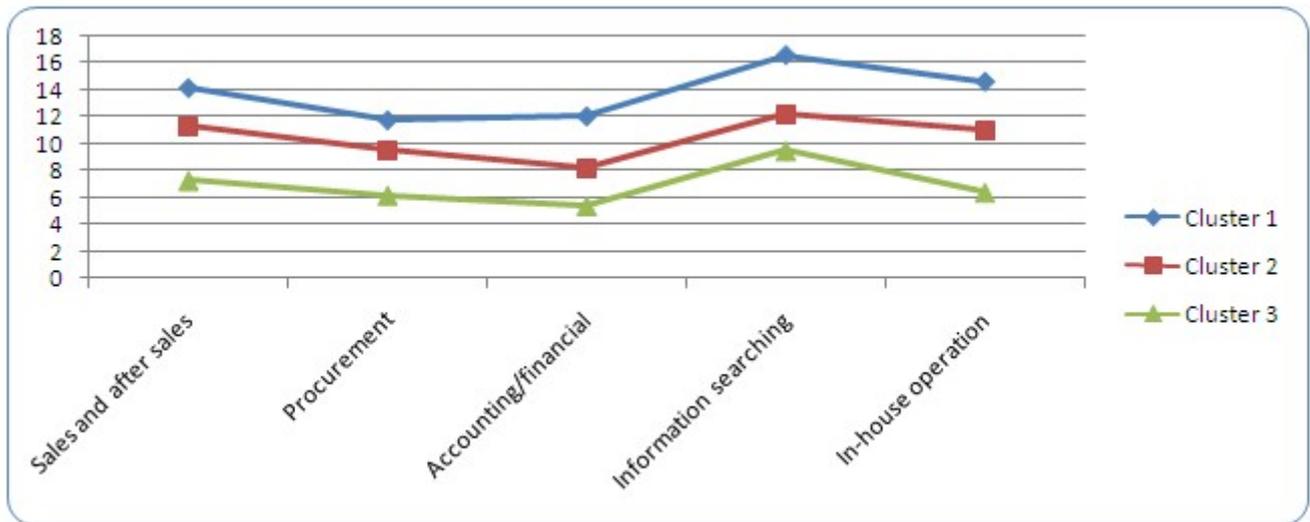

Fig. 2: Fit characteristics across clusters (mean fit score)

The last objective is to compare perceived e-business impact among firms with differing fit characteristics. As results in Table 4 suggests, firm in 'high fit' group viewed greater performance impact for all aspects of performance and followed by 'moderate fit' group and 'low fit' group. Similarly, the ANOVA result ascertains the mean differences among clusters as significant (p. value < .05). This finding corresponds consistently to the earlier works on IT/IS alignment that higher alignment positively relates to greater effectiveness or performance [9, 12, 14, 20].

Table 4. Performance impact across groups (mean score)

Performance aspect	Low fit	Moderate fit	High fit	F-score
Commerce	2.88	3.3	3.92	21.197*
Coordination	2.78	3.1	3.55	16.58*
Productivity	3.07	3.4	4.05	28.46*
Overall score	2.89	3.26	3.84	17.54*

*Significant at 95% confidence level

4. Summary

With e-business as a central focus, this study investigates alignment characteristics amongst SMEs and the extent of its impact to e-business effectiveness. The results indicated that most Malaysian SMEs still do not fully optimize the real values of e-business. Particularly, the values are limited to informational and communicational efficiencies. Secondly, this study promotes further understanding that by properly aligning e-business capabilities to support the most crucial functions, firm would better realize the e-business values. Most importantly, the study provides evidence that such contention prevails in aligning specific type of IT/IS such as e-business.

The outcomes of this study offer several managerial implications. Considering positive link between e-business fit and performance, thus, it is good idea for firms to put continuous effort in aligning e-business to support firms' objectives. Additionally, it is good for SMEs related agencies to provide different kinds of incentives or support for firms in different e-business fit profiles. As for 'highly fit' group, firms expect more support in assisting them to embrace advanced e-business capabilities. Meanwhile, firms in 'low fit' group require further assistance in identifying e-business technologies that suit their business needs.

Finally, this study does not free from limitations. First, it assesses performance impact at specific point of time. Thus, present study unable to conclude on sustainability of the firm performance over time. Secondly, readers should carefully infer the findings to SMEs at large due to relatively small samples size.

5. Acknowledgements

6. References

[1]   R. MacGregor and L. Vrazalic: Jour. of Electronic Comm. in Orgz. Vol. 4, No. 2 (2006), p. 1 – 24
[2]   J. Y. L. Thong: Omega Vol. 29, No. 2 (2001), p. 143-156.
[3]   G. A. Premkumar: Jour. of Orgz. Comp and Elec. Comm. Vol. 13, No. 2 (2003), p. 91 - 121
[4]   L. Raymond, F. Bergeron and S. Blili: Elec. Markets Vol. 15, No. 2 (2005), p. 106 -118
[5]   G. S. Kearns and R. Sabherwal: Jour. of Manage. Info. Syst. Vol. 23, No. 3 (2006), p. 129-162
[6]   P. B. Cragg, M. King H. Hussin: Jour. of Strategic Info. Syst. Vol. 11 (2002), 109–132
[7]   N. A. Ismail and M. King: Jour. of Infor. Syst. and Small Bus. Vol. 1, No. 1-2 (2007), p. 1 - 20
[8]   N. A. Ismail and M. King: Int. Jour. of Accounting Infor. Syst. Vol. 6 (2005), p. 241 - 259
[9]   L. Raymond, F. Bergeron: Industrial Manage. & Data Syst. Vol. 108, No. 5 (2008), p. 577 – 595
[10]   E. B. Swanson: Manage. Sci. Vol. 40, No. 9 (1994), p. 1069 – 1092
[11]   J. C. Henderson and N. Venkatraman: Bus. Quart. Vol. 55, No. 3 (1991), p. 72 - 78
[12]   Y. E. Chan, R. Sabherwal and J. B. Tatcher. IEEE Trans. on Eng. Manage. Vol. 53, No. 1 (2006), p. 27-47
[13]   R. Sabherwal and Y. E. Chan: Infor. Syst. Res. Vol. 12, No. 1 (2001), p. 11 – 33
[14]   P. Cragg and A. Mills: Buss. Process Manage. Jour. Vol. 17, No. 5 (2011), p. 697 – 710
[15]   P. P. Tallon: Jour. of Manage. Infor. Syst. Vol. 24, No. 3 (2007), p. 227-268
[16]   P. Weill and M. H. Olson. Jour. of Manage. Infor. Syst. Vol. 6, No. 1 (1989), p. 59 – 85
[17]   K. Zhu, and K. L. Kraemer: Infor. Syst. Res. Vol. 16, No. 1 (2005), p. 61 -84
[18]   P. B. Cragg, M. Tagliavini and A. Mills: Proceeding of 18th Australasian Conf. on Info. Syst. from http://aisel.aisnet.org/acis2007/10/
[19]   N. Venkatraman: Academy of Manage. Rev. Vol. 14, No. 3 (1989), p. 423 - 444
[20]   V. A. Hooper, S. L. Huff and P. C. Thirkell. The Database for Adv. in Info. Syst. Vol. 41, No. 1 (2010), p. 36 – 55