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IT Alignment and Organisational Performance in Small Firms

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Abstract-This study focused on the alignment of business strategy and IT strategy among 256 small UK manufacturing firms. IT alignment was explored using both the matching and moderation approaches, leading to a measure of alignment for each firm. The group of firms with high IT alignment achieved better organisational performance than firms with low IT alignment. As well as confirming prior findings in large firms, the study extended our understanding of IT alignment in small firms.

INTRODUCTION

Alignment between business strategy and IT strategy has been given significant attention in recent years [1] and has been ranked among the top issues facing IT executives [2]. Most authors suggest that IT alignment has advantages for firms. However, in practice, many firms struggle to achieve alignment [1].

Researchers have been keen to study IT alignment as it may help explain the relationship between the use of information systems in organisations and firm performance. For example, [3] found a positive relationship between IT alignment and firm performance.

Although IT has been used significantly in many small firms, there are few reported studies of IT alignment in small firms. Thus this study aimed to examine IT alignment in small firms, and, in particular, to explore the relationship between IT alignment and organisational performance.

PRIOR RESEARCH

There has been extensive study of business strategy in large organisations, with much of it based on typologies. Reference [4] provided perhaps the best known typology: *cost leadership*, *differentiation*, and *focus*. Reference [5] identified *defenders*, *reactors*, *prospectors*, and *analyzers* as viable strategic orientations of organisations.

The role of business strategy has received attention among small business researchers. Reference [6] identified strategy as one of the three main components that contribute towards growth among small firms. The other two components being the starting resources of the entrepreneur, and firm

characteristics. Reference [6] observed that rapidly growing firms often occupied niche markets. Reference [7] found that the focus strategy emphasised by SMEs was based more on differentiation than cost leadership. Typically, small firms sought relatively low cost forms of product differentiation, emphasising rapid response, quality of service and personal treatment of customers. Reference [8] concluded that small firms were not as strategically oriented as larger organisations, which makes the identification of strategy more difficult. In addition, [9] recognised the lack of strategic awareness in many small firms. "For small companies implicit strategies are the norm." (p. 5).

Some researchers have identified types of small firms based on strategy [10], [11]. However, not all types are necessarily present in all industries [11]. Although these studies suggest that results from some strategy research in larger firms can be applied to small firms, they have failed to provide a consensus model of strategy for small firms. For example, they have identified the following very different typologies: competitive edge, scope constrained, management constrained, local/craftsmen, and local/opportunists [10]; innovative, efficient, versatile, marginal, and reactive [11]. The focus on implicit rather than explicit strategy, combined with a lack of consensus in the literature, makes it difficult to study strategy in small firms.

IT and small firms

Many studies have reported the operational use of IT in small firms but relatively few have examined use from a strategic perspective. Reference [12] identified firms where IT was being used strategically, but such firms were a minority. They also identified examples of IT alignment. For example, in 'efficiency' firms, "there is no recognition of the role of information in supporting the achievement of business strategy" (p. 5). While in 'innovation' firms, "IS are an integral and tightly woven part of the business strategy" (p. 6). Others have provided evidence that IT can be used as a strategic weapon by SMEs to maintain their competitiveness and attain a favourable position within their sector of activity [13]. Thus there is evidence of the strategic use of IT in small firms. This implies a degree of alignment with business strategy, but as yet this IT alignment has not been studied, apart from [14] who examined how well business CSF's were supported by IT.

Many studies have indicated that the conditions are not ripe for IT to be used strategically in small firms. For example, authors comment on the limited resources in small firms [15]. Also, small firms do not perform adequate planning of the use and operation of IT [16]. Consequently this results in a lack of appropriate policies towards IT assessment and adoption. Furthermore, [17] argued that the computing environment in very small firms (with 50 or less employees) was fundamentally different from medium-sized firms, where there was often a formal MIS department and a community of end-users.

While there has been relatively little study of strategic IT in small firms, numerous studies have examined factors that contribute towards the success of IT in small firms. Although the results are not conclusive, two factors have received much support: the role of the owner/manager in small business computerisation and external expertise [17] , [18].

Strategic fit and IT alignment

The concept of 'fit' expresses an idea that the object of design (e.g. an organisation's structure) must match its context in order to be effective [19]. Reference [20] was one of the first to argue that IT can affect a firm's ability to execute their business strategy. Since then, many others have emphasised the need to develop a fit between information technology strategies and business strategies [21] , [22] , [3].

The link between business strategy, IT and performance has been examined. Reference [23] examined IT use and performance across the Miles & Snow typology. They found investment in technological innovations differed across the typology for their sample of high-tech firms. Prospectors emphasised technology leadership, while defenders tended to be very conservative, and analyzers fell in between the two. The link to short and long term success was most positive for defenders, while analyzers gained in the short term and prospectors in the long term. Reference [24] also found that investment in strategic IT was a risky strategy but with potential for high payoff in the long term for early IT adopters. Many other studies have failed to indicate a relationship between IT *use* and organisational performance. However, [3] found a positive relationship between IT *alignment* (not IT use) and organisational performance using the dimensions of business strategy suggested by [25].

The concept of 'fit' has also been debated in the literature. Reference [26] provided a classification for the concept of 'fit', in which he distinguished six interpretations of 'fit'. Different approaches require different mathematical models and have different theoretical implications [25]. The matching and moderation perspectives have been used by a number of researchers, and other perspectives are still in their

exploratory stages and require further development. Reference [27] concluded: '*Studies should be designed to permit comparative evaluation of as many forms of fit as possible*' (p. 358). This indicates that studies should examine different approaches, as adopted by [3]. They used a combination of approaches, with their results supporting the moderation model rather than the matching model, and the systems approach rather than the bivariate approach. Reference [28] also favoured the moderation model following their study of the effect of the organisation structure–technology fit on performance. They claimed that the moderation model was less ambiguous and more widely applicable, compared with matching.

RESEARCH FRAMEWORK

This study aimed to focus on the relationship between alignment and organisational performance, based on the argument that strategic fit has performance implications. Generally, the better the fit, the better the performance [29]. More specifically, the study wished to focus on one aspect of IT alignment, ie, the alignment between business strategy and IT strategy [21]. Reference [30] emphasised that for companies to succeed in an increasingly competitive, information-intensive, dynamic environment, then the alignment of business strategy and IT strategy was a necessity. Furthermore, [3] provided empirical support for a positive relationship between business performance and the alignment of business strategy and IT strategy. The above studies were conducted in the context of large organisations. This study hypothesised a similar relationship between IT alignment and performance for small firms. Thus the study's major hypothesis was:

Small firms that align their IT strategy with their business strategy are more likely to be successful than those that do not align their IT strategy with business strategy.

This major hypothesis is represented in Figure 1 as a line joining the variables 'IT alignment' and 'organisational performance'. It should be noted that Figure 1 shows IT alignment as the only direct influence on organisational performance. The model has no line drawn between business strategy and performance, nor one between IT strategy and performance. The model implies that neither IT strategy nor business strategy influence performance directly. If business strategy or IT strategy directly influenced performance, this would imply that some specific strategy must be superior. If this were the case, then all firms would adopt the same strategies. Instead, the impact on performance of both business strategy and IT strategy comes from their interaction, which is viewed as alignment. Thus IT strategy moderates the impact of business strategy on performance,

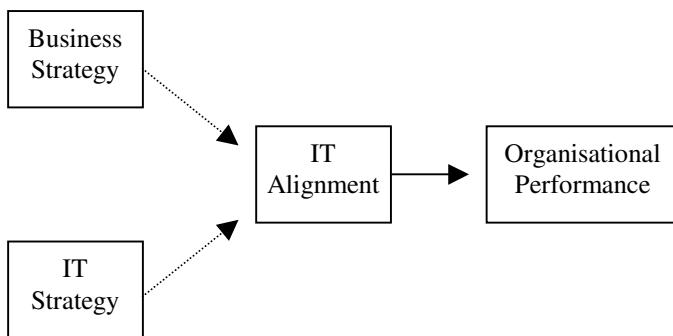


Fig. 1. Research Model

and business strategy moderates the impact of IT strategy on performance. To study these relationships it is necessary to operationalise the four main variables.

Business Strategy

As discussed earlier in the literature review, business strategies in small firms may not be formalised or planned, but emerge into specific organisational commitments. In the absence of an existing instrument to measure business strategy in small firms, various studies were used to develop a measure for this study [31], [32], [33], [34], [35]. Most of these studies attempted to identify key factors that contributed towards small firm competitiveness. Eventually, nine business strategy items were collected from these works, as exhibited in Table 1.

IT Strategy

While many researchers argue that most small businesses are informal and lack IT planning, it is believed that ‘emergent’ and unformalised IT strategies do exist. There has been little study of IT strategy in small firms, so this study adopted a similar approach to [3], where the instrument was developed to mirror the same items as were used to measure business strategy. Thus the instrument was devised to assess the level of IT support provided for business strategy. The

instrument emphasised realised IT strategy. Thus this study measured IT strategy using nine items similar to the nine used to measure business strategy. For example, for the business strategy item ‘we attempt to be ahead of our competitors in introducing new products’, the IT strategy item was “our current systems enable us to introduce new products earlier than our competitors”.

IT Alignment

IT alignment was viewed as the ‘fit’ between business strategy and IT strategy, similar to [3]. Following the suggestions of [27], that different forms of fit should be compared and evaluated, two approaches taken from [26] were modelled - ‘fit’ as ‘matching’ and ‘fit’ as ‘moderation’. This is very similar to the approach adopted by [3] when studying ‘fit’ in larger organisations.

As used by [3], fit as matching was based on the difference between the two strategies (BS - ITS), while fit as moderation was modelled as the interaction between business strategy and IT strategy (BS * ITS). These two mathematical models were first suggested by [25] and tested by [3] in larger companies. Intuitively, the difference model initially seems more appropriate as it seems to measure the mismatch, but it does give equal weight to differences from business strategies that are either very significant or very insignificant for the organisation. The advantage of the multiplicative model in the moderation approach is that it gives the most weight for close matches in the most important strategies for an organisation and this is probably why [3] found it had most support in their results.

A systems perspective was adopted based on [3]. Thus the study was most interested in a measure of total alignment, rather than splitting alignment into various parts.

Organisational Performance

Organisational performance was the dependent variable in this study. Researchers have offered a variety of measures of organisational performance. Subjective measures were used rather than objective measures as subjective measures can capture a wide concept of business performance. The study adopted the instrument developed by [36] who found a strong correlation with objective performance measures. They have since been validated in small business contexts by [37] and [38]. Thus four Likert statements were used to gain the manager’s assessment of the company’s performance relative to its competitors. The four statements assessed: long-term profitability, sales growth, financial resources (liquidity and investment capacity), and public image and client loyalty.

TABLE 1 LITERATURE USED FOR BUSINESS STRATEGY ITEMS

Business Strategy items	Sources of Literature
Pricing Strategy	[31], [32], [34], [35]
Quality Product Strategy	[32], [33]
Product Differentiation Strategy	[31], [32], [35]
Product Diversification Strategy	[31], [32]
New Product Strategy	[31], [34]
New Market Strategy	[31]
Quality Service Strategy	[32], [34]
Intensive Marketing Strategy	[32], [33], [34]
Production Efficiency Strategy	[31], [34]

RESEARCH METHOD

A mail questionnaire survey was used to gather data as the main aim of the study was to compare IT alignment across a range of small firms. The manufacturing sector was selected as they can provide a range of levels of IT sophistication.

The questionnaire was refined in three stages: pre-testing with academics and research students, pre-testing with small business managers, and pilot testing with small business managers. Fifty addresses were used for the pilot survey and 1400 for the main survey. The questionnaires were addressed to the Managing Directors. Personalised cover letters and addresses were used, as well as a pre-printed 'freepost' return envelope. 256 usable questionnaires were returned. This was an 18% response rate, similar to the Cambridge SBRC in 1992. Non response was examined using the time trend extrapolation. The first 30 and last 30 responses were compared on 22 major variables. Only two variables proved significantly different: 'Intensive Marketing' strategy and 'IT support for Intensive Marketing Strategy'. This suggested that non-response was not a significant factor that could affect the conclusions about the variables being studied.

Nearly 70% of the firms were independent companies, with 30% as a subsidiary of another organisation. Mann-Whitney tests on 22 questionnaire items found no significant differences so it was concluded that both types of company could be treated as one sample for further analysis. Slightly more than half of the firms were engineering-based while others considered themselves as non-engineering-based companies. Again, Mann-Whitney tests identified only two variables that differed across these types of firm, which suggested that the engineering and non-engineering firms were similar and could be treated as one sample.

Most firms were more than ten years old (83%), with many (37%) founded between 11 and 20 years ago. Thus most of the firms were mature companies. About half (58%) of the firms had between 50 and 100 full-time employees. 11% had fewer than 50 employees. Most firms had annual sales under 5 million pounds, but 46% were over 5 million pounds. About a third of the firms had used computers for between five to ten years, and another third for 11 to 15 years. Thus the sample contained many firms with considerable experience with computers.

RESULTS

The questionnaire included nine items to measure business strategy. Each item used a 1 to 5 Likert scale alongside an appropriate aspiration statement. Using the Likert scales, respondents were asked to indicate their strength of

agreement with each of the statements. The mean of the responses for each of the nine items was calculated. The highest rated items were 'quality service' at 4.71, 'quality products' at 4.41 and 'production efficiency' also at 4.41. These high rankings are similar to prior studies of small firms [32] , [34]. Similarly, 'pricing/cost reduction' at 2.67 and 'intensive marketing' at 3.14 were ranked lowest, consistent with prior studies [32] , [34]. The other four items scored between 3.6 and 3.75.

Similarly the means of the nine IT strategy items were calculated. The highest ratings were for IT supports 'Quality Service' (3.83), 'Pricing/Cost Reduction' (3.80) and 'Production Efficiency' (3.79), with the lowest ranking being IT supports 'New Market Strategy' (2.14). The other support strategies were between 2.5 and 3.35.

IT Alignment using the matching approach

The matching approach for measuring IT alignment was based on deviation scores [26] computed as the absolute difference between the rating for business strategy (BS) and the rating for IT strategy (ITS). A low value for the difference indicates that the alignment between the two variables is high, while a high value for the difference implies that there is a high degree of misalignment. For each company, the absolute difference between the rating for each of the BS and ITS items was calculated. The mean difference for each strategy area was calculated by summing the absolute difference for all companies, divided by the number of

TABLE 2: IT ALIGNMENT FOR EACH STRATEGY (MATCHING)

Business Strategy / IT Strategy	Mean (Absolute difference)	Std.Dev.	N
Production Efficiency	0.8	.89	248
Intensive Marketing	0.9	.94	246
Quality Service	1.0	.93	247
New Product	1.2	1.04	243
Product Differentiation	1.3	1.08	245
Quality Product	1.3	1.09	247
Product Diversification	1.4	1.14	241
Pricing/Cost Reduction	1.6	1.14	248
New Market	1.7	1.14	247

TABLE 3 IT ALIGNMENT FOR EACH STRATEGY (MODERATION)

Business Strategy / IT Strategy variables	Mean (BS*ITS)	Std.Dev.	N
Quality Service	18.21	5.56	247
Production efficiency	16.98	5.97	248
Quality Product	14.88	5.76	247
New Product	10.27	5.66	243
Pricing/Cost Reduction	10.11	5.18	248
Product Diversification	9.59	4.94	241
Product Differentiation	9.53	5.46	245
Intensive Marketing	8.29	5.30	246
New Market	8.21	5.01	247

companies. The result for all the nine strategy areas is shown in Table 2.

A low mean in Table 2 indicates high alignment, and vice versa, thus production efficiency, intensive marketing and quality service strategies were most aligned. The greatest 'mis-match' was observed for new market strategy and pricing/cost reduction strategy.

IT alignment based on the moderation approach

An alternative perspective is to consider 'fit' as moderation [26], measured by multiplying the ratings for Business Strategy and IT Strategy items [3], [38]. In this case, a high rating for BS and a high rating for ITS will result in a high alignment measure. On the other hand, a low rating for BS and a low rating for ITS will give a low alignment score. For each company and each strategy, the rating for BS was multiplied by the rating for ITS. The means for each strategy area were calculated as for the matching case and are shown in Table 3. The data shows that quality service and production efficiency had high alignment scores, while intensive marketing and new market strategies received low alignment scores.

The rank orderings in tables 2 and 3 are fairly consistent except for the intensive marketing strategy. The matching analysis indicated high alignment for this strategy whereas moderation gave low alignment. The raw data helped explain this inconsistency. Over half of the sample reported a low priority to the 'intensive marketing' strategy. Of these, 49 firms indicated weak support from IT for 'intensive marketing'. Under the matching approach, this 'low-weak' combination was considered to have a high degree of alignment, ie, to be well matched. Under the moderation approach, the 'low-weak' combination implied a low degree of alignment. This inconsistency indicated that the matching approach could provide misleading evidence.

Total IT alignment

Total IT alignment was computed for each firm by summing the moderation alignment scores for all nine items. Full data was available for 238 firms. Total alignment ranged from 20 to 206, with a mean of 106. Four measures of

organisational performance were employed in this research. ANOVA was used to test the relationship between IT alignment and each measure of organisational performance. For this analysis, the total sample was split into three nearly equal groups of firms based on the total IT alignment scores for each firm. For ease of reference, these three groups of firms were referred to as 'high', 'medium' and 'low' alignment. The ANOVA compared the mean performance scores for the three groups, as shown in Table 4. This data indicates that the alignment groups were significantly different for all four measures of performance. Performance was consistently highest in the highly aligned group of firms. This data provided support for the study's major hypothesis. Similar analysis was conducted based on matching, but none of the one way ANOVA results were significant.

DISCUSSION

This research focused on IT alignment in small firms. Importantly, the findings indicated that a large proportion of our sample of small manufacturers had achieved a high degree of alignment between their business strategy and IT. The findings show that SMEs are gaining IT support for their business strategy, particularly in the areas of service quality, production efficiency and product quality. Much past research on IT and small firms suggests that small firms lack strategic planning. Reference [39] highlighted the contrast between the empiricism of small business management methods on the one hand, with the systematisation required by methodologies for planning, designing and implementing IT. The current study provided empirical evidence that a large proportion of small manufacturing firms have aligned their IT with their business strategy.

The study identified a positive association between IT alignment and organisational performance. While causal links cannot be deduced from this research, the results indicate that IT alignment is related to organisational performance. This finding is consistent with studies of larger organisations [3], [40]. The findings suggest that the positive relationship applies to small business, not just large firms.

Implications for research

TABLE 4 MEAN PERFORMANCE SCORES AND ONE-WAY ANOVA BETWEEN IT ALIGNMENT GROUPS AND PERFORMANCE (MODERATION)

Performance	Low alignment (77)	Medium alignment (78)	High alignment (80)	F Ratio	F Prob.	Significance
Long term profitability	3.57	3.78	3.90	3.947	.021	Significant
Sales growth	3.62	3.68	3.96	5.717	.004	Significant
Financial resources	3.45	3.64	3.89	5.030	.007	Significant
Image and client loyalty	3.77	3.77	4.16	6.987	.001	Significant

Prior literature highlighted a major difference between the Matching perspective and the Moderation perspective of 'fit'. This study provided evidence of inconsistent results from the two approaches. The moderation approach seemed to outperform the matching approach. This is consistent with [3] and suggests that researchers should at least be wary when using the matching approach.

Firms achieved differing levels of alignment. This suggests that some firms are doing things differently so the process of alignment deserves further study. For example, the high alignment of many firms implies different levels of IT planning. How do some firms achieve high alignment? Also, what factors influence alignment? The IT success literature has identified a number of success factors, and maybe these apply to alignment too. Furthermore, some strategy items had higher alignment than others. Maybe some strategies are easier to support with IT. Alternatively, some firms may be targeting IT at specific strategies.

Implications for practice

This research demonstrated that alignment between business and IT strategy was clearly linked to organisational performance. This evidence supports prior research findings in large firms and implies that either high performing firms are good at aligning IT with business strategy, or that IT alignment influences organisational performance. The latter possibility, ie, that IT alignment influences performance, suggests that small firms can benefit from IT alignment. Thus managers of small firms should give high priority to IT projects that support their business strategy. This study found that it was useful to view IT alignment as the interaction between business strategy and IT strategy, rather than the simple match between the two. This suggests that firms should aim to support their major strategies with IT, rather than attempt to support all strategies. For example, if quality and customer service are significant strategies, then managers should make sure that their IT is highly aligned to quality and customer service. The need for a strategic perspective implies the involvement of senior managers. This probably requires the owner-manager or CEO to take an active role in seeking IT alignment.

Limitations and research opportunities

In the absence of prior instruments aimed at small firms, the study had to create a research instrument to measure IT alignment. Efforts were made to ensure that the principal aspects of business strategy were present in this instrument, through an extensive search of the literature and pre-testing with small business managers. However, other elements of strategy may have been overlooked. Future research could focus on rigorously validating the instrument used to measure IT alignment.

It is also important to note that this study was based on a survey. This approach has shortcomings as it captures a situation or an event at a point in time. For example, the organisational impact of IT may not have been fully realised unless the IT had been implemented well before the study. Future research could employ a more qualitative approach, such as the case study method or longitudinal study.

The IT strategy items for this study were developed in parallel to the business strategy items. The study also focused on measures of total alignment. Future research could explore other ways of measuring fit. For example, alignment with a firm's dominant business strategy based on [4] or [5], or a more systems/holistic approach.

Another limitation of the study concerns the cause and effect relationship between IT alignment and organisational performance. There are potentially other factors that could influence alignment and business performance. A cross-sectional study such as this can not prove cause and effect relationships. Future researchers may choose different approaches to examine the cause and effect relationship.

CONCLUSION

This is the first reported investigation of IT alignment and organisational performance in small firms and is one of few studies to examine the strategic use or impact of IT among small firms. This study provided a substantial contribution to our understanding of strategic IT in small firms. It not only gained evidence of the importance of IT alignment in small firms, but it also provided a way of measuring alignment. The findings could foster strategic planning for IT in small firms, and encourage researchers to further examine the links between business strategy and IT strategy in small firms.

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