

Strategic Flexibility and SMEs: The Role of Information Technology for Managing Internal and External Relations

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The purpose of the current study was to assess the impact of information technology on strategic flexibility for small- and medium-sized enterprises (SMEs). Results of the study show that under conditions of low environmental dynamism, IT capabilities are associated with greater reactive strategic flexibility. Specifically, IT capabilities enabling the management of internal activities was significant. Under conditions of high environmental dynamism, IT capabilities are associated with greater proactive strategic flexibility. Specifically, IT capabilities enabling the management of competitor information was significant. Managerial as well as future research implications are discussed.

Introduction and Literature Review

Substantial research has examined the importance of IT investments for firms, including if and how such investments may increase the strategic flexibility of firms (the ability to adapt to, and even anticipate, environmental changes, by altering strategy). On one hand, development of IT infrastructure should offer firms improved ability to obtain and manage internal and external information. Firms would have access to real-time information regarding important stakeholders. Much literature has emphasized the importance of gathering, disseminating, and responding to market information regarding a firm's market orientation (see for example, Kohli and Jaworski 1990; Narver and Slater 1990). More importantly, firms that possess the best market information, and respond accordingly, will have more strategic options, including adjusting product/service offerings and anticipating customers' future needs (Evans 1991; Achrol and Kotler 1999; Day 1999). Such abilities allow firms to operate more flexibly according to market dynamics.

On the other hand, a major investment in information technology may actually create a lock-in to a particular technology (Reddy 2006; Shapiro and Varian 1999). These past information technology systems, or legacy systems, may potentially reduce a firm's strategic flexibility (Reddy 2006). Information technology lock-in has special implications for intra-firm and inter-firm relationships, particularly in an increasingly dynamic external environment (the degree of uncertainty and rate of change in the environment; Hitt et al.

1998). For example, Tallon and Kraemer (2003) found that many firms made substantial investments in IT resources in order to build static capabilities, such as reducing operating costs, perhaps specific to a particular product or supplier (Prahalad and Krishnan 2002). However, the development of IT capabilities (superior coordination and information management abilities) tightly geared toward the achievement of such efficiency gains often made the firm more vulnerable to environmental dynamism. Ideally, IT should lower external coordination and internal organization costs by reducing search costs and enabling firms along the value chain to collaborate more closely (Gurbaxani and Whang 1991). Therefore, it is important to tailor IT investments toward building strategic flexibility to improve the management of internal and external relationships, which is appropriate given the level of environmental dynamism.

The overall degree of environmental dynamism may impact what type of strategic flexibility is important for small firms. The wrong kind of IT investments (not creating the appropriate capabilities) may actually limit strategic flexibility. For example, in an environment of low environmental dynamism, firms may only need to respond to these moderate environmental changes, indicating reactive flexibility (the ability to respond to current changes in the environment).

However, in periods of substantial volatility (high environmental dynamism), a higher degree and more difficult form of strategic flexibility becomes paramount, that is, proactive strategic flexibility (the ability to anticipate future changes in the environment). In volatile conditions, it becomes more important to stay ahead of the curve. Reacting to these radical, less predictable changes becomes less useful, because by the time the firm has adjusted, the environment has already changed again. In this case, firms must anticipate changes, and stay ahead of the trends. Therefore, a greater degree of environmental dynamism may demand greater proactive flexibility.

This issue is particularly important for small and medium-sized enterprises (SMEs). Indeed, small firms are not taking advantage of information technology to the same degree as larger companies (Cox et al. 2001; Peet et al., 2002; Sandberg and Vinberg 2000; Wagner et al. 2003). Further, with limited

resources, small firms must invest in IT wisely to achieve very specific goals, and cannot simply develop strong IT capabilities in a generic sense. With limited budgets, it is even more essential for small firms to have a well-developed strategic plan regarding their IT spending, and to customize their IT infrastructure appropriate for their circumstances (Broadbent and Weill 1997). They must develop very specific capabilities to grant them strategic flexibility for dealing with environmental turbulence.

According to Reddy (2006), the impact of IT on organization and performance has often been viewed from one of two perspectives: Coordination theory, with a focus on transaction costs for current relationships; and resource-based theory, with a focus on how IT can be a resource, or a dynamic capability, for a firm (see also Malone and Smith 1988; Malone et al. 1987; as well as Bharadwaj 2000; Byrd 2001; Hitt et al. 1998). The central question then is what specifically should the role of IT be: For superior coordination of current transactions or for building dynamic capabilities to better manage complex and changing business relationships? In the current study, we contend that the degree of environmental dynamism affects which of those perspectives is appropriate. With greater dynamism, the true source of competitive advantage becomes managerial IT knowledge about the nature of those changes, and what is driving them (Reddy 2006). That is, the valuable resource or capability is for SMEs to not get locked into any current, existing capability, but instead to be flexible enough to be able to obtain and interpret knowledge about a confusing external environment, and to develop the dynamic capabilities to succeed in those changing circumstances.

Therefore, the current study posits that when environmental conditions are more certain and slowly changing, SME's focus their IT capabilities to achieve internal and vertically integrated efficiencies so that they can better react to their environment; when environmental conditions are less certain and rapidly evolving, SME's focus their IT capabilities to more effectively gather/analyze information about external market participants as a means of anticipating environmental changes (see Figure 1 for this model).

Model and Hypotheses

Developing IT Capabilities

Fundamentally, IT investments, their nature and purpose, are critical strategic issues. Investing in IT is necessary for firms of all types to develop firm capabilities. Studies show that IT investments are critical to developing important capabilities, which in turn, should improve firm performance (Bharadwaj 2000; Powell and Dent-Metcalf 1997; Santhanam and Hartono 2003). Smaller firms in particular, who have limited resources, must invest in IT resources wisely, to develop specific IT capabilities.

The overall objective of IT investments should be clear, and should clearly target what specific IT capabilities need to be developed (Broadbent and Weill 1997). Central to these IT capabilities is the issue of managing internal and external relations; having up-to-date information and being able to respond to and even anticipate changes and trends regarding those constituencies.

These IT capabilities may relate to internal operations and cost efficiency, or external parties that may be driving the environmental changes. The focus on current internal efficiencies would include managing internal activities or managing the supply chain network. For example, a company employs an IT system that allows for comprehensive tracking of upstream costs and delivery schedules for products and services from various suppliers. Through the use of this system, the owner is better able to manage supplier costs and coordinate work flow with supplier delivery thereby decreasing project expenses. Through this process the company reaps financial performance improvements.

The focus on trends in external entities would include managing customer information and managing competitor information. In a similar scenario, a company employs an IT system that allows for comprehensive tracking of downstream customer demand for various projects. As such, the owner is better able to track trends in consumer demand for various options so that he or she may proactively adjust future plans in the anticipation of market desires. The extent of these changes will affect which entities are most critical.

An uncertain and dynamic environment often creates emerging customer niches and changing demographics compared to current customers, and where their needs tend to be rather latent and ambiguous (Callaway and Hamilton 2006). Firms need to be able to anticipate these evolving customer needs and generate new capabilities based on that knowledge, and discover new solutions to unexpressed needs of customers, as well as attract new customers (D'Aveni 1994; Leonard-Barton 1995). The most successful firms are committed to continuous market learning, and discovering latent needs and unserved markets (Slater and Narver 1998). In short, customer changes usually represent the leading edge of external changes, and firms must stay ahead of those changes to be successful.

Of course, those firms that do stay ahead of such changes may well be other competitors. Ultimately, a firm in a more dynamic environment may confront a new and entirely distinct set of competitors that often includes entrepreneurial startups. These smaller entrepreneurial firms may also pursue proprietary technology. As such, the capabilities and the technology of these firms are uncertain and volatile in a particularly dynamic environment (Callaway and Hamilton, 2006). Therefore, the more dynamic and volatile the external environment, the more important it is for firms to develop IT

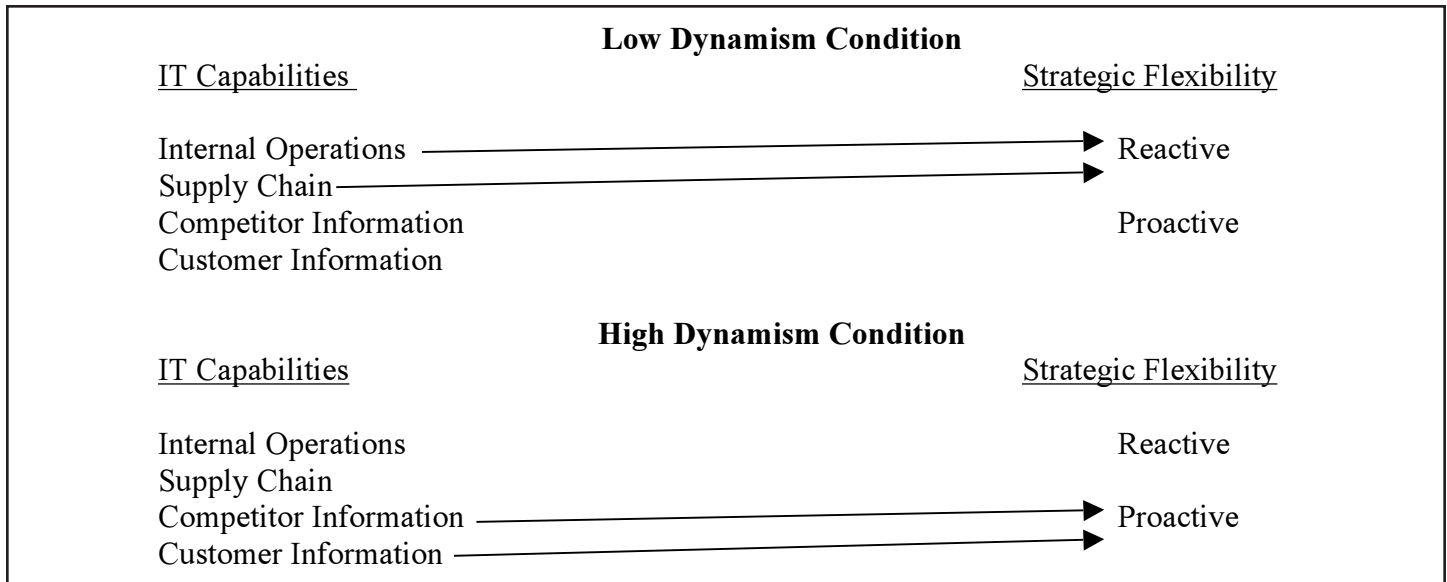


Figure 1. Model of Proposed Relationships

capabilities to manage customer and competitor information. On the other hand, a focus on cost efficiency (internal operations and the supply chain) is more appropriate for a less dynamic environment.

Generating Strategic Flexibility

Strategic flexibility refers to the ability to adapt to, and even anticipate, environmental changes by altering firm strategy (Bierly and Chakrabarti 1996; Nadkarni and Narayanan 2004). Strategic flexibility, or the ability to quickly respond in a proactive or reactive manner, enables firms to better manage risks (Grewal and Tansuhaj 2001). Because it includes multiple factors, strategic flexibility is a polymorphous construct (Grewal and Tansuhaj 2001). Strategic flexibility may comprise proactive (anticipatory) or reactive (adaptation) flexibility (Johnson et al. 2003). Proactive flexibility indicates an ability to anticipate changes in the environment, while reactive flexibility refers to the ability to rapidly and effectively respond to such changes once they become evident. Because IT capabilities improve a firm's information flow, knowledge flow, and organizational learning, IT investments are critical for a firm's strategic flexibility. Furthermore, the improved monitoring and coordination should also enable the firm to effectively react to environmental changes (Johnson et al. 2003).

Strategic flexibility is particularly essential for small firms. Large firms often possess enough slack resources to cover various contingencies, and may attain strategic flexibility by investing in several strategic options (Bierly and Chakrabarti 1996; Broadbent and Weill 1997; Grewal and Tansuhaj 2001). On the other hand, smaller firms must achieve strategic flexibility through entrepreneurial alertness and faster response

and implementation times (Hatch and Zweig 2001; Yu 2001). IT capabilities in particular help entrepreneurial ventures to achieve these important attributes, thereby enhancing their strategic flexibility. Hatch and Zweig (2001) argued that the success of small firms depends on their "ability to quickly adapt by modifying their competitive positioning, adjusting their value propositions and targeting different customer segments," as well as to "quickly perceive the need for change and make it happen" (p. 45).

While IT capabilities help generate strategic flexibility in general, whether proactive or reactive flexibility becomes more important depends on the level of environmental dynamism. The degree of uncertainty and rate of change in the environment, such as technology, regulations, as well as changes with external entities, all affect the nature of strategic flexibility that is most critical for SMEs. Specifically, these environmental changes may include changing customer requirements, developing industry technology, evolving competitor tactics, product changes, and industry regulation.

Therefore, it is important for firms to consider the level of environmental dynamism when developing IT capabilities that will enhance their strategic flexibility (Bierly and Chakrabarti 1996; Hatch and Zweig 2001). That is, with changing customer requirements and demands, development of new technologies, emergence of new and different competitors and changing tactics, product introductions, and changing regulations, particular IT capabilities are essential for firms to adjust to or anticipate such market volatility. But because the level of dynamism in the environment affects whether strategic flexibility needs to be more proactive or reactive, firms need to take care to invest in the correct specific IT capabilities, depending on that environment.

According to Broadbent and Weill (1997), the strategic context of the firm indicates how the firm needs to connect, and structure its information technology infrastructure. This context affects whether the view of IT infrastructure would be dependent or enabling, indicating whether the primary value driver benefits the current strategy or provides for current and future flexibility. A dependent view of infrastructure indicates that infrastructure investments are geared toward responding to specific, known current strategies; while the enabling view of infrastructure indicates that investments are geared toward providing flexibility for firms to achieve their long-term goals and enable the rapid development of new products. The former emphasizes cost savings while the latter targets flexibility with respect to customers and competitors.

In the case of low environmental dynamism, SMEs will focus their IT capabilities in a way that reduces costs and targets their current strategies and options. Such firms will emphasize the efficiency of their cost structure, including their internal operations and their current supply chain. As such, IT capabilities will help the firm manage internal activities and their supply chain network. Therefore, those specific IT capabilities are expected to be associated with greater reactive strategic flexibility.

Furthermore, in periods of high environmental dynamism, SMEs will focus their IT capabilities in order to increase their potential to address possible future contingencies. As such, they will need to gather information on important external entities, such as customers and competitors, to stay ahead of the curve. These entities are likely driving many of the environmental changes. Firms must be able to read where the market is going and how competitors are maneuvering. Therefore, IT capabilities should help the firm manage customer information and competitor information, and those specific IT capabilities are expected to be associated with greater proactive strategic flexibility. Specifically,

Hypothesis 1a: Under environmental conditions that are more certain and slowly changing (low environmental dynamism), IT capabilities will be more strongly related to reactive strategic flexibility than proactive strategic flexibility.

Hypothesis 1b: Under conditions of low environmental dynamism, IT capabilities that help the firm manage the supply chain and internal activities will be more strongly associated with reactive strategic flexibility than capabilities that help the firm manage customer and competitor information.

Hypothesis 2a: Under environmental conditions that are less certain and rapidly evolving (high environ-

mental dynamism), IT capabilities will be more strongly related to proactive strategic flexibility than reactive strategic flexibility.

Hypothesis 2b: Under conditions of high environmental dynamism, IT capabilities that help the firm manage customer and competitor information will be more strongly associated with greater proactive strategic flexibility than capabilities that help the firm manage the supply chain and internal activities.

Methodology

Sample and Procedure

The sample for the current study consisted of a list of 1,300 small- to mid-sized companies (500 employees or less) located in the Midwest. A letter was sent to top management within each company, explaining the purpose of the research, a questionnaire, and a postage-paid return envelope. A total of 160 surveys were completed (a response rate of 12.3 percent). The responses came from various sectors such as retail, construction, and financial services. Of the sample responding, 36 percent of the companies had between 20–49 employees while 33 percent had between 50–99 employees. About half of the companies reported that some portion of their IT function was outsourced, and nearly all of these reported domestic outsourcing (96%).

The response rate of this study is typical of similar studies. In addition, nonresponse bias was assessed by testing for differences between early and late respondents on the variables used in the proposed framework for this study. No significant differences were found for any of the variables.

Questionnaire

Measures used in the questionnaire were adapted from constructs relevant to this research, and were based on a literature review of similar research as well as knowledge of regional firms. Early drafts of the survey were reviewed for readability and understandability. Ultimately, the final questionnaire included measures related to the following constructs: IT capabilities, environmental dynamism, and strategic flexibility. The purpose of the survey was to measure perceptions of top management regarding particular aspects of their companies under the assumption that these cognitions define the reality of their organizations. This approach is consistent with Day and Nedungadi (1994), and others, who argue the importance of perceptual aspects of managerial decision-making in the domain of competitive strategy.

Measures

IT Capabilities. IT capabilities included four seven-point items, where respondents provided perceptions regarding the extent to which IT capabilities help the firm manage: cus-

customer information, competitor information, internal operations, and the supply chain network, in order to achieve competitive advantage (scaled: very small extent...very great extent). Given the research objectives of the study, these items were examined separately in subsequent analyses. As such, this approach to assessing IT capabilities addresses what specifically the organization should be able to accomplish. This approach of measuring IT capabilities is consistent with conceptions derived in management, marketing, as well as IT strategy literatures. (see for example, Kohli and Jaworski 1990; Day and Nedungadi 1994).

Environmental Dynamism. Environmental dynamism comprised five seven-point items, indicating respondents' perception of the rate of change in the industry (scaled: change very slowly...change very quickly) according to specific dimensions. The five dimensions include customer requirements, industry technology, competitors' strategies and tactics, rate of products and services changes, and industry regulations. These five items were combined to form an overall measure of environmental dynamism. The coefficient alpha for the scale was .84. This approach to the construct is consistent with strategy and marketing literature (see for example, Maltz and Kohli 1996; Miller and Friesen 1983).

A median split was used to create the low environmental dynamism group (scores lower than 4 on the 1-7 scale) and the high environmental dynamism group (scores higher than 4 on the 1-7 scale). The split created groups with statistically significant different environmental dynamism means ($t=17.07$, $p<.001$). The mean for the low dynamism group was 3.09 ($n= 58$) while the mean for the high dynamism group was 5.03 ($n=91$). According to Hair et al. (1998), the group sizes resulting from the median split meet acceptable levels of power. Specifically, for analyses on samples between 50 and 100 using four independent variables, explained variances (R^2) between .10 and .20 are deemed to be truly significant at the .05 level.

Strategic Flexibility. Strategic flexibility was measured according to two dimensions—reactive and proactive, which is consistent with current conceptualizations in the strategy literature. Five seven-point items were used. For reactive strategic flexibility, respondents addressed their perceptions of the organizational capability of reacting/responding to five specific strategic imperatives. For proactive strategic flexibility, respondents indicated their perceptions of the organizational capability of proactively anticipating the same five strategic imperatives. These five strategic imperatives included: resource reallocation needs, the need to modify business partnerships, emerging market opportunities, changing environmental conditions, and changing organizational technology needs. Each of these items was scaled as much worse than competitors...much better than competitors. The coefficient alphas for the reactive and proactive strategic flexibility

scales were .84 and .89, respectively. This approach to strategic flexibility is consistent with management and marketing literature (see for example, Sanchez 1995; Teece et al. 1997; Eisenhardt and Martin 2000; Grewal and Tansuhaj 2001; Johnson et al. 2003).

Results and Analysis

The objective of the present research was to test the relationship between IT capabilities and strategic flexibility in lower and higher dynamism environments. Table 1 provides the correlation matrix for the measures used in this study. An examination of the correlation matrix provides some evidence for the validity of the measures. The two facets related to strategic flexibility are strongly correlated as would be expected as they are conceptually similar. In contrast, these two measures show much weaker correlations with conceptually related but different constructs such as environmental dynamism. In summary, associations among variables show some support for convergent and discriminant validity.

Variance inflation factors were used to assess the effects of multicollinearity among the independent variables used in the regression equations. The variance inflation factor scores were under 2.00 for both the low and high dynamism groups. Hair et al. (1998) consider variance inflation factors under 2 to indicate acceptable levels of multicollinearity. Accordingly, while the independent variables are not completely orthogonal, a frequent occurrence in behavioral research (Pedhazur 1982), the degree of collinearity is within acceptable standards.

Table 1. Correlation Matrix

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------------------------------|------|------|------|------|------|------|------|
| 1 IT Customer Information | 1.00 | | | | | | |
| 2 IT Competitor Information | .51 | 1.00 | | | | | |
| 3 IT Internal Operations | .59 | .40 | 1.00 | | | | |
| 4 IT Supply Chain | .46 | .50 | .43 | 1.00 | | | |
| 5 Proactive Strategic Flexibility | .32 | .28 | .36 | .27 | 1.00 | | |
| 6 Reactive Strategic Flexibility | .33 | .27 | .35 | .22 | .85 | 1.00 | |
| 7 Environmental Dynamism | .29 | .35 | .29 | .49 | .25 | .26 | 1.00 |

Note: All correlations statistically significant at .01

Regression analysis was used to test the hypotheses. The results of the regression analyses related to hypotheses 1a and 2a are presented in Table 2. Results indicate that under conditions of low industry dynamism, IT capabilities are

more strongly related to reactive strategic flexibility than proactive strategic flexibility (F value of 2.896 and significance level of .031 for reactive strategic flexibility, compared to F value of 2.522 and significance level of .053 for proactive strategic flexibility). Furthermore, under conditions of high industry dynamism, IT capabilities are more strongly related to proactive strategic flexibility (F value of 3.556 and significance level of .010 for proactive strategic flexibility, compared to F value of 2.430 and significance level of .054 for reactive strategic flexibility).

Table 2. Results of Overall Model Tests for Hypotheses 1a and 2a

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|-------|------|
| Regression | 9.094 | 4 | 2.274 | 2.896 | .031 |
| Residual | 39.255 | 50 | .785 | | |
| Total | 48.349 | 54 | | | |

Predictor: IT Capabilities; Dependent Variable: **Reactive** Strategic Flexibility
 Moderator: **Low** Environmental Dynamism
 R Square: .188; Adjusted R Square: .123;
 Std Error of Estimate: .886

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|-------|------|
| Regression | 11.615 | 4 | 2.904 | 2.522 | .053 |
| Residual | 57.571 | 50 | 1.151 | | |
| Total | 69.185 | 54 | | | |

Predictor: IT Capabilities; Dependent Variable: **Proactive** Strategic Flexibility
 Moderator: **Low** Environmental Dynamism
 R Square: .168; Adjusted R Square: .101;
 Std Error of Estimate: 1.073

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|-------|------|
| Regression | 8.520 | 4 | 2.130 | 2.430 | .054 |
| Residual | 72.755 | 83 | .877 | | |
| Total | 81.276 | 87 | | | |

Predictor: IT Capabilities; Dependent Variable: **Reactive** Strategic Flexibility
 Moderator: **High** Environmental Dynamism
 R Square: .105; Adjusted R Square: .062;
 Std Error of Estimate: .936

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|-------|------|
| Regression | 11.853 | 4 | 2.963 | 3.556 | .010 |
| Residual | 69.172 | 83 | .833 | | |
| Total | 81.025 | 87 | | | |

Predictor: IT Capabilities; Dependent Variable: **Proactive** Strategic Flexibility
 Moderator: **High** Environmental Dynamism
 R Square: .146; Adjusted R Square: .105;
 Std Error of Estimate: .913

With respect to hypotheses 1b, it was argued that under conditions of low environmental dynamism, certain IT capabilities, specifically for management of internal activities and the supply chain network, will be associated with greater reactive strategic flexibility. This hypothesis is partially supported. In periods of low environmental dynamism, the management of internal activities was the significant factor, showing a t value of 2.086 and a significance level of .042. However, management of the supply chain network was not significant.

Table 3. Results for Hypothesis 1b

Coefficients

| Model | Unstandardized | | Standardized | | |
|-----------------|----------------|------------|--------------|--------|-------------|
| | B | Std. Error | Beta | t | Sig. |
| Constant | 3.506 | .345 | | 10.159 | .000 |
| IT Customers | 9.753E-02 | .084 | .205 | 1.157 | .253 |
| IT Competitors | -4.763E-02 | .114 | -.067 | -.419 | .677 |
| IT Internal Op. | .183 | .088 | .356 | 2.086 | .042 |
| IT Supply Chain | -4.513E-02 | .088 | -.080 | -.513 | .610 |

Dependent Variable: Reactive Strategic Flexibility
 Moderator: Low Dynamism

Hypothesis 2b argued that under conditions of high environmental dynamism, certain IT capabilities, specifically for management of customer and competitor information, will be associated with greater proactive strategic flexibility. This hypothesis is also partially supported. In periods of high environmental dynamism, the specific IT capability that was significant was management of competitor information, showing a t value of 2.068 and significance of .042. However management of customer information was not significant. See Table 4.

Table 4. Results for Hypothesis 2b

Coefficients

| Model | Unstandardized | | Standardized | | |
|-----------------|----------------|------------|--------------|--------|-------------|
| | B | Std. Error | Beta | t | Sig. |
| Constant | 3.694 | .367 | | 10.067 | .000 |
| IT Customers | 1.022E-02 | .071 | .019 | .143 | .886 |
| IT Competitors | .135 | .065 | .256 | 2.068 | .042 |
| IT Internal Op. | .122 | .077 | .205 | 1.587 | .116 |
| IT Supply Chain | -1.209E-02 | .063 | -.023 | -.192 | .849 |

Dependent Variable: Proactive Strategic Flexibility
 Moderator: High Dynamism

Discussion and Conclusions

The current study has developed and tested a model measuring the impact of IT capabilities on both proactive and reactive flexibility, given the degree of environmental dynamism.

Indeed, this study has demonstrated a positive relationship. Specifically, in periods of low environmental dynamism, IT capabilities are associated with greater reactive strategic flexibility, whereas in periods of high environmental dynamism, IT capabilities are associated with greater proactive strategic flexibility.

Appropriate IT investments will create the capabilities, by improving a firm's information flow, knowledge flow, and organizational learning (Johnson et al. 2003), to be able to anticipate such changes. Such firms then will be able to "quickly perceive the need for change and make it happen" and to "(modify) their competitive positioning, (adjust) their value propositions and (target) different customer segments" Hatch and Zweig (2001, 45). Most importantly, however, this study goes deeper into investigating the nature of capabilities and environmental dynamism, and has revealed which specific aspects of capabilities are most significant depending on that environment.

During low turbulence, firms can react to environmental changes, and focus inwardly, perhaps developing more efficient processes and improving the value chain. Interestingly, IT capabilities enabling managing internal activities was significant for reactive strategic flexibility, but managing the supply chain network was not. The reason for this may reflect the limited influence that SMEs may have with suppliers. Smaller firms may be able to respond to the environment and address internal operations, but may have very little bargaining power with many of their suppliers. In this context, investing in IT capabilities to manage suppliers then may do nothing to increase flexibility. This may be particularly true if some of the suppliers of the SMEs are larger corporations.

Perhaps even more surprising was the fact that IT capabilities enabling management of competitor information for proactive flexibility was significant, but not management of customer information. It would seem that managing customer information should be essential for proactive strategic flexibility in a turbulent environment. Once again, the reason for this finding may be that SMEs simply do not possess the resources and sophisticated market research techniques to stay ahead of the curve on reading market changes, and instead may rely on anticipating the moves by their closest competitors. This may be particularly true if some competitors are larger firms that do study the market themselves. Because of limited resources, it may be easier for SMEs to focus on a couple of key competitors, perhaps those who are

capable of capturing substantial market share quickly, rather than try to read potentially confusing and contradictory signals from perhaps thousands of customers. In short, anticipating competitors may be the most affordable way for SMEs to anticipate where the market is going. This points to the potential importance for the development of a competitive intelligence literature specifically related to SMEs.

Limitations of the present research include variables selected for inclusion as well as other potentially relevant explanatory variables. This study, as a matter of necessity, limited the variables selected for examination. While the variables chosen were based on theory, the authors recognize that other variables related to IT capabilities could influence strategic flexibility. Therefore, including additional variables holds the potential to increase the explanatory power of models examined in this research.

Future research could assess the generalizability of findings for particular industries. Would different dynamics associated with specific industries alter the results observed in the present study? In addition, given that IT capabilities were significantly related to reactive flexibility under low dynamism while IT capabilities were significantly related to proactive flexibility under high dynamism, future research could focus on the differential influence of dynamism on other strategic constructs.

Future research can also explore the variables used in the present research and firm performance linkages. Further, an exploration of flexibility constructs as they relate to different capability domains beyond IT could be interesting. What other constructs might shed additional light as antecedents of reactive and proactive flexibility? Finally, the addition of other potential moderators that might influence the impact of capabilities on strategic flexibility would be beneficial.

In conclusion, there are important implications of this study. Clearly it is important for small firms to make appropriate IT investments in order to develop IT capabilities. It is also clear that such developments need to target specific aspects of capability-building given the degree of environmental dynamism. A more proactive stance necessitates superior ability to read competitor maneuvering while a more reactive stance can target internal efficiency. Hopefully this study has begun to shed some light on the importance of which IT capabilities are most critical given specific environmental conditions.

References

- Achrol, R. S., and P. Kotler. 1999. Marketing in the network economy. *Journal of Marketing* 63: 146-163.
- Bharadwaj, A. S. 2000. A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly*: 169-196.
- Bierly, P. E., and A. K. Chakrabarti. 1996. Technological learning, strategic flexibility, and new product development in the pharmaceutical industry. *IEEE Transactions of Engineering Management* 43: 368-380.

- Broadbent, M., and P. Weill. 1997. Management by maxim: creating business driven information technology infrastructures. *Sloan Management Review* 38: 77-92.
- Byrd, T. 2001. Information technology: Core competencies, and sustained competitive advantage. *Information Resources Management Journal* 14: 27-36.
- Callaway, S., and R. Hamilton. 2006. Exploring disruptive technology: The structure and control of internal corporate ventures. *International Journal of Organizational Analysis* 14: 87-106.
- Cox, A., L. Chicksand, and P. Ireland. 2001. *The E-business report*. Boston, MA: Earlsgate Press.
- Day, G. S. 1999. Creating a market driven organization. *Sloan Management Review* 41: 11-22.
- Day, G. S., and P. Nedungadi. 1994. Managerial representation of competitive advantage. *Journal of Marketing* 27: 411-427.
- D'Aveni, R. 1994. *Hypercompetition: Managing the Dynamics of Strategic Maneuvering*. New York: Free Press.
- Eisenhardt, K., and J. A. Martin. 2000. Dynamic capabilities: What are they? *Strategic Management Journal* 21: 1105-1121.
- Evans, J. S. 1991. Strategic flexibility for high technology maneuvers: A conceptual framework. *Journal of Management Studies* 28: 69-89.
- Grewal, R., and P. Tansuhaj. 2001. Building organizational capabilities for managing economic crisis: The role of market orientation and strategic flexibility. *Journal of Marketing* 65: 67-80.
- Gurbaxani, V., and S. Whang. 1991. The impact of information systems on organizations and markets. *Communications of the ACM* 34: 59-73.
- Hair, J. F. Jr., R. E. Anderson, R. L. Tatham, and W. C. Black. 1998. *Multivariate Analysis*, 5th ed. Upper Saddle River, NJ: Prentice Hall.
- Hatch, J., and J. Zweig. 2001. Strategic flexibility: the key to growth. *Ivey Business Journal*: 44-47.
- Hitt, M., B. Keats, and S. DeMarie. 1998. Navigating in the new competitive landscape: Building strategic flexibility and competitive advantage in the 21st century. *Academy of Management Executive* 12: 22-42.
- Johnson, J. L., L. R. Pui-Wan, A. Saini, and B. Grohmann. 2003. Market-focused strategic flexibility: Conceptual advances and an integrative model. *Journal of the Academy of Marketing Science* 31: 74-89.
- Kohli, A. K., and B. J. Jaworski. 1990. Market orientation: The construct, research propositions, and managerial implications. *Journal of Marketing* 54: 1-18.
- Leonard-Barton, D. 1995. *Wellsprings of Knowledge*. Boston, MA: Harvard Business School Press.
- Malone, T., and S. Smith. 1988. Modeling the performance of organizational structures. *Operations Research* 36: 421-436.
- Malone, T., J. Yates, and R. Benjamin. 1987. Electronic markets and electronic hierarchies. *Communications of the ACM* 30: 484-497.
- Maltz, E., and A. K. Kohli. 1996. Market intelligence dissemination across functional boundaries. *Journal of Marketing Research* 33: 47-61.
- Miller, D., and P. H. Friesen. 1983. Strategy-making and environment: The third link. *Strategic Management Journal* 4: 221-235.
- Nadkarni S., and V. K. Narayanan. 2004. Strategy frames, strategic flexibility and firm performance: The moderating role of industry clockspeed. Academy of Management Best Conference Paper.
- Narver, J. C., and S. F. Slater. 1990. The effect of a market orientation on business profitability. *Journal of Marketing* 54: 20-35.
- Pedhazur, E. J. 1982. *Multiple Regression in Behavioral Research*, 2nd ed. Fort Worth, TX: Holt, Rinehart and Winston.
- Peet, S., C. Brindley, and B. Ritchie. 2002. The European Commission and SME support mechanisms for e-business. *European Business Review* 14: 335-341.
- Powell, T. C., and A. Dent-Metcalf. 1997. Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic Management Journal* 18: 375-405.
- Prahalad, C., and M. Krishnan. 2002. The dynamic synchronization of strategy and information technology. *MIT Sloan Management Review* 43: 24-33.
- Reddy, S. 2006. Strategic flexibility and information technology properties: Competitive advantage and asset specificity. *ACR* 14: 16-43.

- Sanchez, R. 1995. Strategic flexibility in product competition. *Strategic Management Journal* 16: 135-159.
- Sandberg, K., and S. Vinberg. 2000. Information technology and learning strategies in small enterprises. *Behavior & Information Technology* 19: 221-227.
- Santhanam, R., and E. Hartono. 2003. Issues in linking information technology capability to firm performance. *MIS Quarterly* 27: 125-153.
- Shapiro, C., and H. Varian. 1999. *Information rules: A strategic guide to the network economy*. Boston, MA: Harvard Business School Press.
- Slater, S., and J. Narver. 1998. Customer-led and market-oriented: Let's not confuse the two. *Strategic Management Journal* 19: 1001-1006.
- Tallon P. P., and K. L. Kraemer. 2003. Investigating the relationship between strategic alignment and IT business value: The discovery of a paradox. In Shin Namchul, ed. *Creating Business Value with Information Technology: Challenges and Solutions*. Hershey, PA: Idea Group Publishing, 1-22.
- Teece D. J., G. Pisano, and A. Shuen. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal* 18: 509-533.
- Wagner, B., U. Fillis, and U. Johansson. 2003. E-business and e-supply strategy in small and medium sized businesses (SMEs). *Supply Chain Management* 8: 343-355.
- Yu, T. F. L. 2001. Toward a capabilities perspective of the small firm. *International Journal of Management Reviews* 3 (September): 185-197.



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