Dual Focus in Exploration and Exploitation: The Route to Sustainable Competitive Advantage

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Abstract: Organizations that can successfully develop both radical and incremental product innovations positively impact sustained competitive advantage. Past research has indicated that a dual focus in innovation strategy may be fulfilled by use of dual organizational structures and cultures. This research complements these efforts by analyzing business process influences on dual focus. Using data collected from US high technology manufacturers, four strategic archetypes in innovation were developed and analyzed using cluster analysis. Dual focus firms were shown to have multiple processes in place that impact both types of innovation strategies and that these firms implement these processes to a greater extent than those firms operating in the more extreme positions. Following the report of results, implications for organizations toiling for a sustainable competitive advantage through product innovation are discussed, as well as future research directions.

Keywords: Exploration, Exploitation, Dual focus, Product innovation, Strategic archetypes, Business process, High technology

1 Introduction

> "To sustain excellence, companies need dual strategies—
> one for the present and one for the future." (Abell, 1999, 73)

The extant literature suggests firms that successfully achieve a dual focus of exploration in radical product innovation and exploitation in incremental product innovation have greater firm performance than firms entrenched in either extreme (e.g., Abell, 1999, Tushman and O'Reilly, 1996). Organizations that can profitably develop both radical and incremental innovations positively impact sustained competitive advantage, dramatically improving their chances of organizational survival and success in both dynamic and stable environments (Tushman and O'Reilly, 1996). However, due to naturally occurring inherent tensions between exploitation and exploration, firms may strategically embed themselves in either extreme, severely reducing their firm performance (e.g., March, 1991; Tushman and O'Reilly, 1996). More specifically, exploration of radical innovation to the abandonment of exploitation in incremental innovation brings elevated costs and risks of continuous experimentation without the benefits of accrued distinctive competence. Conversely, exploitation to the abandonment of exploration may be the path of least resistance in cost and risk, but will likely lead to suboptimal performance (March 1991), especially in dynamic environments. Therefore, in order to sustain competitive advantage, organizations must have dual strategies in place—"one for the present and one for the future."

In this study, an innovation strategy of exploration encompasses those decisions and activities aimed at developing radical innovations, while an innovation strategy of exploitation encompasses those decisions and activities aimed at developing incremental innovations (He and Wong, 2004, Varadarajan and Jayachandran 1999). Furthermore, radical innovation is defined as a new product that incorporates a large new body of technical knowledge (Gatignon et al., 2002); incremental innovation is defined as a new product that incorporates relatively minor changes in technology (cf, Gatignon and Xuereb, 1997). The attainment of dual focus in both exploration and exploitation is challenging and calls for organizational architectures of sometimes conflicting processes, structure, and culture (Tushman and O'Reilly, 1996).

Past research has indicated that dual focus may be achieved by use of dual structures (Duncan, 1976) and dual cultures (Gibson and Birkenshaw, 2004). This research compliments these prior efforts by analyzing business process influences on dual focus and the implications for organizations laboring for sustainability in competitive advantage.

This paper is Part II of a two-part research effort. Part I proposed and tested the effects of three key business process areas on exploration and exploitation in innovation, as well as the implications of dual focus on firm performance. Business processes studied included Product Development Management (PDM), Supply Chain Management (SCM) and Customer Relationship Management (CRM). Part II, and the focus of this study, uses the knowledge gained from these initial efforts to develop strategic archetypes based on the business processes implemented by the studied organizations. Using data collected from a nationwide sample of US high technology manufacturers, four strategic archetypes in innovation (dual focus firms, largely exploiters, largely explorers, and neither explorers or exploiters) were developed and analyzed using cluster analysis. This paper proceeds as follows: First, a background review of business process influence on innovation and relevant research on strategic archetypes is presented. Next, the results of Part I are reviewed to set the stage for this study. Following the report of results, academic and managerial implications are discussed, as well as exciting future research directions.

2 Background

2.1 Core Business Processes for Exploration and Exploitation

Processes are those "routines or patterns of current practice and learning" (Teece et al., 1997, p.518). The implementation of successful processes is one step toward a firm's competitive advantage. Once implemented, they display a high level of coherence and stability by becoming "embedded" in the organization. As such, they play an influential role in strategic choice (cf, Srivastava et al., 1999).

The embeddedness of processes explains, in part, the rigidity of many incumbent firms to "stay the course" of exploration or exploitation. For exploiters, in-place processes increase their efficiency and effectiveness through incremental innovation while decreasing their ability to change or develop new processes that promote radical innovation (e.g., Nelson and Winter, 1982; Teece et al., 1997). For explorers, failure to learn from unsuccessful radical innovation proliferates exploration without significant gain and benefit (Levinthal and March, 1993). The same embedded processes that brought failure will be employed repeatedly until lessons-learned solicits process reformation. However, the embeddedness of processes can be used to an advantage if processes for *both* exploration and exploitation become effectively institutionalized in the organization. They can exert a positive influence on both innovation strategies as they smoothen and give direction to innovation decisions and efforts (Nelson and Winter, 1982). Thus, dual focus firms will not become rigid in exploration or exploitation if they wisely and proactively incorporate multiple, yet often conflicting, business processes that influence both types of innovation strategies.

Srivastava et al. (1999) argue that there are three core business processes: the PDM process, the SCM process, and the CRM process. The PDM process involves developing and managing the creation of products that satisfy customer needs and wants. The SCM process involves designing and managing the supply chains that facilitate the design, production, and delivery of the products. Finally, the CRM process entails all aspects of developing and managing customer relationships, including the identification of new sets of customers and understanding their needs and wants. These processes are placed in the organization's collective memory (Day 1994) and directly impact their strategic directions.

Process researchers must consider the nature of the strategy and the industry to assess process impacts and relevancy (Huff and Reger, 1987). Hence, process antecedents were chosen based on strategy (innovation in exploration and exploitation) and industry type (high technology manufacturing). Day (1994)'s conceptual article on the capabilities and underlying processes of a market-driven organization was consulted for process constructs relevant to an organization that seeks sustained competitive advantage through technology-based

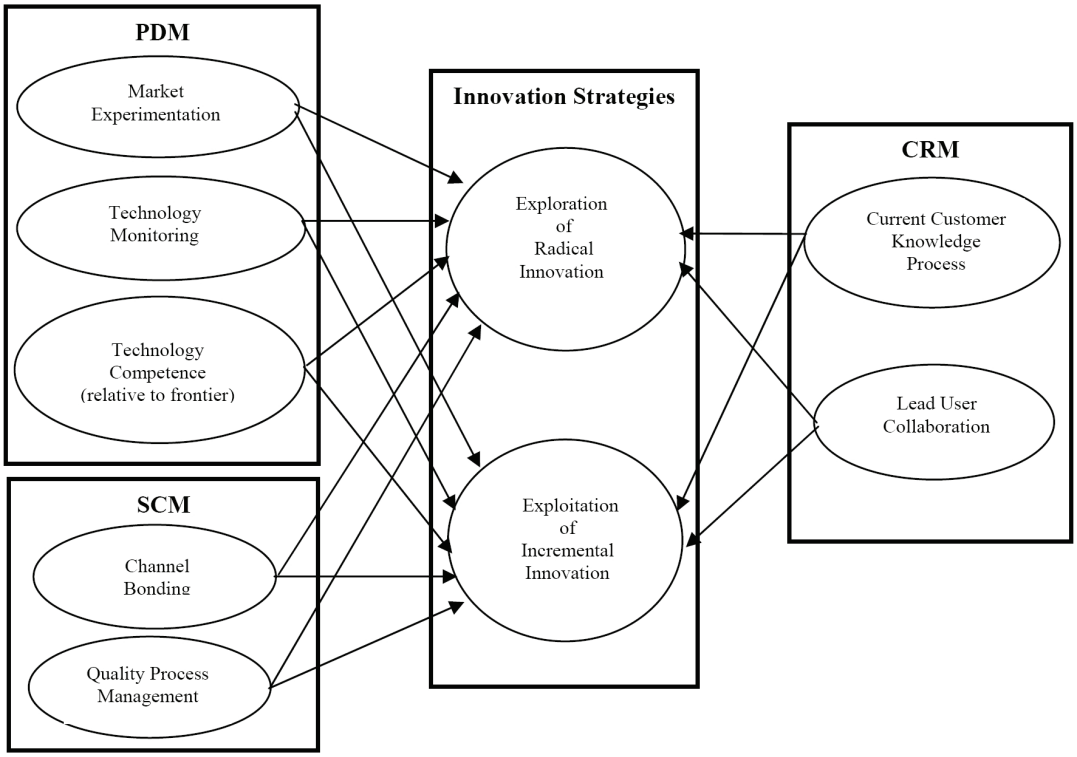

Figure 1 Tested model of business process influences on exploration and exploitation

innovation strategies of exploration and exploitation. Chosen processes were subsequently integrated into the Srivastava et al. (1999) core business process framework (Figure 1). The PDM business process includes ascertaining new customer needs through *market experimentation*, defined as activities undertaken by the firm to gain information through testing new ideas on current and potential customers (Day, 1994, Slater and Narver, 2000), and designing new products and reinvigorating old products through *technology monitoring* and *technology competence*. *Technology monitoring* is defined as the process in which an organization acquires knowledge about and understands new technology developments in its external environment (Day 1994; Srivastava et al. 1999), while *technology competence* is defined as an organizational set of skills, knowledge, and experience that is necessary to design the product innovation (cf, Hamel and Prahalad, 1994). In this study the latter is relative to the technological frontier. The SCM business process includes *channel bonding* whereby durable relationships are created via activities of communication, joint problem solving, and coordination with suppliers (Day 1994) and *quality process management*, that is, process management techniques, such as ISO9000, employed to improve the efficiency of operational processes and reduce variance (Benner and Tushman, 2002) in manufacturing and product assembly. Finally, the CRM process includes determining the needs of existing customers and potential new customers through the *current customer knowledge process* (a "set of behavioral activities that generates customer knowledge from current customers pertaining to their needs for new product innovations"(Li and Calantone 1998, p.14)) and *lead user collaboration*, the set of behavioral activities that generates knowledge from lead users[1] pertaining to their current and potential product needs (Wind and Mahajan, 1997). These processes within each overarching core business process influence the subject innovation strategies at varying levels of intensity and direction (Tinoco, 2007).

1 Lead users are defined as those users "whose present strong needs will become general in the marketplace months or years in the future" (von Hippel 1986, p.791).

2.2 Strategic Archetypes

In strategy research, considerable knowledge is gained from the identification of distinct strategic archetypes. This type of analysis can reveal more complex phenomenon than would have been apparent otherwise (Bierly and Chakrabarti, 1996). In 1978, Miles, et al. discussed the contradictory pulls of exploration and exploitation in their seminal work on adaptation with respect to strategy, structure, and process. Couched in efficiency versus effectiveness terms, they categorize firms as Defenders, Analyzers, Prospectors, and Reactors based on a myriad of variables, including competitive strategy, technology, pursuit of market opportunities, product development, etc. With respect to innovation, Defenders are exploiters, such that pursuit of innovation is incremental with respect to their current product base. Thus, they are highly efficient, but ineffective organizations, running the risk of mortality in a changing environment. On the other side of the innovation spectrum, Prospectors are explorers, chasing new product and market opportunities at each turn. Due to their penchant for entrepreneurship, Prospectors are more likely to create radical product innovations. Thus, they are highly effective, but can be inefficient organizations, running the risk of low profitability and overextension of resources. Analyzers are a cross between Prospectors and Defenders, whereby they scan for new products and opportunities while defending their current product line. Analyzers have the ability to be both efficient and effective, but run the risk of inefficiency and ineffectiveness if the strategy is poorly executed. Interestingly, the researchers hinted that the strategy, structure, and processes implemented by the Analyzers may be the direction of the future for a sustainable competitive advantage.

This study contends that firms can be clustered into strategic archetypes based on chosen innovation strategy and scrutinized against business processes executed by the firm. The archetype of "explorers" will implement those business processes that are highly correlated to exploration of radical innovation; "exploiters" will implement those business processes that are highly correlated to exploitation of incremental innovation. More importantly, dual focus firms will have the characteristics of both explorers and exploiters, implementing multiple business processes and positively impacting exploration *and* exploitation as a result. (For the associated theoretical arguments to these assertions, refer to Tinoco (2007).)

3 Study Background and Results

3.1 Sample and Data Collection

In Part I of the study, survey responses were collected from upper echelon executives of US manufacturers across 9 high technology industries using the appropriate techniques for questionnaire construction, pretest, and implementation targeting executive populations (cf, Cycyota and Harrison, 2006; Dillman, 2000). The intended respondents were chief executive officers/presidents/chairman and vice presidents of marketing, strategy, or business development (corporate level). In all, 1000 corporations, public and private, were contacted via a three-wave mailing, resulting in an effective firm response rate of 28%. Non-response bias and common method bias were assessed using both secondary data and primary data. Results suggest that neither were issues in this study.

All scales were chosen based on their relevance to this research, as well as their successful track record in previous research in terms of reliability and validity. Table 1 provides the list of individual items for each construct and relevant statistics. Overall, measures demonstrate good reliability. Acceptable discriminant validity was also determined via examination of inter-item correlations and cross-loadings.

3.2 Results of Part I

The model depicted in Figure 1 was tested using partial least squares (PLS) with the software package, PLSGraph, V3.00, Build 1126[2]. Table 2 summarizes the results, detailing path coefficients and statistical significance. Clearly, market experimentation, technology monitoring, and technology competence posi-

2 The author wishes to thank Wynne Chin, University of Texas Houston for providing the PLS software.

tively impact exploration. To a lesser degree, lead user collaboration and channel bonding also impact exploration in the positive direction. On the other hand, technology monitoring, quality process management, and current customer knowledge process positively impact exploitation, while technology competence (relative to the technological frontier) has a negative impact on exploitation. These results suggest that 1) firms that largely employ exploration strategies ("explorers") should have the highest levels of market experimentation, technology competence, lead user collaboration and channel bonding relative to the other firms in the study; 2) "exploiters" should have the highest levels of technology monitoring, quality process management and current customer knowledge process relative to the other firms (However, both explorers and exploiters would have high levels of technology monitoring); 3) firms that employ a dual focus perspective should have high levels of *all* studied business processes (but less than their extreme counterparts) as they strive to accomplish competitive advantage through both exploration and exploitation; and 4) conversely, firms that neither explore nor exploit will have the lowest levels of all the studied processes relative to the other firms in the study.

3.3 Results of Part II

Following a review of Part I results, cluster analysis was pursued with the intent of uncovering strategic archetypes based on innovation strategies chosen. Figure 2 graphically represents the relationship between levels of exploitation and exploration by respondent firm. Visual inspection reveals the possibility that some interesting clusters may be teased from the data. While the majority of firms appear to cluster around the average, a significant number of firms exhibit higher levels of both exploration and exploitation. Smaller numbers of firms exhibit higher exploration with lower exploitation, lower exploration with higher exploitation, and a very small number of firms exhibit lower levels of both.

While past studies (cf, Gibson and Birkenshaw, 2004) dictate the existence of 4 clusters (dual focused, explorers with higher ratings on exploration than exploitation, exploiters with higher ratings on exploitation than exploration, and neither with lower ratings on both exploration and exploitation), visual inspection of Figure 2 implied the possibility of 5 clusters (highly dual focused, moderately dual focused, explorers, exploiters, and neither). Thus, using the K-means algorithm of non-hierarchical clustering in SPSS 11.0, analysis of both 4-cluster and 5-cluster grouping was performed using standardized data as required. Fit for each grouping was acceptable based on high F-statistics (significance levels ignored) and high face validity following inspection of cluster means for both solutions. Because fit was acceptable for either solution, the remaining analysis was performed using the 4-cluster solution, keeping the research in line with prior studies.

Predictive validity was assessed for business processes founded on the theoretically-based belief that dual focused firms should rank high on all business processes. Additional post hoc cluster analyses was performed using the 4-cluster grouping as stated above, that is, dual focused, largely exploiter, largely explorer, and neither an explorer or exploiter. Means and cluster sizes are shown in Table 3. Visual examination of this information provides some insight into dual focused firms and business process implementation.

While no formal hypotheses were made, there were some initial expectations as to the results of the clustering based on the Part I findings and as stated highlighted in 3.2 above. Highly explorative firms were expected to have the highest levels of market experimentation and technology competence, channel bonding, and lead user collaboration relative to the other groups. Highly exploitative firms were expected to have the highest levels of technology monitoring, quality process management and current customer knowledge process. Both explorers and exploiters should have high levels of technology monitoring. Dual focus firms were expected to high levels of market experimentation and technology competence, channel bonding, and lead user collaboration but at a lower level relative to the extreme explorers. Similarly, they were expected to have high levels of technology monitoring, quality process management, and current customer knowledge process but lower than the extreme exploiters. Interestingly, this was not the case as dual focused firms ranked *highest*, based on means, with respect to *all* of the business processes. Not surprisingly, firms that were neither explorers nor exploiters ranked lowest.

Table 1 Scales, item loadings, and construct reliability

Construct	Construct Items	Mean	Standard Deviation	Loading	αa
Market Experimentation					.84
	We learn customer requirements and needs through prototype/demonstration programs.	3.51	1.118	.749	
	We develop and test many new ideas over the course of new product development.	3.30	1.090	.837	
	We have on-going programs that involve a continuous string of experiments designed for incremental knowledge gains.	3.01	1.201	.726	
	We learn about customer preferences as we work them through new product iterations.	3.77	.977	.689	
Technology Monitoring					.84
	We are often one of the first in our industry to detect technological developments that may potentially affect our business.	3.46	1.080	.792	
	We actively seek intelligence on technological changes that are likely to affect our business.	3.81	.990	.860	
	We are often slow to detect changes in technologies that might affect our business. (Reverse coded)	3.72	1.012	.663	
	We actively monitor small technology changes that may impact our products.	3.44	.926	.677	
Technological Competence					.91
	We have substantial investment in personnel dedicated to state of the art technology.	3.60	1.209	.857	
	Our current set of technological skills and knowledge is lagging state of the art. (Reverse coded)	2.42	1.073	.777	
	We continuously reinvest to operate successfully in state of the art technology.	3.50	1.028	.859	
	Much of our technical expertise is in state of the art technology.	3.44	1.069	.864	
Channel Bonding					.90
	We develop team-based mechanisms (joint meetings, conferences, etc.) with our major supplier for continuous exchange of information and activity coordination.	3.00	1.194	.808	
	Our major supplier participates in our product conceptualization and development.	2.51	1.133	.792	
	Open communication between us and our major supplier occurs at many levels and functions.	3.30	1.171	.801	
	We have joint product planning and scheduling with our major supplier.	2.65	1.198	.894	

Construct	Construct Items	Mean	Standard Deviation	Loading	αa
	We have put in place information system links so that we know the others' requirements and status in real-time.	2.24	1.149	.706	
Quality Process Management	To what extent do you use process management techniques (e.g., ISO9000) to				.97
	improve product reliability	3.52	1.321	.934	
	reduce process variance	3.37	1.258	.930	
	improve product quality	3.66	1.293	.965	
	reduce defect rate	3.61	1.283	.964	
	improve manufacturing efficiency	3.48	1.320	.901	
Current Customer Knowledge Process					
	We rarely/regularly meet our customers to learn their needs for new products.	4.14	1.063	.709	
	We casually/systematically process and analyze customer information.	3.39	1.031	.673	
	Information from customers is barely/fully integrated in new product design.	3.99	1.049	.770	
	We rarely/regularly study our customers' operations for new product ideas.	3.52	1.084	.828	
Lead User Collaboration					.86
	We actively seek to identify customers that are considered experts in the uses and functions of our products.	3.98	1.036	.868	
	We rarely contact lead users for their input on new product ideas. (Reverse coded)	4.05	1.056	.833	
	Working with lead users has allowed us to better understand the needs of our other customers.	3.94	.996	.749	
Exploration of Radical Innovation					.77
	Introduced a new generation of products.	4.43	.945	.841	
	Develop completely new or different technology knowledge bases.	3.42	1.141	.717	
	Enter new technology fields.	3.15	1.208	.622	
Exploitation of Incremental Innovation					.83
	Extend product range (product extension).	4.13	.939	.778	
	Make minor improvements in a current technology.	3.49	1.104	.815	
	Reuse your existing technology knowledge.	3.95	.929	.767	

[a] Internal consistency.

Table 2 Summary of Part I test results

Exogenous Variables	Endogenous Variables	Path Coefficients (t-values)
Market Experimentation	Exploration of Radical Innovation	.196 (2.8059)**
Technology Monitoring	"	.154 (1.9667)**
Technology Competence	"	.147 (2.1219)**
Channel Bonding	"	.078 (1.3035)*
Quality Process Management	"	-.080 (1.1628)
Lead User Collaboration	"	.115 (1.3483)*
Current Customer Knowledge Process	"	-.034 (0.4350)
Market Experimentation	Exploitation of Incremental Innovation	.016 (.2427)
Technology Monitoring	"	.299 (4.9228)**
Technology Competence	"	-.171 (2.3702)**
Channel Bonding	"	-.049 (0.7031)
Quality Process Management	"	.281 (4.0110)**
Lead User Collaboration	"	-.091 (1.2304)
Current Customer Knowledge Process	"	.169 (2.0812)**

** Note: *p < .10; **p<.05 (one-sided)

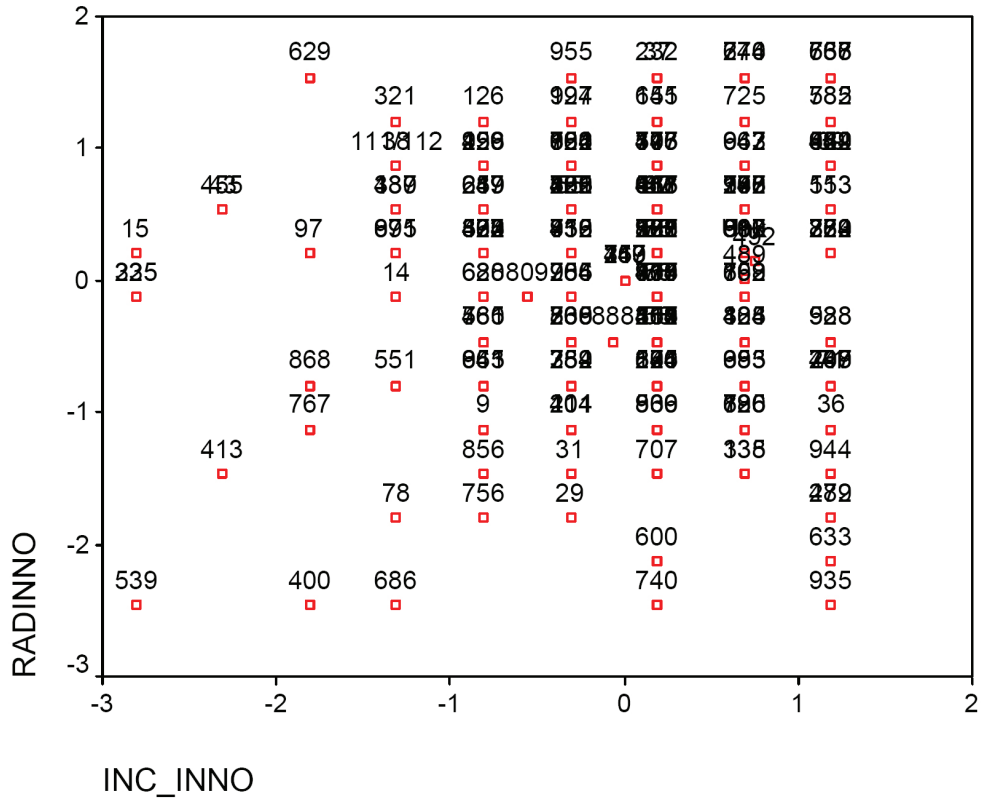

Figure 2 Plot of exploitation of incremental innovation (INC_INNO) versus exploration of radical innovation (RADINNO) by firm

Note: Numbers in graph refer to firm identification numbers in database. Numbers overlap where a higher concentration of firms exists.

Table 3 Results of predictive validity tests for cluster and process constructs

Variable	Cluster 1: Neither (N = 17)	Cluster 2: Largely Exploiter (N = 81)	Cluster 3: Largely Explorer (N = 65)	Cluster 4: Dual Focus (N = 78)	F-Statistics
Market Experimentation	-.4510	-.1132	-.0449	.2538	5.681**
Technology Monitoring	-.4476	-.1325	-.0018	.2170	3.217**
Technology Competence	-.2947	-.1561	.0315	.1912	2.526*
Channel Bonding	-.3912	-.0165	-.0220	.0769	1.728**
Quality Process Management	-.5633	.0242	-.3557	.3091	4.906**
Current Customer Knowledge Process	-.5696	.0632	-.0449	.1295	3.348**
Lead User Collaboration	-.6571	-.1136	.0715	.2322	5.382**

Note: Based on mean centered data and n = 241.

Note: Homogeneity of Variance could not be assumed for Lead User Collaboration or Technology Monitoring, therefore the Brown and Forsythe statistic was used where F (3, 68.155) = 5.382, p<.05 for lead user collaboration and F (3, 60.989) = 3.217, p<.05 for technology monitoring.

Note: *p<.10; **p<.05

ANOVA F-statistics revealed that four groups did indeed differ significantly on all business processes. Specifically, F-statistics were as follows: market experimentation (F (3,240) = 5.681, p<.05), technology monitoring (F (3, 60.989) = 3.217, p<.05), technology competence (F (3,240) = 2.526, p<.05), channel bonding (F (3,240) = 1.728, p<.05), quality process management (F (3,240) = 4.906, p<.05), current customer knowledge process (F (3,240) = 3.348, p<.05, and lead user collaboration (F (3, 68.155) = 5.382, p<.05). For technology monitoring and lead user collaboration, homogeneity of variance could not be assumed, and the Brown and Forsythe test statistic was used in lieu of the ANOVA F-statistic.

Post hoc comparison tests were then conducted to determine whether the dual focus group was significantly different from the other groups for each business process. Refer to Table 4. Results revealed that the dual focus group was significantly different than all other groups in market experimentation, and significantly different from at least one other group in both CRM processes and the SCM process of quality process management, but not channel bonding. It is important to use caution in interpreting these results, as cluster analysis includes subjective assessments. The data and subsequent clustering of firms may not have teased out the "extreme" players in the sample, that is, the highly explorative and highly exploitative firms may not have been adequately captured in a 4-group clustering. It is also noted that the "neither" sample was significantly smaller (N = 17) than the other groups (65 < N < 81), possibly biasing the results. Moreover, examination of the specific firms in this group indicated that many of the companies in the "neither" group were build-to-specification manufacturers. As such, they do not employ (or employ to a very low degree) processes that are geared to product innovation. Because of these issues, discussion of results of the post hoc comparison tests will concentrate on dual focus, explorers, and exploiters where differences in sample size are not extreme.

Since market experimentation is highly tied to radical innovation development, the result that dual focus firms employ market experimentation significantly more than the explorers is intriguing, the implication being that they are more risk adverse than even their explorer counterparts. An alternate explanation which requires more scrutiny into individual firm characteristics is that extreme explorers may have fewer plans to market their innovations directly. Examples of this type of marketing strategy would include licensing or selling designs to interested parties willing to commercialize inventions.

With respect to technology monitoring, there was a significant difference between the dual focus firms and exploiters, but not explorers. Technology monitoring is critical for both exploration and exploitation,

Table 4 Results of post hoc comparisons on cluster versus business process

Variable	Test	Cluster (I)	Cluster (J)	Mean Difference (I-J)	Standard Error	Significance
Market Experimentation	Tukey's HSD	Dual Focus	Neither	.7048**	.20140	.003
			Exploiter	.3670**	.11937	.013
			Explorer	.2987*	.12637	.087
Technology Monitoring	Tamhane	Dual Focus	Neither	.6647	.30015	.213
			Exploiter	.3495**	.13082	.045
			Explorer	.2188	.12872	.437
Technology Competence	Tukey's HSD	Dual Focus	Neither	.4859	.24530	.198
			Exploiter	.3473*	.14538	.082
			Explorer	.1596	.15391	.728
Channel Bonding	Tukey's HSD	Dual Focus	Neither	.4681	.20593	.107
			Exploiter	.0934	.12205	.870
			Explorer	.0989	.12921	.870
Quality Process Management	Tukey's HSD	Dual Focus	Neither	.8724**	.31924	.034
			Exploiter	.2850	.18920	.435
			Explorer	.6648**	.20030	.006
Current Customer Knowledge Process	Tukey's HSD	Dual Focus	Neither	.6991**	.22741	.013
			Exploiter	.0664	.13478	.961
			Explorer	.1744	.14269	.613
Lead User Collaboration	Tamhane	Dual Focus	Neither	.8893**	.27199	.025
			Exploiter	.3457**	.11338	.016
			Explorer	.1606	.13228	.787

Note: *p<.10; **p < .05

but Part I results revealed a stronger association with exploitation then exploration. It is possible that dual focus firms monitor the environment for state of the art technologies with approximately the same intensity as the explorers but monitor incremental changes with more intensity than the exploiters. It was anticipated that there would not be a statistical difference between dual focus firms and either explorers or exploiters with respect to technology monitoring. With respect to technology competence (measured relative to the frontier), there was a significant difference between dual focus and exploiters, but not explorers. This was as anticipated as technology competence relative to the frontier and exploration are highly correlated. Thus, dual focus firms and explorers should have high levels of technological competence. There was no significant difference between dual focus and explorers or exploiters with respect to channel bonding. Based on the results of Part I, this was not surprising as there was only a weak positive association between exploration and channel bonding, indicating that channel bonding is not correlated to the type(s) of innovation strategy employed.

Regarding quality process management (highly associated with exploitation), there was a significant difference between dual focus firms and explorers, but not exploiters. As quality process management is highly correlated to exploitation, this was anticipated. It was anticipated that dual focus firms and explorers would be significantly different in their employment of current customer knowledge process. This process is highly associated with exploitation, but not exploration. Interestingly, this was not the case which leads to the supposition that dual focus firms pay attention to current customers to the same degree as explorers and

exploiters. Lastly, lead user collaboration, highly tied to explorative activities, was a discriminator between dual focus firms and exploiters as anticipated.

As stated above, a few of the comparisons were not as anticipated and will require further inquiry in future research. Nonetheless, it is felt that these results lend additional statistical evidence that dual focus firms share similar characteristics with both exploiters and explorers, implementing multiple, yet conflicting, business processes to attain higher levels of both exploration of radical innovation and exploitation of incremental innovation.

4 Discussion

Dual focus in exploration and exploitation is the key to sustainable competitive advantage for today's high technology firms. Successful exploitation of incremental innovations increases the probability of short term profits while exploration of radical innovations increases the probability of long term profits. However, the accomplishment of dual focus in innovation remains a perplexing and challenging task for many firms in the competitive high technology climate. This is made strikingly apparent by the continued multidiscipline calls by academia and practitioners for further study of this area, and by the substantial number and quality of responses and comments made by top executives to this research effort.

Both dual structure and culture have been shown to positively influence dual focus, however, until now, no research has been conducted with respect to impacts of core business processes on dual focus. Yet dual focus in strategy remains a desirable avenue to competitive advantage sustainability, especially in high technology industries. In this study, dual focus firms were shown to have multiple processes that impact both types of innovation strategies and that these firms implement these processes to a greater extent that firms operating in the more extreme positions.

The challenges to firms, and, as a result, to attaining sustainability in competitive advantage, are many. First, firms must fight the natural tendency to push radical product development to the "back seat." While it is more costly, more time consuming, and laden with risk compared to the easier, quicker incremental product development, the benefits to the firm are many. Knowledge with respect to state of the art technology development and/or technology integration is gained with exploration and a path to long term profitability is set. Second, as revealed in this study, firms interested in a dual focus must employ business processes that often diverge with respect to innovation strategy, pushing and pulling at limited resources. For example, as supported in Part I of the study, exploration is associated with *lead user* collaboration while exploitation is tied to *current customer* knowledge process. Lead users and a firm's current customers have very different characteristics which require different techniques to bring their fresh ideas into the product innovation process (cf, Lilien, et al. 2002). Lastly, excellence can lead firms to core competencies in implemented business processes. However, these competencies can become core rigidities (Leonard-Barton, 1992), trapping the firm into either exploration or exploitation, depending on prevailing processes used (Holmqvist, 2004). Companies that strive for sustainable competitive advantage through product innovation must use core competencies to their advantage by becoming proficient in processes that influence exploration *and* processes that influence exploitation, dampening the natural bias of each alone.

Future research efforts will delve further into the business process – strategy association. A holistic model employing structure, culture, and business processes may add insight into dual focus and sustainable competitive advantage from all three organizational influences. Lastly, some results obtained in this study require further analysis. As noted above, a reexamination of the number of clusters is warranted, along with post hoc comparisons using a 5-cluster grouping. Further examination into specific characteristics of the firms in each cluster may reveal answers to some of the interesting, but unanticipated results, outlined in Section 4. Lastly, production process innovations are also used by exploiters to a greater extent than explorers. Therefore, to fully understand dual focus firms with respect to innovation and add another passageway to sustainable competitive advantage, production process innovations should be added to the analysis.

5 Conclusion

The attainment of dual focus between radical and incremental innovation is challenging and calls for organizational architectures that include differing business processes. Firms that successfully embed these processes can positively impact both types of innovation strategies. Besides organizational structure and culture, this research provides an additional path to dual focus, one that incorporates the core business processes of the firm. Consequently, for a sustainable competitive advantage, managers must link these business processes to dual strategies, "one for the present and one for the future."

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