

Design Co-creation and Performance in New Product Development Process

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Abstract

Co-creation is a kind of marketing strategy or business strategy that stresses the generation and continuing realization of mutual firm-customer value. Product design, marketing, and Innovation ought to be closely coordinated in companies. Most researchers have indicated that highly effective connection among innovation R&D, marketing activities, and design pushes products in to the marketplace and guarantees their success. However, empirical studies from the Co-creations among design, marketing, and innovation strategies in New Product Development (NPD) performance are intermittent. Within this study, enterprises through the Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) database were chosen randomly as subjects. Inside the first survey, the status from the marketing strategy, innovation strategy, and design strategy was determined. Following a new product was marketed for one year, another survey was conducted for NPD performance check. After repeated contact, 285 enterprises (21.11%) responded. Major findings in the study are listed below: (1) The Structural Equation Model (SEM) results demonstrate a good fit involving the theoretical model and observed data for innovation, marketing, and design strategies; (2) The NPD performance is influenced by an enterprise's innovation, marketing, and design strategies. Moreover, innovation and marketing strategies also influence NPD performance through design strategy. For NPD performance, design strategy is both a completely independent variable and an intervening variable; (3) The NPD performance could be reinforced when enterprises struggle for design, innovation, and marketing strategies.

Keywords: Strategic Innovation, Co-creation, NPD Performance.

1. INTRODUCTION

Co-creation is a kind of marketing strategy or business strategy that stresses the generation and continuing realization of mutual firm-customer value (Roggeveen *et al.*, 2012). It sights marketplaces as forums for firms and active clients to talk about, mix and renew each other people's assets and abilities to produce value through new types of interaction, service and learning systems. It is different from the standard active firm - passive consumer market construct of history (Lehrer *et al.*, 2012; Chen *et al.*, 2012).

Marketing is carefully connection with product design (Zhang *et al.*, 2007; Luchs and Swan, 2011). Along the way of getting a new product to advertise, the marketing department should return information and facts and communicate with the design department (Conway, 2007; Paul and Martin, 2007). A highly effective link between marketing actions and design inspires product invention (Sherman, *et al.*, 2000). Moreover, innovation stands out as the more effective survival ability for enterprises down the road (Gary and Peter, 2001). Continuous innovation might help organizations maintain their status being a market leader make certain development (Dittrich and Duysters, 2007). Especially, in economic recessions, quickly launching new services can help companies break via bottlenecks and switch failures into successes (Ulrich and Eppinger, 2004).

As a result, innovation, marketing, and product design in corporations are tightly connected. Within the quest for good new product development (NPD) performance, one should find out the

roles design should play to achieve the targets of innovation and marketing strategies. The R&D staff and product designers in organizations need to pay close focus on challenges from market changes and instantly reply to actions of challengers. Additionally they have to complete NPD by based on the innovation strategy within a company (Hsieh *et al.*, 2006; Ravi, 2007; Girard *et al.*, 2007; Luchs and Swan, 2011). Design is a crucial useful resource in companies, a mechanism for that integration of product development, as well as a serial loop within the total value chain (Twigg, 1998; Aydin *et al.*, 2007). An efficient link among innovation R&D, marketing activities, and design can be a powerful strength in new marketplaces and critical for product success. Research by Hsu (2009) and Hsu (2011a) indicated that Taiwanese enterprises had adopted some special strategies in product design. Nevertheless, literature assessing the connections among marketing, innovation, and design strategies, and NPD performance has limitations. Look around the connection between marketing, innovation, and design strategies on NPD performance, CEOs in Taiwan's consumer electronics companies were interviewed. The fit between theoretical models and observed data was examined. Furthermore, a connection model was generated and concrete suggestions were provided, in a way that marketing strategy, innovation strategy, and design strategy can promote NPD performance.

2. LITERATURE REVIEW AND FRAMEWORK DEVELOPMENT

2.1 Organizational Marketing Strategy

Marketing strategies function as the essential underpinning of marketing plans made to fill market needs and achieve marketing objectives. Kotler (2003) described marketing strategy as a series of principles enterprises use to serve their customers and to reach their profit goal. Armstrong and Kotler (2003) claimed that a marketing strategy can guide an enterprise to make the most of its resources with the aim of satisfying a target user group's needs to reach its marketing goal.

Marketing strategy involves careful scanning of the internal and external environments. Cravens *et al.* (1999) maintained that a marketing strategy might cover branding strategy, cost-reduction strategy, channel strategy, and innovation strategy. Regarding an innovation strategy, a solid relationship exists between marketing strategy and product innovation. Particularly, researchers have different types for marketing strategy. The combination of product, price, place, and promotion (4Ps) is the most popular type (Kotler, 2003). In this study, ideas from the work by Kotler (2003), Eleri and Robert (2007), and Paul and Morgan (2007) were integrated into four strategic dimensions: product, price, channel, and promotion.

2.2 Organizational Innovation Strategy

Innovation is the use of new solutions that meet new needs, inarticulate needs, or existing market needs. An innovation strategy offers an environment for creativity and innovation, in ways that a company can provide unique products or services that differ from those of their competitors (Schuler and Jackson, 1987). Companies may use numerous combinations of resources and techniques to generate different innovation strategies, from which they can execute their policies and enhance their performance (Dziura, 2001; Tidd and Bessant, 2009).

Innovation strategy studies can be divided roughly into three categories. (1) The dimension of technical innovation strategy includes a high ratio of R&D expense to revenue (Kuczmariski, 1996); aggressiveness in the application of logos, royalties, and patents (Dziura, 2001); frequent introduction of new techniques to improve production or manufacturing procedures (Kuczmariski, 1996; Ulrich and Eppinger, 2004); and constant improvement of production procedures (Gobeli and Brown, 1987) to achieve an enterprise's goal. (2) The dimension of innovation in commercial mode strategy includes innovative products or services (Johne, 1999; Yoon and Lilien, 1985), and improving, renewing, or extending current products or adding new product lines (Kuczmariski, 1996; Ulrich and Eppinger, 2004) to change or relocate the target customer group (Atuahene-Gima, 1996). (3) The dimension of innovation in management strategy includes timely adoption of a proper response strategy; building and controlling the distribution channel to cope with changes in the external environment; promptly solving customer problems (Johne, 1999); and adopting new management methods that promote organizational performance by raising wages or improving the worker welfare system (Subramanian and Nilakanta, 1996) to stimulate R&D

personnel to innovate (Gilbert, 1994). The three dimensions of innovation strategy in this study were technical innovation, commercial innovation, and managerial innovation.

2.3 Organizational Design Strategy

Design strategy is a discipline which will help firms figure out what to create and do, so why do it and just how to innovate contextually, both immediately and also over the long-term. Design strategy is generally considered the manner in which an enterprise processes new product designs under the total enterprise strategy (Crawford, 1994). Olson *et al.* (1998) regarded design strategy as an effective way of allocating and coordinating design resources to fulfill enterprise goals. Oakley (1990) noted that a design strategy and enterprise strategy are mutually dependent. A design strategy considerably impacts a company's competitive status, and it is also a conversation channel between organizations and their upstream and downstream partners (Hua *et al.*, 2011). Mozota (2006) applied three basic strategies from the competition strategies by Porter (1980) to describe the purposes of a design strategy: design for cost; design for brand image; and design for focus.

Furthermore, Kelley (1992), who analyzed dozens successful product design cases, developed a strategic color palette in which a design strategy is composed of 12 strategic factors. Furthermore, Sung and You (1999) claimed that a design strategy is the tangible response to innovative design activities in an organization. Furthermore, they integrated the design strategy factors (Kelley, 1992) and identified ten innovative product design factors. According to Sung and You (1999), a design strategy is made a series of strategy-related design properties that can be used to achieve the goal of product design innovation, such that an enterprise has a unique advantage. Consequently, a design strategy is the way in which product innovation is executed, customer demands and competitor influences are analyzed, and is used to fulfill an enterprise's performance goal through coordination of a company's core R&D capabilities (Hsu, 2006). In this study, Hsu's (2009, 2011a) design strategy perspectives were taken into consideration when dividing product design strategies in enterprises into four categories: reinforce R&D capacity; reduce production cost; ensure product quality; and increase the strength of enterprise brand image dimensions.

2.4 Organizational NPD Performance

Running a business and engineering, new product development (NPD) may be the complete procedure for getting something new to promote. An item is some benefits offered for exchange and could be tangible (that's, something physical you are able to touch) or intangible (just like a service, experience, or belief). NPD performance is a purpose for those corporations (Mumin, 2010; Ciriaco *et al.*, 2010); nevertheless, measures of NPD performance varies. In literature, NPD performance measures were financial and non-financial (Mat and Jantan, 2009; Ciriaco *et al.*, 2010). For example, Barczak (1995) used the following four indices of NPD performance: (1) sales return on a certain level or that higher or lower than the goal level; (2) profit rate for new products; (3) percentage of goal reached by market share; and (4) total satisfaction of customer with new products. Cooper and Kleinschmidt (1995) employed other criteria to create a map of NPD performance: success rate; sales; profit relative to spending; technical success rating; sales return (sales impact); profit (profit impact); sales goal (meeting sales objectives); profit goal (meeting profit objectives); profitability versus number of competitors; and overall success.

Driva *et al.* (2000) used five criteria to measure NPD performance in the manufacturing industry: total cost of projects; whether projects are completed on time; difference between actual cost of a project and its budget; difference between actual finish time and previously set time; and launch time for a new product. Leenders and Wierenga (2002) used another five criteria to measure NPD performance: decision-making speed for NPD; quality of decision-making procedures for NPD; speed of NPD; commitment to turn NPD strategies into actions; cost effectiveness of NPD; and ability to respond to new commercial opportunities. Furthermore, Ulrich and Eppinger (2004) and Ciriaco *et al.* (2010) identified five dimensions of NPD performance: product quality, product cost, development time, development cost, and development ability. Based on these studies, criteria for measuring NPD performance are financial and non-financial. Six criteria were used to

measure NPD performance: reaching the sales volume goal for new products by percentage; financial percentage of reaching the sales return goal for new products; technical ability promotion of new products; company brand image and promotion by new products; and customers' non-financial appraisals of new products.

2.5 Research Framework and Hypotheses

(1) Organizational marketing and design strategy

Marketing methods ought to be according to product design (Zhang *et al.*, 2007 Luchs and Swan, 2011). Throughout the entire process of something new entering an industry, a marketing department should exchange information and communicate with its design department (Conway, 2007 Paul and Martin, 2007). A highly effective link between marketing activities and design triggers product innovation (Gupta and Wilemon, 1990 Sherman, *et al.*, 2000). Many scientists have stated that design is definitely an integral resource for businesses, a vital mechanism for brand new product integration, as well as an important serial loop within the value chains of businesses (Twigg, 1998 Aydin *et al.*, 2007). Consequently, a company should integrate their assets and finished new items through coordination with various industries based on their marketing strategy and practical product design strategy (Souder and Song, 1997 Bloch, 2011 Luchs and Swan, 2011). In line with the impact of marketing strategy on design strategy, the next hypothesis is provided:

H1: A highly effective marketing technique of a company positively influences its design strategy.

(2) Organizational marketing strategy and NPD performance

Souder and Song (1997) stated that marketing strategy and product are associated a marketing strategy can boost product quality (Jeremy *et al.*, 2005) and implementation of product R&D (Luchs and Swan, 2011). The R&D and marketing departments inside a company should be integrated to effectively apply techniques (Souder and Moenaert, 1992). Gupta and Wilemon (1990) contended that product innovation within the hi-tech industry requires close coordination between your R&D and marketing departments within an enterprise. Kinchen (2010) and Hsu (2011b) contended that product design can specify the marketing strategy and get product. Sherman *et al.* (2000) mentioned that mix-business functional integration influences the NPD cycle. Many students also stated that the mixing of the product procedure and management improves NPD performance in businesses (Song *et al.*, 1997 Durward *et al.*, 1998 Lau *et al.*, 2007). Based on the results of a marketing strategy on NPD performance, the next hypothesis is suggested:

H2: A highly effective marketing technique of a company positively influences its NPD performance.

(3) Organizational innovation and design strategy

Effective service or product innovation may be the center and motive energy for competitive advantage (Mozota, 2003 Veryzer and Mozota, 2005 Jamie and Costas, 2007). In NPD, product design be aligned using the innovation technique of a company (Mozota, 2006 Dell'Era and Verganti, 2007 Sari *et al.*, 2007). Within the NPD process, each proper hierarchy within an enterprise should be employed in coordination to apply its total policy (Veryzer and Mozota, 2005 Renee *et al.*, 2007). Based on its innovation strategy goal, a company must collocate practical product design tasks and integrate innovation assets within an enterprise to create new items through mix-organization communication and coordination (Mozota, 2006 Claudio and Roberto, 2007 Sari *et al.*, 2007). Innovation strategy and design strategy are carefully related (Hsu, 2011). This, another hypothesis is placed for innovation strategy and design strategy:

H3: A highly effective innovation technique of a company positively influences its design strategy.

(4) Organizational innovation strategy and NPD performance

By having an innovative strategy, businesses can quickly launch new items inside a marketplace, helping businesses break bottlenecks as well as turn failure into success (Ulrich and Eppinger,

2004 Christoph, 2007). Based on goals within an innovation strategy, a company must collocate practical product design tasks and integrate innovation assets to create new items through mix-business communication and coordination (Mozota, 2006 Claudio and Roberto, 2007 Sari *et al.*, 2007). Many students also have contended that effective integration of the enterprise's innovation methods and capacity improves NPD performance (Handfield *et al.*, 1999 Andi and Minato, 2003 Hsu, 2006). However, some research has demonstrated that no direct relationship is available which they might be affected by another intervening variable (e.g., Roger *et al.*, 2006). Based on the discussion of innovation strategy and NPD performance, a 4th hypothesis is provided:

H4: highly effective innovation technique of a company positively influences its NPD performance.

(5) Organizational design strategy and NPD performance

Obviously, NPD performance is carefully associated with product design strategy (Cooper and Kleinschmidt, 1987 Souder and Song, 1997 Ulrich and Person, 1998). An enterprise's efforts in product design could be measured by their NPD performance (Pawar and Driva, 1999). Excellent NPD performance is really a goal for each enterprise (Mumin, 2010 Ciriaco *et al.*, 2010). Based on Hsu (2009), businesses with various design methods vary within their financial and non-financial performance. Therefore, according to this discussion from the results of design strategy on NPD performance, a fifth hypothesis is provided:

H5: A highly effective design technique of a company positively influences its NPD performance.

Based on this literature review, a conceptual research framework covering H1-H5 is built (Figure. 1).

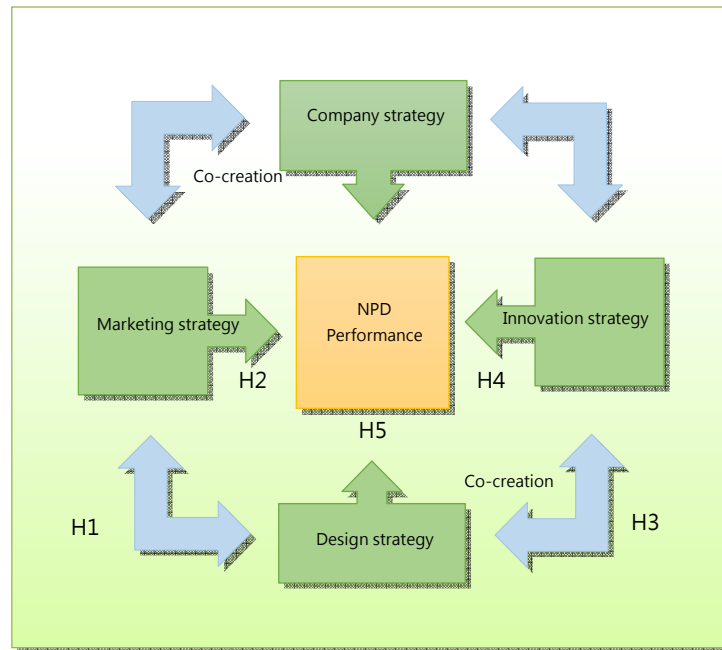


FIGURE 1: Conceptual model of Co-creation of organization's strategy in an enterprise.

3. METHOD

To determine of design strategy, four major dimension is employed R&D capacity, reduce production cost, ensure product quality, and improve brand image. These indices are selected in the studies by Sung and You (1999) and Hsu (2011a). A focus-group interview (FGI) was utilized to recognize the prospective user group, research limits, and associations among variables and dimensions. Seven experts (four experienced managers and three expert students) evaluated

whether variables from literature were appropriate. Within the pilot test, professionals chose their amount of agreement with every item on the 5-point Likert scale, varying from 1 for never or don't agree whatsoever to five for always or totally agree.

In the formal questionnaire survey, 1300 businesses were at random selected in the Taiwan Electrical and Electronic Manufacturers' Association (TEEMA) CEOs were requested in 2 surveys. While in the first survey, the status from the marketing strategy, innovation strategy, and design strategy was determined. After something new was promoted for just one year, another survey was carried out being an NPD performance check. After repeated contact, 285 companies (21.11%) responded.

4. DATA ANALYSIS AND RESULTS

Table 1 lists the mean, standard deviation, and correlation matrix of each variable. Table 2 lists the standardized loading (SL), standard error (SE), t-value, composite reliability (CR), and average variance extracted (AVE) for each dimension. The CR value for the dimensions of marketing strategy, innovation strategy, design strategy, and NPD performance was 0.89, 0.85, 0.88, and 0.86, respectively; total CR was 0.89, exceeding the standard value of 0.70 (Hulland, 1999), indicating good consistency in the model. The AVE for the major dimensions of marketing strategy, innovation strategy, design strategy, and NPD performance was 0.80, 0.75, 0.71, and 0.67, respectively; total AVE was 0.73, exceeding the standard value of 0.5 (Fornell and Larcker, 1981).

	<i>Mean</i>	<i>Sd</i>	<i>MS</i>	<i>IS</i>	<i>DS</i>	<i>NP</i>
MS	3.985	0.685	1.000			
IS	4.179	0.584	0.274	1.000		
DS	4.522	0.613	0.591	0.635	1.000	
NP	4.365	0.773	0.553	0.555	0.613	1.000

Notes: MS: Marketing strategy; IS: Innovation strategy; DC: Design strategy; NP: New Product Development Performance

TABLE 1: Basic Statistics.

<i>Core Constructs</i>	<i>Item</i>	<i>SL</i>	<i>SE</i>	<i>t-value</i>	<i>CR</i>	<i>AVE</i>
Marketing strategy	<i>MS1</i>	0.77	0.38	18.89	0.89	0.80
	<i>MS2</i>	0.84	0.29	13.45		
	<i>MS3</i>	0.86	0.32	19.89		
	<i>MS4</i>	0.89	0.28	15.47		
Innovation strategy	<i>IS1</i>	0.86	0.21	12.36	0.85	0.75
	<i>IS2</i>	0.85	0.17	13.56		
	<i>IS3</i>	0.91	0.22	16.78		
Design strategy	<i>DS1</i>	0.86	0.35	12.44	0.88	0.71
	<i>DS2</i>	0.75	0.25	11.36		
	<i>DS3</i>	0.81	0.32	13.49		
	<i>DS4</i>	0.85	0.33	19.59		
NPD performance	<i>NP1</i>	0.86	0.26	25.28	0.86	0.67
	<i>NP2</i>	0.83	0.32	15.55		
	<i>NP3</i>	0.84	0.25	20.15		
	<i>NP4</i>	0.84	0.23	17.45		
	<i>NP5</i>	0.79	0.19	18.77		
	<i>NP6</i>	0.89	0.16	16.68		

Notes: SL: Standardized loading; SE: Standardized error; CR: Composite reliability; AVE: average variance extracted

TABLE 2: Accuracy Analysis Statistics.

An assessment of research model fit can help verify the conceptual framework and hypotheses. Lisrel 8.8 was used for structural equation modeling by maximum likelihood. The analytical results were as follows: χ^2/df (ratio of chi squared over degrees of freedom) = 1.401, goodness-of-fit index (GFI) = 0.982, adjusted goodness of fit index (AGFI) = 0.938, comparative fit index (CFI) = 0.955, incremental fit index (IFI) = 0.986, and root mean square error of approximation (RMSEA) = 0.047. Because χ^2/df was <2.0 and because GFI, AGFI, CFI, and IFI were >0.90, RMSEA was smaller than 0.05 (Gefen *et al.*, 2011; Hair *et al.*, 1998; Atuahene-Gima and Li, 2002; Baker *et al.*, 2002; Brown *et al.*, 2000; Cannon and Homburg, 2001). Thus, research model had adequate goodness of fit.

The theoretical model investigated contains potential dependent variables and potential independent variables. The influences of potential variables cover direct effect, indirect effect, and total effect. Marketing strategy has a direct effect on design strategy and NPD performance (Table 3). Marketing strategy significantly affects design strategy ($\beta = 0.27$, $t = 3.58$, $p < 0.05$). Marketing strategy significantly affects NPD performance ($\beta = 0.29$, $t = 4.23$, $p < 0.05$). Additionally, innovation strategy has direct significant effects on design strategy ($\beta = 0.31$, $t = 4.75$, $p < 0.01$) and NPD performance ($\beta = 0.36$, $t = 3.83$, $p < 0.01$).

Furthermore, design strategy significantly affects NPD performance ($\beta = 0.39$, $t = 6.01$, $p < 0.001$). Marketing strategy also has significant indirect effect on NPD performance ($\beta = 0.19$, $t = 3.67$, $p < 0.05$) through the effect path of marketing strategy \rightarrow design strategy \rightarrow NPD performance. Innovation strategy also has a significant indirect effect on NPD performance ($\beta = 0.21$, $t = 2.98$, $p < 0.01$) through the effect path of innovation strategy \rightarrow design strategy \rightarrow NPD performance. Among all direct effects (Table 4), design strategy has the greatest direct effect (0.39) on NPD performance; innovation strategy has the second largest direct effect on design strategy (0.31); and marketing strategy has the smallest direct effect on design strategy (0.27). Clearly, marketing strategy has a significant direct effect on NPD performance. Adding the indirect effect marketing strategy on NPD performance through design strategy, the total effect of marketing strategy on NPD performance is 0.42, a relatively high degree of influence. Similarly, innovation strategy has a significant direct effect on NPD performance. Through design strategy, innovation strategy has an indirect effect on NPD performance; total effect is 0.43, demonstrating that innovation strategy also has an important effect on NPD performance. Thus, H1–H5 are supported.

		<i>Design strategy</i>		<i>NPD Performance</i>	
		<i>β-value</i>	<i>t-value</i>	<i>β-value</i>	<i>t-value</i>
Marketing strategy	<i>Direct effect</i>	0.27	3.58*	0.29	4.23*
	<i>Indirect effect</i>	--	--	0.19	3.67*
	<i>Total effect</i>	0.27	3.58*	0.42	5.45*
Innovation strategy	<i>Direct effect</i>	0.31	4.75***	0.36	3.83*
	<i>Indirect effect</i>	--	--	0.21	2.98*
	<i>Total effect</i>	0.31	4.75***	0.43	5.48*
Design strategy	<i>Direct effect</i>			0.39	6.01**
	<i>Indirect effect</i>			--	--
	<i>Total effect</i>			0.39	6.01**

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

TABLE 3: Direct, Indirect, and Total Effect Rules.

<i>Hypotheses</i>	<i>Paths</i>	<i>Expected signs</i>	<i>Effect</i>	<i>Results</i>
H1	<i>Marketing strategy \rightarrow Design strategy</i>	+	0.27	Supported
H2	<i>Marketing strategy \rightarrow NPD Performance</i>	+	0.29	Supported
H3	<i>Innovation strategy \rightarrow Design strategy</i>	+	0.31	Supported
H4	<i>Innovation strategy \rightarrow NPD Performance</i>	+	0.36	Supported
H5	<i>Design strategy \rightarrow NPD Performance</i>	+	0.39	Supported

TABLE 4: Hypotheses Rules.

5. CONCLUSIONS

Co-created value arises by means of personalized, unique encounters for that customer (value-in-use) and continuing revenue, learning that has been enhanced market performance motorists for that firm (loyalty, associations, customer person to person) (Roggeveen *et al.*, 2012). Value is co-created with clients assuming a person has the capacity to personalize their experience utilizing a firm's product-service proposition - within the duration of its use - to an amount that's ideal to obtain work(s) or tasks done and which enables the firm to derive greater value from the product-service investment by means of new understanding, greater revenues/profitability and/or superior brand value/loyalty (Lehrer *et al.*, 2012).

Although several studies have asserted that design or design strategy is an important resource for enterprises, an essential mechanism for new item integration, and an important serial loop within the worth chains of enterprises (Wheelwright and Clark, 1992; Twigg, 1998), these research are only case analyses or conceptual proposals, lacking a theoretical underpinning. This study explores empirically the correlations amongst marketing, innovation, and design techniques. Confirmatory factor evaluation outcomes indicate suitable construct validity; convergent validity and discriminant validity for each variable attain their statistical requirement. Furthermore, the structural equation model obtained demonstrates a good match involving the theoretical model and observed information for innovation, marketing, and design techniques. Moreover, marketing strategy and innovation strategy also influence NPD overall performance indirectly, by means of design strategy. Hence, for NPD overall performance, design strategy is both an independent variable and intervening variable. For total impact on NPD efficiency, design strategy is probably the most significant variable, followed by innovation strategy, and marketing strategy.

Enterprises will have to efficiently integrate their resources and total new item innovation via communication and coordination amongst unique sectors as outlined by marketing strategy or innovation strategy objectives. Analytical final results obtained by this study help analytical final results obtained by Atuahene-Gima and Li (2001), Sung and Gilmour (2002), Mozota (2006), Claudio and Roberto (2007), and Sari *et al.* (2007). Importantly, solution design could be made use of to market innovation strategy and applies concrete criteria for item innovation. This study confirmed the study result obtained by Hsu (2009; 2011b). While only a single business, the customer electronics market, and a single nation, Taiwan, is analyzed in this customer electronics industry is representative of the international market place, and is second in international competitiveness. Furthermore, most Taiwanese enterprises have manufacturing plants in Mainland China; hence, the customer electronics enterprises in Taiwan plus the Taiwan consumer electronics enterprises in Mainland China possess the biggest market place share worldwide. Hence, the analytical benefits obtained by the study are frequently representative within the worldwide customer electronics sector.

In line with Takeuchi and Nonaka (1986), profit from new items contributes roughly 30-40% to total revenue for an organization. For instance, new items within the US manufacturing industry contribute roughly 40% to annual income and 32% to a company's profits (Haas, 1989). Furthermore, according to a survey by the US "Product Improvement and Management Association" (PDMA), 32.4% of item turnover for any business came from new goods launched in last 5 years. For the hi-tech business, the percentage is even higher, reaching 42.3% (Griffin *et al.*, 1996). This really is the very first longitudinal study of elements important to item innovation, marketing, item design, and NPD efficiency. Concrete design practices (e.g., form, function, texture, and operation) will likely be investigated in the future.

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