

# Research on Correlation between Innovative Activities & Development Strategies of New Product and Development Performance in Taiwan's High-tech Companies

Yi-Chan Chung<sup>1</sup>, Chih-Hung Tsai<sup>1†</sup>

Wei-Jaw Deng<sup>2</sup>, and Wen-Chin Chen<sup>2</sup>

<sup>1</sup> Department of Industrial Engineering and Management  
Ta-Hwa Institute of Technology

1 Ta-Hwa Road, Chung-Lin, Hsin-Chu, Taiwan, ROC  
Tel: +886-3-5430-466, E-mail: ietch@thit.edu.tw

<sup>2</sup> Graduate Institute of Management of Technology  
Chung-Hua University  
30 Tung-Shiang, Hsin-Chu, Taiwan, ROC

## Abstract

Due to the advancement of technology and rapidly changing environment of the market, the life cycle of high-tech products is becoming shorter. The enterprise must constantly innovate and select correct development strategy of new product in order to respond to customers' demands for upgrading operational performance of industry. Development of new product is the critical activity for enterprise's survival and growth. This research focuses on the effects of Taiwan high-tech companies' introduction of innovative activity and development strategy of new product on development performance of new product for analysis and exploration. The result findings reveal that: (1) High execution degree of innovative activity has positive effect on the implementation of development strategy of new product; (2) The companies with better implementation of development strategy of new product reveal better development performance; (3) The companies with higher degree of execution of innovative activity and better execution of development strategy of new product reveal better development performance of new product.

**Key Words:** Innovative Activity, Development Strategy of New Product, Development Performance

---

†Corresponding Author

---

## 1. Introduction

With the advancement of technology, the life cycle of product is becoming shorter. The development process of new product and the reduction of the time entering the market are thus particularly important. Therefore, how to rapidly introduce new product and how to operate innovative activity and development strategy of new product have become the issues enterprises should value at present. When facing the environmental pressure of severe competition, how to introduce new product in short time and reduce the development and time entering market of new product have become the focus for the operational strategies of many enterprises. During the process of developing new product, there are fewer enterprises involving the concept of innovative activity in the strategy of development of new product. This research will manage the empirical study with respect to the correlation among innovative activity and development strategy of new product and development performance of new product. This research mainly explores the effects of innovative activity and development strategy of new product on development performance of new product. The research objectives are: (1) to explore the effect of innovative activity on the development strategy of new product; (2) to explore the effect of innovative activity and development strategy of new product on the development performance; (3) to explore the effect of development strategy of new product on the development performance of new product.

## 2. Literature Review

### 2.1 Innovative Activity

Innovative activity can be described in the following different kinds of perspectives: (1) product perspective: the scholars holding this perspective include Blau and Mckinley (1979), Burgess (1989), Kelm *et al.* (1995). What they value is the result generated by innovative activity and its measurement of innovative activity is based on concrete products; (2) process perspective: the scholars holding this perspective include Kimberly (1986), Drucker (1985), Amabile (1988), Kanter (1988), Johannessen and Dolva (1994), Scott and Bruce (1994) who indicated that innovative activity is a kind of process which judges innovation from a series of process or stages; (3) product and process perspective: the scholars Tushman and Anderson (1986), Dougherty and Bowman (1995), Lumpkin and Dess (1996) believed that innovative activity should be defined by binary perspective of product and process and the result and process should be combined; (4) diversity perspective: the scholars Damanpour (1991), Russell (1995) and Robbins (1996) believed that innovative activity cannot only focus on "technology level" and neglect "management level". Thus, they claim that innovative activity should include technology innovation such as product, process and facilities and

---

management innovation such as system, policy, plan and service. Knight (1967) divided innovative activities into: (1) product or service innovative activity: it means production or sales of new product or new service; (2) innovative activity of production manufacturing: it means the innovation of working assignment, policy and information system or new method adoption of production business or skill; (3) innovative activity of organizational structure: it means the changes of work assignment, responsibility relationship, communication system and reward system in the organization; (4) innovative activity of personnel: it means the change of members' behavior or belief. Daft (1978) divided innovative activity into: (1) innovative activity of management structure: including the innovation of elements of strategy and organizational structure; (2) innovative activity of skill: including innovation of product, skill, working process and originality of product. Holt (1983) divide innovative activity into: (1) innovative activity of skill: using the original technology or creating new technologies can lead to product innovation or manufacturing innovation; (2) innovative activity of management: using new managerial method or system; (3) innovative activity of organization: adopting new organizational structure to establish a set of new pattern of interpersonal interaction; (4) innovative activity of regulation: innovative activity is based on the present technologies and focuses on present customers. Chacke (1988) allocated innovative activity into: (1) innovative activity of products: developing new innovative products; (2) innovative activity of process: using new production method; (3) innovative activity of organization: developing new organizational structure pattern. Based on the above reorganization of literatures, this research allocates innovative activities into innovative activity of management, innovative activity of skill, innovative activity of market and innovative activity of culture as the main perspectives of "innovative activity" of this research.

## **2.2 Development Strategy of New Product**

The study of Anoff and Stewart (1967) pointed out that development strategy of new product can be divided into four types: (1) possessing the strategy to enter the market as pioneer: the enterprise has powerful capacity of research and development and leading skills. In specific product market, it has the leading position in terms of technology; (2) strategy for following the leaders: it has many resources of research development and when the market is at the timing of growing, it can rapidly respond to the situation and acquire advantage; (3) application and improvement: in the mature market, the improved product has complied with the customers' demands and only few innovative development is devoted to upgrading manufacturing efficiency and maintaining the original market; (4) strategy of imitation: treating imitation as the main strategy. After studying development strategy of new product of technology companies, Meyer and Roberts (1986) indicated that the strategies of new products are composed of the following two dimensions: (1) newness of technology required for development of new product in comparison with the original technology of the

---

company; (2) Newness of target market of new products in comparison with the past users of the products. Firth and Narayanan (1996) defined new product strategies by three dimensions: (1) Newness of embodied technology; (2) Newness of market applications; (3) Innovativeness in the market. According to these three dimensions, their research finding defines the following five new product strategies: (1) Innovators; (2) Investors in technology; (3) Searching for new markets; (4) Business as usual; (5) Middle-of-the-road.

Cooper (1984b) believed that there are four variables of development strategy of new product as follows: (1) new product characteristics of the enterprise: including creating new products, developing products which can satisfy customers' demands more comparing with the competitors, product centralization and difference; (2) market characteristics pursued by new products: including new markets, customers, competitors or sales channels; (3) technology characteristics of the enterprise: including the percentage of R&D expense in sales volume, R&D characteristic of the company, etc.; (4) technology characteristics embodied by new products: including embodying advanced/ complicated technology, close connection between new products and R&D resources of the company, maturity and centralization of the technology, etc. In the study of Barczak (1995), new product strategies are divided into the following three: First to market, Fast follower and Delayed entrant. After reorganizing the related literatures, this research divides development strategy of new product into the follows: (1) innovative capacity of development of new product; (2) technology capacity of development of new product; (3) market development capacity of new products; (4) research & development capacity of new product as the strategic dimensions of development of new product.

### **2.3 Development Performance of New Product**

Hopkins (1981) indicated that when evaluating the development performance of new product, one should use the following five indicators for measurement: (1) evaluation of financial affairs; (2) evaluation of objective; (3) proportion of new products in the whole sales; (4) proportion of new products successfully to market; (5) overall satisfaction toward development of new product. Barczak (1995) evaluated the development performance of new product by profit rate of new products, target accomplishment of market share, sales volume and overall satisfaction toward new product development. In the study of Olson *et al.* (1995), the researchers propose ten indicators for measuring the development performance of new product: quality level of new products, R&D quality level of new products, satisfaction toward ultimate design of new products, time spent for reaching balance of profit and loss after new products entering the market, accomplishment of target sales, strictness of budget control, comparison between time spent for finishing the plan and the expected planning, satisfaction toward the specific project of new product development, contribution of new product development and the devotion during the development of new products.

---

Calantone *et al.* (1995) regarded Return of Investment, Investment Growth Rate, Sales Growth Rate, Market Share and Market Share Growth Rate as the measurement indicators for the development performance of new product. In the study of Song and Parry (1997), the researchers adopted four indicators to measure the relative success level of the companies' development of new product: (1) comparing the quality of new products with the competitors; (2) comparing sales volume of new products with the competitors; (3) comparing profit rate of new products with the competitors; (4) comparing the ratio of new products successfully to market with the expected target of profit. Cooper (1984a) measured the development performance of new product by two dimensions: overall performance of new products and successful rate of new product development. Dwyer and Mellor (1991) investigated the correlation between the activities and development performance of new product of 96 companies. In this study, they use four indicators to measure the development performance of new product and those indicators are: (1) evaluation of overall success/failure; (2) profit level; (3) sales target; (4) the opportunities brought by new products for the future of the company. Based on the reorganization of the above literatures, this research adopts five indicators as the dimensions of development performance of new product which are: (1) time of new product entering the market; (2) quality level of new products; (3) market share of new products; (4) ratio of new products successfully entering the market, (5) the cost of new product development for entering the market.

#### **2.4 Innovative Activity and Development Strategy of New Product**

Song and Montoya-Weiss (1998) indicated that the execution degree of innovative activity is a critical classification method for the specific plan of new product development. The execution degree of innovative activity will affect the selection and implementation of development strategy of new product. Development strategy of new product is the base of all of the activities of new product development. We can thus recognize the effect of innovative activity on development strategy of new product and the activities of new product development. According to Ansoff's (1967) proposal which treats the newness of product and market toward manufacturers as the framework of development strategy of new product, Johnes and Storey (1998) described the role of new products in the activities of enterprise. Their research finding reveals that innovative activities of new products will affect the selection and implementation of development strategy of new product.

#### **2.5 Innovative Activity and Development Performance of New Product**

Teece and Pisano (1994) believed only the organizations with rapid proceeding of innovative activities and the managerial capacities of integrating and arranging internal and external resources can be successful in the competitive environment of the world. Thus, the

---

implementation of innovative activity, to some degree, affects the development performance of new products. According to the study of Booz *et al.* (1982), innovative activities can upgrade the newness or innovation of products in the market and enhance the development performance of new product. The research of Raudsepp (1987) pointed out that the companies with better execution degree of innovative activities are more likely to have the capacities to develop new products and attract the clients to purchase their products which leads to the increase of share rate of new products and better development performance of new products. The research finding of Youssef (1991) revealed that the implementation of innovative activity can increase the development performance of new products, upgrade the capacity and R&D speed of new product development. The study of McGrath (1993) indicated that through innovative activities, the enterprise can encourage the employees to develop the products which can the consumers and upgrade the development performance of new products. Cooper and Kleinschmidt (1996) pointed out that the executives' supports of innovative activities would affect the development performance of new product. The study of Gatignon and Xuereb (1997) indicated that innovative activities would influence the advantage and cost of new product development. The research finding of Kotabe (1990) revealed that there is positive correlation between innovative degree of products and development performance of new product. The enterprises with better innovative activities will have positive effect on the development performance of new product.

## **2.6 Development Strategy of New Product and Development Performance of New Product**

The study of Cooper and Kleinschmidt (1991) pointed out that clear and definite development strategy of new product is the critical factor affecting the development performance of new product. Definite development strategy of new product can enhance the successful rate of development of new product for entering the market, find out the problems earlier and reduce the time to the market. Cooper (1983) investigated 58 cases of innovative industry products of 30 companies and finds out that the successful cases of new product development have more complete and clear strategy and process of product development. The failure cases of new product development have less complete strategy and process of product development. The investigation of Hise *et al.* (1989) with respect to 195 specific cases of new product development revealed that the lack of a complete and definite development strategy of new product would reduce the ratio of new products successfully entering the market. Wind and Mahajan (1988) indicated that during the development of new products, the execution degree of development strategy of new product would affect the development performance of new product. If the company considers involving in new product market with brand-new products, it should adopt complete product development process. If it enters the market with the original products, it can omit the generation of originality and concept

---

evaluation. Balachandra and Friar (1997) pointed out that new product strategy include the function and regulation of specifications of new products, current situation analysis of market and control of product development process. Complete and definite new product strategy is beneficial for the successful rate of new products entering the market. The study of Cooper and Kleinschmidt (1987) indicated that in order to increase the development performance of new product, the company must first collect the related market information, evaluate internal and external environments and resources and plan the development strategy of new product which complies with its target.

### 3. Research Methodology

This research mainly explores the relationship among innovative activity, development strategy of new product and the development performance of new product and the research framework is showed as Figure 1.

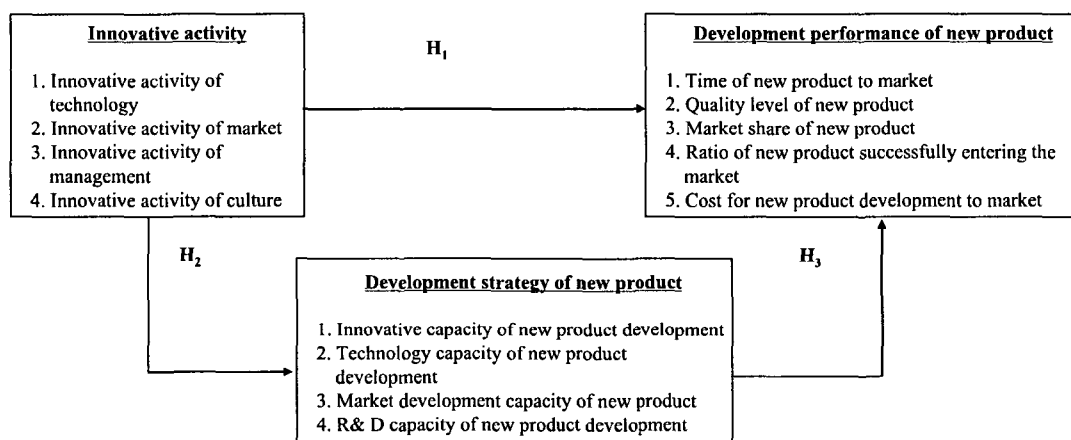


Figure 1. Research structure

#### 3.1 Reserach Hypotheses

According to the exploration of literature, this research infers the hypotheses as follows:

**$H_1$ : When the execution degree of innovative activity is higher, it would have significant and positive effect on the development performance of new product.**

$H_{1-1}$ : When the execution degree of innovative activity of technology is higher, it would have significant and positive effect on the development performance of new product.

$H_{1-2}$ : When the execution degree of innovative activity of market is higher, it would have significant and positive effect on the development performance of new product.

- H<sub>1.3</sub>: When the execution degree of innovative activity of management is higher, it would have significant and positive effect on the development performance of new product.
- H<sub>1.4</sub>: When the execution degree of innovative activity of culture is higher, it would have significant and positive effect on the development performance of new product.
- H<sub>2</sub>: When the execution degree of innovative activity is higher, it would have significant effect on the execution degree of development strategy of new product.**
- H<sub>2.1</sub>: When the execution degree of innovative activity of technology is higher, it would have significant effect on execution degree of development strategy of new product.
- H<sub>2.2</sub>: When the execution degree of innovative activity of market is higher, it would have significant effect on execution degree of development strategy of new product.
- H<sub>2.3</sub>: When the execution degree of innovative activity of management is higher, it would have significant effect on execution degree of development strategy of new product.
- H<sub>2.4</sub>: When the execution degree of innovative activity of culture is higher, it would have significant effect on execution degree of development strategy of new product.
- H<sub>3</sub>: There is significant effect of development strategy of new product on the development performance of new product.**
- H<sub>3.1</sub>: There is significant effect of innovative capacity of new product development on the development performance of new product.
- H<sub>3.2</sub>: There is significant effect of technology capacity of new product development on the development performance of new product.
- H<sub>3.3</sub>: There is significant effect of market development capacity of new product on the development performance of new product.
- H<sub>3.4</sub>: There is significant effect of R&D capacity of new product development on the development performance of new product.

### 3.2 Questionnaire Collection and Data Analysis

The questionnaire of this research is divided into four sections. The first to the third section are measured by Likert five-point scale. The first section: innovative activity mainly includes: (1) innovative activity of technology; (2) innovative activity of market; (3) innovative activity of management; (4) innovative activity of culture as the measurement items of this questionnaire design. The second section: development strategy of new product mainly includes: (1) innovative capacity of new product development; (2) technology capacity of new product development; (3) market development capacity of new products; (4) R&D capacity of new product development as the measurement items of questionnaire design. The third section: development performance of new products mainly includes: (1) time of new products for entering the market; (2) quality of new products; (3) market share of new products; (4) ratio of new products for successfully entering the market; (5) cost of new product for successfully entering the market as the measurement items for questionnaire design. The fourth



section refers to the basic information of the company includes: (1) industry categorization; (2) capital volume of the company; (3) numbers of employees.

This research regards Taiwan's high-tech companies as the empirical targets. When distributing the questionnaires, the research selects the companies which are more well-known and with the experience of new product development as the samples of research. Based on the scope of "integrated circuit industry", "computer and related industry", "communication industry", "precise machinery industry", "biotechnology industry" and "OPTO industry", the research collects the related information by mailing the questionnaires. The respondents must have thorough understanding for the process of new product development. The research treats the specific case managers of new product development, experienced product planning personnel and experienced R&D managers and innovative activity executives as the targets in order to strengthen the validity of questionnaire. The questionnaires are anonymous and distributed to 590 companies. The distribution time is December of 2005 and return time is January of 2006. Among return questionnaires, there are 102 valid questionnaires and 16 invalid questionnaires with incomplete responses. The question design of this questionnaire is based on the opinions of scholars and experts and literature exploration. As to the scoring of the responses, this research calculates Cronbach  $\alpha$  factor of each question in each dimension and examines their reliability. When Cronbach  $\alpha$  value is larger, it means that the correlation degree among each question of the dimension is higher and internal consistency degree is also higher. Nunnally (1978) indicated that in basic studies, the reliability which is over 0.7 is accepted. The reliability of this research is over 0.7; thus, the reliability is trustworthy. The reliability value of each variable in this research is shown in Table 1. This research adopts close questionnaire design and uses SPSS 10.0 for windows as the analysis of execution data of statistical software. The analytical content includes t-test and multiple-regression-analysis for the research validation and analysis.

**Table 1.** Reliability value of each variable

Questionnaire aspects	Innovative activity				Development strategy of new product				Development performance of new product
	Technology innovation	Market innovation	Management innovation	Culture innovation	Innovation capacity	Technology capacity	Market development capacity	Development capacity	
Cronbach $\alpha$	0.81	0.83	0.79	0.80	0.86	0.83	0.81	0.83	0.89

#### 4. Research Validation

This research manages t test with respect to innovative activity, development strategy of new product and development performance of new product.

#### 4.1 Relationship between Innovative Activity and Development Performance of New Product

According to the observation of overall average, the research divides industry into two groups: high execution degree and low execution degree of innovative activity (average is 3.71, the ones over 3.71 are considered high and the ones less than 3.71 are considered low) and manages t test for the development performance of new product. Table 2 reveals that the companies with higher execution degree of innovative activity have significant effect on the development performance of new product ( $P=0.006$ ). The research finding supports research hypothesis  $H_1$ : when the execution degree of innovative activity is higher, it would have significant and positive effect on the development performance of new product.

**Table 2.** The effect of execution degree of innovative activity on t test of the development performance of new product

	High execution degree of innovative activity	Low execution degree of innovative activity	T value	P value
Development performance of new product	4.2301	3.4356	1.332	0.006*

Note) \*means  $p < 0.01$

Each dimension of innovative activity has significant effect on the development performance of new product as Table 3. Innovative activity of technology ( $P=0.003$ ), innovative activity of market ( $P=0.001$ ), innovative activity of management ( $P=0.000$ ) and innovative activity of culture ( $P=0.001$ ) all reveal significance. Hypotheses  $H_{1-1}$ ,  $H_{1-2}$ ,  $H_{1-3}$ ,  $H_{1-4}$  are validated.

**Table 3.** T test of the effect of innovative activity on the development performance of new product

Innovative activity	Development performance of new product	
	t value	P value
Technology innovative activity	2.342	0.003*
Market innovative activity	1.787	0.001*
Management innovative activity	2.571	0.000*
Culture innovative activity	2.170	0.001*

Note) \*means  $p < 0.01$

#### 4.2 Relationship between Innovative Activity and Development Strategy of New Product

The execution degrees of technology innovative activity ( $P=0.003$ ), market innovative ac-

tivity ( $P = 0.005$ ), management innovative activity ( $P = 0.000$ ) and culture innovative activity ( $P = 0.008$ ) would reveal significant effects on the development strategy of new product as Table 4. Hypotheses  $H_{2-1}$ ,  $H_{2-2}$ ,  $H_{2-3}$ ,  $H_{2-4}$  are validated.

**Table 4.** T test of the effect of innovative activity on the new product development strategy

Innovative activity	New product development strategy	
	T value	P value
Innovative activity of technology	2.140	0.003*
Innovative activity of market	2.826	0.005*
Innovative activity of management	2.473	0.000*
Innovative activity of culture	2.868	0.008*

Note) \*means  $p < 0.01$

#### 4.3 Relationship between Development Strategy of New Product and Development Performance of New Product

Each aspect of development strategy of new product: innovative capacity of development of new product ( $P = 0.001$ ), Skillful capacity of development of new product ( $P = 0.006$ ), market development capacity of new product ( $P = 0.007$ ), development capacity of new product ( $P = 0.002$ ) reveal significant effects on the development performance of new product as Table 5. Hypotheses  $H_{3-1}$ ,  $H_{3-2}$ ,  $H_{3-3}$ ,  $H_{3-4}$  are validated.

**Table 5.** T test of the effect of development strategy of new product on the development performance of new product

Development strategy of new product	Development performance of new product	
	t value	P value
Innovative capacity of development of new product	1.614	0.001*
Skillful capacity of development of new product	0.124	0.006*
Market development capacity of new product	0.756	0.007*
Development capacity of new product	0.437	0.002*

Note) \*means  $p < 0.01$

#### 4.4 Multiple-Regression-Analysis of Effects of Innovative Activity, Development Strategy of New Product on the Development Performance of New Product

Multiple-regression-analysis is a kind of extended application of simple correlation and it is mainly to understand the straight line relationship between a set of predictor variables and a criterion variable. The multiple-regression-analysis of this research is shown as Tables 6 and 7. The model of Model 1 (Table 6) is  $\hat{y}_1 = 0.127X_1 + 0.297X_2 + 0.350X_3 + 0.215 X_4 + \epsilon_1$

( $X_1$  refers to innovative activity of technology,  $X_2$  is innovative activity,  $X_3$  is innovative activity of management,  $X_4$  is innovative activity of culture) and it reveals positive and prominent correlation. Adjusted  $R^2$  is 0.812 and the level of explanatory capacities of all of the variables is considerably high. The model of Model 2 (Table 7) is  $\hat{y}_2 = 0.214 X_5 + 0.352 X_6 + 0.526 X_7 + 0.614 X_8 + \epsilon_2$  ( $X_5$  refers to innovative capacity of new product development,  $X_6$  is technology capacity of new product development,  $X_7$  is the market development capacity of new products,  $X_8$  is R&D capacity of new product development) and it reveals positive and prominent correlation. Adjusted  $R^2$  is 0.795 and the level of explanatory capacities of all of the variables is considerably high. Thus, the effects of innovative activity and development strategy of new product on the development performance of new product can be validated.

**Table 6.** Multiple-regression-analysis of the effect of innovative activity on the development performance of new product

Variables	Model 1			
	B	Std. E	Beta	T value
Technology innovative activity	0.127	0.105	0.175	1.304
Market innovative activity	0.297	0.199	0.231	1.992
Management innovative activity	0.350	0.114	0.319	2.058
Culture innovative activity	0.215	0.102	0.325	1.021
Adjusted $R^2$	0.812			

**Table 7.** Multiple-regression-analysis of the effect of development strategy of new product on the development performance of new product

Variables	Model 2			
	B	Std. E	Beta	T value
Innovative capacity of development of new product	0.214	0.106	0.124	0.922
Skillful capacity of development of new product	0.352	0.089	0.518	4.051
Market development capacity of new product	0.526	0.079	0.183	0.851
Development capacity of new product	0.641	0.075	0.301	3.216
Adjusted $R^2$	0.795			

## 5. Conclusions

This research conducts empirical analysis of questionnaire survey with regard to Taiwan's high-tech industry. The research uses statistical analysis in order to understand the effects of innovative activity and development strategy of new product on the development performance of new product. Through the validation of research hypotheses, the research develops the

theoretical model affecting relationship. The research finding reveals that there is significantly positive effect of innovative activity and development strategy of new product on the development performance of new product. In other words, the research hypothesis of “the higher the degree of execution of innovative activity is and the better the execution of development strategy of new product is, the better the development performance of new product is” is validated. According to the statistical figures from Table 2 to Table 5, there is positive effects of innovative activity and development strategy of new product on the development performance of new product. Therefore, in order to upgrade the competitiveness, the enterprise should value the implementation of innovative activities and the management of development strategy of new product. Besides, it should fully understand the situations in the market and carefully evaluate and select the strategies of new product development during the period of new product development in order to reach better development performance of new product. This research merely focuses on the exploration of high-tech industry and in the future, other industries can be analyzed empirically for studying the effects of different industries’ implementation of innovative activities and development strategy of new product on the development performance of new product. This research only studies the relationship among innovative activities, development strategy of new product and the development performance of new product. In the future, the research can focus on environmental characteristics in order to acquire more complete research results.

## References

1. Amabile, T. M.(1988), “A Model of Creativity and Innovation in Organizations,” In B.M. Staw & L.L. Cummings (Eds.), *Research in Organizational Behavior*, Vol. 10, Greenwich, CT: JAI Press, pp. 123-167.
  2. Anoff, H. I. and Stewart, N. M.(1967), “Strategies for a Technology Based Business,” *Harvard Business Review*, Vol. 1, No. 1, pp. 101-131.
  3. Balachandra, R. and Friar, J.(1997), “Factors for success in R&D project innovation: A conceptual framework,” *IEEE Transactions on Engineering management*, Vol. 44, No. 3, pp. 276-287.
  4. Barczak, G.(1995), “New Product Strategy, Structure, Process and Performance in the Telecommunications Industry,” *Journal of Product Innovation management*, Vol. 12, No. 2, pp. 224-234.
  5. Blau, J. R. and McKinley, W.(1979). “Ideas, Complexity and Innovation,” *Administrative Science Quarterly*, Vol. 24, pp. 200-219.
  6. Burgess, G. H.(1989), *Industrial Organization*, Englewood Cliffs, N.J.: Prentice-Hall.
  7. Booz, Allen and Hamilton(1982), *New Product Management for the 1980’s*, New York.
-

8. Calantone, R., Vickery, S. and Deoge, C.(1995), "Business Performance and Strategic New Product Development Activities: An Empirical Investigation," *Journal of Product Innovation management*, Vol. 12, No. 3, pp. 214-223.
  9. Chacke, G. K.(1988), *Technology Management Application to Corporate Markets and Military Missions*, NY: Praeger.
  10. Cooper, R. G.(1984a), "New Product Strategies: What Distinguishes the Top Performers," *Journal of Product Innovation Management*, Vol. 2, pp. 151-164.
  11. Cooper, R. G.(1984b), "The Strategy-Performance Link in Product Innovation," *R&D Management*, Vol. 14, pp. 247-259.
  12. Cooper, R. G. and Kleinschmidt, E. J.(1986), "An Investigation into the New Product Process: Steps, Deficiencies, and Impact," *Journal of Product Innovation Management*, Vol. 3, No. 2, pp. 71-85.
  13. Cooper R. G. and Kleinschmidt, E. J.(1987), "New Products: What Separates Winners from Losers," *Journal of Product Innovation Management*, Vol. 4, No. 3, pp. 169-184.
  14. Cooper, R. G. and Kleinschmidt, E. J.(1991), "New product Process at Leading Industrial Firms," *Industrial Marketing Management*, Vol. 20, No. 2, pp. 137-147.
  15. Cooper, R. G.(1983), "A Process Model for Industrial New Product Development," *IEEE Transactions on Engineering Management*, Vol. EM-30, No. 1, pp. 2-11.
  16. Damanpour, F.(1991), "Organizational Innovation: a Meta-analysis of Effects of Determinants and Moderators," *Academy of Management Journal*, Vol. 34, No. 3, pp. 555-590.
  17. Daft, R. L.(1978), "A Dual-Core Model of Organizational Innovation," *Academy of Management Journal*, Vol. 21, pp. 193-210.
  18. Drucker, P. F.(1985), *Innovation and Entrepreneurship: Practice and Principles*, Landon: Heinemann.
  19. Dwyer, L. D. and Mellor, R.(1991), "New Product Process Activities and Project Outcomes," *R&D Management*, Vol. 21, No. 2, pp. 31-52.
  20. Dougherty, D. and Bowman, E. H.(1995), "The Effect of Organizational Downsizing on Product Innovation," *California Management Review*, Vol. 37, No. 4, pp. 28-44.
  21. Firth, R. W. and Narayanan, V. K.(1996), "New Product Strategies of Large, Dominant Product Manufacturing Firms: An Exploratory Analysis," *Journal of Product Innovation Management*, Vol. 13, No. 4, pp. 334-347.
  22. Gatignon, H. and Xuereb, J. M.(1997), "Strategic Orientation of the Firm and New Product Performance," *Journal of Marketing Research*, Vol. 34, pp. 77-90.
  23. Holt, K.(1983), *Product Innovation Management*, Butterworths, 2nd ed.
  24. Hopkins, D. S.(1981), "New Product Winners and Losers," *Research Management*, Vol. 12, No. 1, pp. 12-17.
  25. Hise, R. T., O'Neal, L. A., Parasuraman, A., and McNeal, J. U.(1989), "The Effect of Product Design Activities on Commercial Success Levels of New Industrial Products,"
-

*Journal of Product Innovation Management*, Vol. 6, No. 1, pp. 43-50.

26. Johannessen, J. A. and Dolva, J. O.(1994), "Competence and Innovation: Identifying Critical Innovation Factors," *Entrepreneurship, Innovation and Change*, Vol. 3, No. 3, pp. 209-222.
  27. Johne, A. and Storey, C.(1998), "New service development: A review of literature and annotated bibliography," *European Journal of Marketing*, Vol. 32 No. 3, pp. 184-251.
  28. Kanter, R. M.(1988), "When a Thousand Flowers Bloom: Structural, Collective, and Social Conditions for Innovation in Organization," *Research in Organizational Behavior*, Vol. 10, pp. 169-211.
  29. Kotabe, M.(1990), "Corporate Product Policy and Innovation Behavior of European and Japanese Multinationals: An Empirical Investigation," *Journal of Marketing*, Vol. 54, No. 1, pp. 19-33.
  30. Kelm, K. M., Narayanan, V. K., and Pinches, G. E.(1995), "Shareholder Value Creation During R&D Innovation and Commercialization Stages," *Academy of Management Journal*, Vol. 38, No. 3, pp. 770-786.
  31. Kimberly, J. R.(1986), "The Organizational Context of Technological Innovation," In D. D. Davis & Associates (Eds.), *Managing Technological Innovation*, San Fransisco: Jossey-Bass.
  32. Knight, K. E.(1967), "A Descriptive Model of the Intra-firm Innovation Process," *Journal of Business*, Vol. 40, pp. 478-496.
  33. Lumpkin, G. T. and Dess, G. G.(1996), "Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance," *Academy of Management Review*, Vol. 21, No. 1, pp. 135-172.
  34. Meyer, M. H. and Roberts, E. B.(1986), "New Product Strategy in Small Technology-Based Firms: a Pilot Study," *Management Science*, Vol. 32, No. 7, pp. 806-821.
  35. McGrath, R. G.(1993), *The Emergence and Evaluation of Organizational Competence*, Working Paper, The Warton School University of Pennsylvania.
  36. Nunnally, J. C.(1978), *Psychometric Theory*, Second ed., Mc Grew-Hill.
  37. Olson, E. M., Walker, O. C., and Ruekert, R. W.(1995), "Organizing for Effective New Product Development: The Moderating Role of Product Innovativeness," *Journal of Marketing*, Vol. 59, pp. 48-62.
  38. Raudsepp, E.(1987), "Establishing a Creative Climate (two dozen ways to turn on your organization's light bulbs)," *Training and Development Journal*, Vol. 4, pp. 50-53.
  39. Russell, R. D.(1995), "An Investigation of Some Organizational Correlates of Corporate Entrepreneurship: Toward a Systems Model of Organizational Innovation," *Entrepreneurship Innovation and Change*, Vol. 4, No. 4, pp. 295-314.
  40. Robbins, S. P.(1996), *Organization Behavior: Concepts, Controversies and Applications*, Englewood Cliffs, N.J.: Prentice-Hall.
-

41. Scott, S. G. and Bruce, R. A.(1994), "Determinants of Innovative Behavior: A Path Model of Individual Innovation in the Workplace," *Academy of Management Journal*, Vol. 37, pp. 580-607.
  42. Song, X. M. and Parry, M. E.(1997), "A Cross-National Comparative Study of New Product Development Processes: Japan and the United States," *Journal of Marketing*, Vol. 61, No. 2, pp. 1-18.
  43. Song, X. M. and Montoya-Weiss, M. M.(1998), "Critical Development Activities for Really New versus Incremental Products," *Journal of Product Innovation management*, Vol. 15, No. 2, pp. 124-135.
  44. Tushman, M. L. and Anderson, P.(1986), "Technological Discontinuities and Organizational Environments," *Administrative Science Quarterly*, Vol. 31, pp. 439-465.
  45. Teece, D.J. and Pisano, G.(1994), "The Dynamic Capabilities of Firms: an Introduction," *Industrial and Corporate Change*, Vol. 3, No. 3, pp. 537-556.
  46. Wind, Y. and Mahajan, V.(1988), "New Product Development Process: A Perspective for Reexamination," *Journal of Product Innovation Management*, Vol. 5, pp. 304-310.
  47. Youssef, M. A.(1991), *Advanced Manufacturing Technologies, Manufacturing Strategy and Economic Performance: An Empirical Investigation*, PhD. Dissertation, City University of New York.
-