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A Study of the Determinants and Outcomes of International New Product Rollout Timeliness

국제신제품시판 시의성의 결정요인과 결과에 관한 연구

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Contents

Abstract

This study concerns the identification of INPR process (i.e., antecedents, timeliness in new product development (NPD) and international new product rollout (INPR) and consequences) for international new product performance. It was empirically tested by a Korean sample to verify the validity of the research framework. The results show that cross-functional integration exhibited a statistically significant and positive effect on NPD timeliness. For the rapid development of new products, evidence is mounting in favor of cross-functional integration that facilitates both the quick dissemination and utilization of information. A higher level of marketing synergy was positively associated with a higher level of NPD timeliness. These findings suggest that marketing synergy plays a key role in enhancing NPD timeliness in South Korean manufacturing companies. The results also indicate that HQ-subsidiary cooperation was positively related to INPR timeliness. More comprehensive and varied information flows between HQ and subsidiary are likely to achieve product competitive advantage and then the latter may lead to international new product launch timeliness. However, technology synergy has no significant influence on NPD timeliness, implying that Korean manufacturers' managers do not recognize technology to be a major driving force, unlike Western manufacturers' managers. The findings also indicate that the positive effects of timeliness in INPR on international new product performance. It is important note that successful achievements of international new product success are likely to rely on INPR timeliness. Importantly, the results found that products developed within planned time frames are more likely to be rolled out into multi-markets on-time, resulting in higher levels of performance than when NPD completion is delayed.

Key Words : Cross-functional Integration, HQ-subsidiary Cooperation, International New Product Success, Synergy, Time Efficiency

Ⅰ. Introduction

Early rollout of new products in target markets has become an essential factor for survival. There has been increasing emphasis on the need to study international new product launches in view of the difficulty in achieving successful new product development and commercialization. A company strives to improve performance (e.g., market share and financial performance) and firm value through new product introductions. Managers and scholars think that new product success is one issue and a second, and equally vital, concern to today's management is speeding products to market (Cooper, 1994). The rapid introduction of reliable new products is a prerequisite for the success of every company. In order to improve customer value, a faster response time is a significant way to gain competitive advantage (Oakley, 1996; 1997). Product introductions have positive and increasing effects on firm value (Pauwels *et al.*, 2004). The effect of delays in new product introductions on the market value of the firm is to decrease it, on average, by 5.25% (Hendricks and Singhal, 1997).

Timeliness is defined as "the time required to complete the project relative to its anticipated time frame" (Cooper and Kleinschmidt, 1994; Olson *et al.*, 1995). Cooper and Kleinschmidt (1994) measured timeliness by using two measures (i.e., staying on schedule and time efficiency). Staying on schedule refers to the degree to which the project adheres to the time schedule and time efficiency is the degree to which the project is done in a time efficient manner relative to the competition/industry norm. Also, timeliness (conversely delay) has been considered in connection with rollout time of new products by Chryssochoidis and Wong (1998). However, unlike timeliness proposed by other researchers measuring it in a domestic market, timeliness in international new product launches has to take into consideration multiple target-country markets. Based on a consideration of the latter, timeliness in international new product rollout (INPR) is defined as the actual availability of the new product within- or faster than-the planned (scheduled/anticipated) time frame for product availability across the firm's multiple target-country markets (Chryssochoidis and Wong, 1998).

Building upon the above argument, the question is presented as: ***Why should a company enforce specific internal factors for time efficiency in new product development (NPD) and international new product rollout (INPR)? Does time efficiency in INPR influence international new product success?*** This research is an attempt to uncover the relationships between antecedents, timeliness in NPD and INPR, and consequences in order to explain the INPR process as whole. Accordingly, this research

aims to: ***Demonstrate and test the direct relationships between marketing, technology and organizational context factors, time dimension (i.e., NPD timeliness and INPR timeliness) and international new product performance in Korean companies.***

The attainment of the objective is important for a number of reasons. The first importance of this study concerns the identification of INPR process (i.e., antecedents, timeliness in NPD and INPR and consequences) for international new product performance. This study represents the conceptualizing of the INPR process as an element in the achievement of new product success in target-country markets. This conceptualization of the INPR process has implications for theory and management in exporting organizations. Importantly, it was empirically tested by a Korean sample (i.e., 232) to verify the validity of the research framework. In addition, for managers, there are also clear practical benefits to be gained. Perhaps the most significant concern the potential implications for guidance and recommendations relating to resource allocation decisions. Consequently, management can effectively plan and allocate resources to achieve the objectives of new product performance as well as timeliness in NPD and INPR.

The second importance of this study is to identify the key factors that drive timeliness in NPD and INPR. The study offers key facilitators (i.e., marketing, technology and organizational context factors) of timeliness in NPD and INPR. Furthermore, the investigation of the key role of time dimensions (i.e., timeliness in NPD and INPR) between antecedents and consequences in the INPR process is the focus of this research. The results of this study may help to provide substantive conclusions concerning the antecedents of NPD and INPR timeliness such as marketing, technology and organizational context factors.

Ⅱ. Literature Review

1. Marketing, Technology, Organization, and New Product Performance

The literature has highlighted the saliency of alignment of marketing and technical resources with project needs (i.e., marketing and technical synergies) and prevalence of supportive organizational attributes (i.e., cross-functional integration and HQ-subsidiary cooperation) as key determinants of international new product outcome.

Successful new products emerge from a combination of the firm's existing capabilities, skills, and resources. Synergy consists of marketing and technology synergy. Marketing synergy refers to the project's fit with a firm's existing marketing skills and resources, namely the available market research, sales force, distribution, and advertising and promotion skills and resources (Song and Montoya-Weiss, 2001; Song and Parry, 1997a). Technical synergy refers to a project's fit with a firm's existing technical skills and resources, namely the available R&D, engineering and production skills and resources (Song and Montoya-Weiss, 2001; Song and Parry, 1997a).

Cross-functional integration is the extent of interaction and communication, information sharing, coordination, and involvement across functions in executing specific NPD tasks (Song and Montoya-Weiss, 2001). Integration of marketing, manufacturing, and R&D activities can be easier said than done: to be effective, processes for cross-functional coordination and communications must be in place to enable different functional areas to cooperate, leading to new product success (e.g., Donnellon, 1993; Kahn, 1996; Kahn and McDonough, 1997; Leenders and Wierenga, 2002; Song *et al.*, 1997a; b; Song and Parry, 1997a; b).

HQ-subsidiary behavioural relationships have explained that HQ-subsidiary cooperation is associated with subsidiary product performance (e.g., market share, sales and ROI) (Hewett and Bearden, 2001). This is because the HQ and subsidiaries achieve mutual goals with respect to the marketing procedures, directives, and programmes for a particular product through their effective relationships. Developing products for international markets with customers across borders is a complex process, containing multiple interactions (Rogers *et al.*, 2005). Gathering market intelligence on local markets (e.g., customers and competition status) will be achieved through cooperation between HQ and subsidiaries' units or agents. Cavusgil *et al.* (1993) suggest that market-driven learning is beneficial for companies in developing new products for export since it allows them to gain insights into local market characteristics conducive to new product acceptance.

2 Time Efficiency and New Product Performance

With respect to the relationship between time efficiency (e.g., time-to-market and cycle time) and new product performance, many studies have been carried out in NPD literature (e.g., Datar *et al.*, 1997b; Hultink and Robben, 1995). Hultink and Robben (1995) divided new product performance dimension

into product-level measures (e.g., launched on time and speed-to-market), financial performance (e.g., profitability and ROI), and customer acceptance measures (e.g., market share and unit sales). Lead time at each stage of the new product development process (i.e., concept generation, prototype completion, and volume production) positively affects market share (Datar *et al.*, 1997b). Other studies on the relationship between time efficiency and other performance dimensions in terms of financial performance and customer acceptance have been carried out (e.g., Cooper and Kleinschmidt, 1994; Chryssochoidis and Wong, 1998).

Ⅲ. Conceptual model and Hypotheses

Figure 1 presents the proposed conceptual framework followed by the discussion of the rationale for the proposed model to develop specific hypotheses.

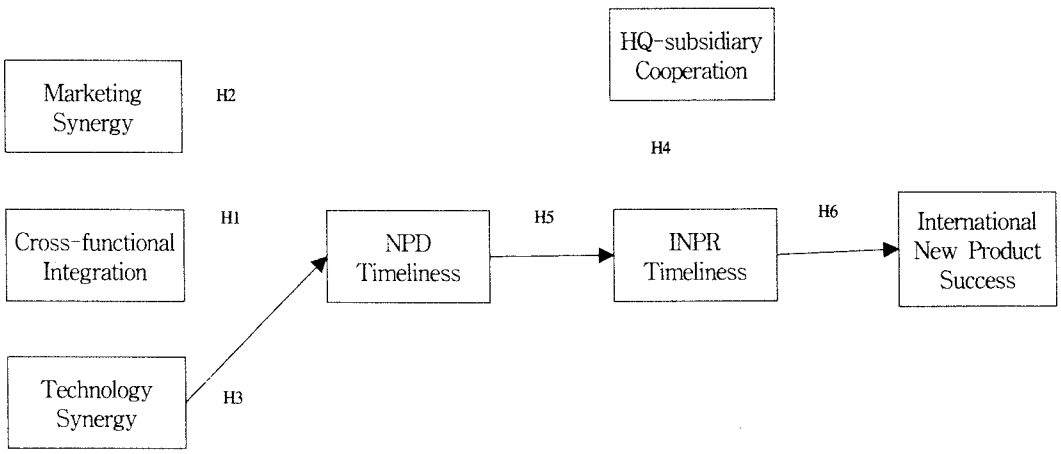

Figure 1 Conceptual Framework

1. The Influence of Cross-functional Integration on NPD Timeliness

There is a clear consensus in the literature that a high level of cross-functional integration improves new product performance in terms of firm-level measures (e.g., sales) (e.g., Song and Parry, 1997b),

process measures (e.g., technical success) (e.g., Song and Parry, 1996; Song and Montoya-Weiss, 2001), customer measures (e.g., market share) (e.g., Song and Parry, 1996), and financial measures (e.g., ROI) (e.g., Song and Montoya-Weiss, 2001). Organizations divide their employees into specialized functions so that people with appropriate knowledge and experience can perform the firm's various activities (Xie *et al.*, 1998). The existence of specialized functions in a company leads to interfunctional conflict when dealing with complex tasks (e.g., NPD) that require information sharing and cooperation among functions (Ruekert and Walker, 1987). That is, an insufficiency of cooperation and interaction among functions in the NPD process prevents the members across functions from sharing information and knowledge of technology and market situations. Furthermore, a high level of interfunctional conflict requires excess organizational costs in terms of time (Xie *et al.*, 1998). However, a high level of cross-functional integration brings the mutual involvement of all technical, marketing and manufacturing functions, accurate, on time and high quality input by technical and marketing personnel as well as customers' involvement (Chryssochoidis and Wong, 1998). For new product development, a high level of cross-functional integration enables a company to rapidly reach optimal solutions and decisions without requiring excess time. As a result, the likelihood of timeliness in NPD should increase with an increase in the level of cross-functional integration. Therefore,

H1: The level of cross-functional Integration is associated positively with the level of timeliness in NPD

2. The Influence of Marketing and Technology Synergy on NPD Timeliness

Superior resources and skills reflect the pattern of a firm's past investment to enhance its competitive position, and they represent a firm's ability to produce more efficiently or better satisfy customers (Song *et al.*, 1997b). NPD performance (e.g., speed of brand quality improvement) is a consequence of an organization's marketing and technology capabilities in the capabilities-based NPD studies (Moorman and Slotegraaf, 1999). Skill and resource synergy enables a company to competently execute various marketing and technical activities to improve time efficiency in the NPD process. This is because proficiency in executing the development process is driven by the fit between a new product concept and a firm's available resources and skills (Song and Montoya-Weiss, 2001). However, a firm's

insufficiency of resources and skills in the NPD process is one of the causes of new product failure and it is also a major time waster (Cooper and Kleinschmidt, 1994; Cooper and Edgett, 2003). Accordingly, a lack of synergy between project needs and available resources and skills in a firm may be negatively related to the level of time efficiency. A gap between the amount of information required to perform particular NPD activities and the amount of information already possessed by the firm originates from a lack of marketing and technology synergy (Song and Montoya-Weiss, 2001). Therefore, this study will have similar results, namely that marketing and technology synergy will achieve timeliness in NPD and will be positively related to timeliness in NPD. Consequently,

H2: The level of marketing synergy is associated positively with the level of timeliness in NPD

H3: The level of technology synergy is associated positively with the level of timeliness in NPD

3. The Influence of the HQ-subsidiary/agent Cooperation on INPR Timeliness

Most products are now developed for international markets, meaning that they can be sold simultaneously in multiple markets (Rogers *et al.,* 2005). To compete effectively in international markets, companies must quickly identify changing customer needs, develop more complex products to satisfy those needs worldwide, and provide better customer service. HQ-subsidiary cooperation enables firms to respond quickly to rapidly changing markets and technologies. Proficiency in marketing and technical activities is driven by the effective organization of work (e.g., HQ-subsidiary/agent cooperation) (Brown and Eisenhardt, 1995). Successful cooperation between HQ and subsidiaries can adapt a new product and marketing strategies to meet consumers' needs and preferences based on the amount and variety of information available to them. Therefore, increasing information about target-country markets leads to increased efficiency by reducing uncertainty. The effective HQ-subsidiary cooperation drives proficiency in NPD activities and then achieves product competitive advantage. Product competitive advantage allows companies to successfully deliver a new product to the marketplace on time. On the basis of the above considerations, HQ-subsidiary/agent cooperation will influence INPR timeliness.

H4: The level of HQ-subsidiary/agent cooperation is associated positively with the level of INPR timeliness

4. The Influence of NPD Timeliness on INPR Timeliness

Delays in planned launches into overseas markets (i.e., a time lapse between domestic and overseas launches) may reduce new product success. Oakley (1996; 1997) found that both time to overseas launch and the proportion of total sales in overseas markets are significantly associated with new product commercial success one year after launch. That is, more successful launches in the domestic market are strongly associated with a much faster introduction to overseas markets. The timely development of a new product is a prerequisite factor for its successful introduction into the domestic market because a short new product development (NPD) cycle can afford companies significant efficiency (e.g., cost reduction) and greater market segment coverage (Menon *et al.,* 2002). Speed enables firms to respond quickly to rapidly changing markets and technologies (Cooper and Kleinschmidt, 1994). Moreover it enhances product superiority (Ali *et al.,* 1995; Cooper and Kleinschmidt, 1994). Product competitive advantage encourages a firm to quickly launch its new product into target markets. This implies that a delay in completing the NPD project raises doubts about product competitive advantage and then causes delay in INPR. Consequently,

H5: The level of NPD timeliness is associated positively with the level of INPR timeliness

5. The Influence of INPR Timeliness on International New Product Performance

Time efficiency in the NPD process increases new product performance (Brown and Karagazoglu, 1993) because it enhances profitability as well as competitive advantage (Cooper and Kleinschmidt, 1994). Therefore, the timely development of new products leads to competitive advantages (e.g., product superiority) and then positively influences product performance. Timely roll-out of new products across target-country markets in terms of a planned time enables companies to acquire comparative advantages in line with market's situation-specific factors. This implies that planned market entry timing has a tendency to reflect a company's view of its advantages, given that timing, in terms of the market's requirements for success. This is because market pioneers, early followers, and late entrants tend to have different skill and resource profiles (Robinson *et al.,* 1992). According to a study by Abell (1978), the 'strategic window' for market entry tends to open at different times for different entrant types. A delay in INPR is likely to mitigate company's advantages in matching the target market's success

requirements. Therefore, a company, achieving timely roll-out of new products across target-country markets, is able to execute and match its specific competencies (e.g., marketing or manufacturing advantages) to its target market's key success requirements. In light of the above discussion, the likelihood of new product success should increase with an increase in the level of timeliness in INPR. Consequently,

H6: The level of INPR timeliness is associated positively with international new product performance.

Ⅳ. Methodology

1. Sample and data collection

Respondents were drawn from Korean manufacturing companies. To collect data, the drop-and-collect survey (DCS) method, which involves the researcher in personally delivering and later collecting the survey instrument (the questionnaire) either directly to the target respondent or indirectly via a gatekeeper (e.g., a secretary) (e.g., Ibeh *et al.*, 2004), was used. The selection of sample is based on the following considerations. First, the sampling frame consisted of the top 1,000 companies from the databases of the Korea Chamber of Commerce and Industry (KCCI). Second, the author focused on manufacturing (non-service) industries, which reduced the pool of companies to 447. Of 336 firms that had initially agreed to participate, data on 244 firms were collected. 12 cases with incomplete answers were eliminated, yielding a final total of 232 completed, usable questionnaires (a 52% response rate), which contributed to the ensuing data analysis.

The selected companies belong to a range of industry sectors such as metals and fabricated metal products (14.7%), computers, electrical and electronics (21.5%), motor vehicles and other transport equipment (13.8%), chemicals and chemical products (19.4%), machinery and mechanical equipment (9.9%), refined petroleum, rubber, and plastic products (7.8%) and food, beverages, textiles, and paper products (12.9%). Following Armstrong and Overton (1977), a non-response bias check was conducted by comparing early with late respondents. An independent samples t-test indicated that there were no significant differences at the 5% significance level, supporting the assumption that respondents were

not different from non-respondents.

2. Pre-test and measures

A draft questionnaire, prepared using well-established scales drawn from the relevant literature, was subjected to a pre-test. For enhancement of the construct validity of the survey measures, eight industry experts were asked to indicate any ambiguity regarding the phrasing of the items. In addition, two academicians reviewed the questionnaire, and minor revisions were made. The researcher then contacted a random selection of 33 NPD managers from a list of 100 Korean-based firms operating in a variety of manufacturing industries in order to test the reliability and validity of the measures with a small sample. Accordingly, a pilot test with 33 NPD managers, who were asked to fill out the questionnaire and to provide feedback on the instrument's wording and the appropriateness of the administration method, was conducted using the revised instrument. The results of the pilot study indicated that measures loaded strongly on their corresponding constructs and showed an acceptable level of reliability.

Marketing synergy was measured with an eight-item scale taken from Song and Montoya-Weiss (2001). *Technology synergy was* a six-item scale adopted from Song and Montoya-Weiss (2001). *Cross-functional integration* was a four-item scale adopted form Song and Parry (1997a, b) and Song and Montoya-Weiss (2001). *HQ-subsidiary cooperation was* a five-item scale taken from Hewett and Bearden (2001). *New product development timeliness* was measured with a two-item, taken from Cooper and Kleinschmidt (1994). *International new product rollout timeliness* was measured with a two-item, based on Chryssochoidis and Wong (1998) and Cooper and Kleinschmidt (1994). Both timeliness scales tapped notions of time efficiency (the degree to which the project [new product availability in target-country markets] was done in a time efficient manner) and staying on schedule (the degree to which the project [new product rollout] adhered to planned schedule). *International new product success* was a ten-item (i.e. profit, sale and market share), taken from Song and Parry (1997a). *International new product success* was measured along a seven-point Likert scale, from 1 = very unsuccessful, to 7 = very successful. All other constructs were measured along a seven-point Likert scale, ranging from 1 = strongly disagree, to 7 = strongly agree. Table I presents a description of response formats and specific items for the multi-item scales.

V. Data analysis and results

Analyses using structural equations provide a more holistic approach than separate reliability and regression analyses (Bagozzi and Phillips, 1982). Structural equation modeling (SEM) is a powerful statistical technique that combines the measurement model (confirmatory factor analysis) and the structural model (path analysis) into a simultaneous statistical test (Hoyle and Smith, 1994).

Table I Measurements

Construct	Items
Cross-functional integration	The degree of integration between R&D and manufacturing was high. This product was developed from frequent interactions between customers and our cross-functional product development team - it was a truly a cross-functional team effort. The degree of integration between marketing and R&D was high. The degree of integration between manufacturing and marketing was high.
Marketing synergy	Our company's marketing research skills were more than adequate for this project. Our company's salesforce skills were more than adequate for this project. Our company's distribution skills were more than adequate for this project. Our company's advertising/promotion skills were more than adequate for this project. Our company's marketing research resources were more than adequate for this project. Our company's salesforce resources were more than adequate for this project. Our company's distribution resources were more than adequate for this project. Our company's advertising/promotion resources were more than adequate for this project.
Technology synergy	Our company's R&D skills were more than adequate for this selected project. Our company's engineering skills were more than adequate for this selected project. Our company's manufacturing skills were more than adequate for this selected project. Our company's R&D resources were more than adequate for this selected project. Our company's engineering resources were more than adequate for this selected project. Our company's manufacturing resources were more than adequate for this selected project.
HQ-subsidiary Cooperation	People from the marketing operations at both headquarters and our overseas subsidiaries/agents regularly interacted. There was open communication between the marketing operations at headquarters and our overseas subsidiaries/agents. The marketing operations at headquarters and our overseas subsidiaries/agents had similar goals. Overall, our overseas subsidiaries/agents' marketing departments were satisfied with its interaction with the marketing operation at headquarters. There was a give-and-take relationship between the marketing operations at headquarters and our overseas subsidiaries/agents.

Construct	Items
NPD timeliness	The degree to which the project was done in a time-efficient manner. The degree to which the project adhered to the time schedule.
INPR timeliness	The degree to which the actual availability of the new product for sale in the firm's target country-markets was achieved in a time-efficient manner. The adherence of the new products to the rollout schedule.
International new product success	In the global marketplace, how successful was this selected project from an overall profitability standpoint? Relative to your firm's other new products, how successful was this selected project in terms of profits? Relative to competitors' products, how successful was this selected project in terms of profits in the global marketplace? Relative to your firm's objectives for this selected project, how successful was this selected project in terms of profits? Relative to your firm's other new products, how successful was this selected project in terms of sales? Relative to competitors' products, how successful was this selected project in terms of sales? Relative to your firm's objectives for this selected project, how successful was it in terms of sales? Relative to your firm's other new products, how successful was this selected project in terms of market share? Relative to competitors' products, how successful was this selected project in terms of market share? Relative to your firm's objectives for this selected project, how successful was it in terms of market share?

1. Confirmatory factor analysis

For the measurement model, a confirmatory factor analysis (CFA) was run based on the covariance matrix of the 37 observed variables (items). Initially, a CFA using the LISREL program was conducted for seven constructs (latent factors $\xi_1, \ldots, \xi_7$). CFA was performed on the entire set of items simultaneously (Anderson *et al.*, 1987). The overall model fit indices demonstrate a lack of fit. The chi-square value is 1521.62 (degree of freedom = 608, p = 0.000), non-normed fit index (NNFI) value is 0.864, the comparative fit index (CFI) value is 0.876, and the root mean square error of approximation (RMSEA) value is 0.081.

Table II CFA Results for Measurement Model: Standardized Coefficient Loadings and t-values

Items			Standardized Factor Loadings (t-values)				
	Cross-functional Integration (CFI)	Marketing Synergy (MSYN)	Technology Synergy (TSYN)	HQ-subsidiary Cooperation (HQsub)	New Product Development Timeliness (NPDT)	International New Product Rollout Timeliness (INPRT)	International New Product Success (INPS)
CFI 1@	0.75(Fixed)						
CFI 3	0.91(13.60)						
CFI 4	0.84(16.33)						
MSYN 4@		0.74(Fixed)					
MSYN 6		0.80(11.41)					
MSYN 7		0.81(12.41)					
TSYN 1@			0.84(Fixed)				
TSYN 3			0.84(15.04)				
TSYN 4			0.84(14.97)				
HQsub 1@				0.91(Fixed)			
HQsub 2				0.90(18.77)			
HQsub 3				0.73(13.61)			
NPDT 1@					0.98(Fixed)		
NPDT 2					0.59(6.74)		
INPRT 1@						0.99(Fixed)	
INPRT 2						0.56(6.43)	
INPS 1@							0.70(Fixed)
INPS 6							0.80(11.36)
INPS 7							0.83(11.84)
INPS 9							0.87(12.34)
INPS 10							0.87(12.30)

@ : reference variable (indicator); the way to assign a unit of measurement for a latent variable is to fix a non-zero coefficient (usually one) in the relationship for one of its observed indicators.

There are several large residuals (i.e., $\geq$ |2.58|). Accordingly, further iterations were carried out, successively dropping the item with the largest standard residuals and conducting a CFA until the statistics of overall model fit are satisfactory (Byrne, 1998). The process of model re-specification

resulted in the deletion of 16 items. The final model gives a chi-square value of 325.17 (degree of freedom = 168, p=0.000). Following an alternative to χ^2(i.e., χ^2/df ratio) proposed by Byrne (1998), the final model is adequate, the ratio of χ^2 to the degree of freedom (i.e., a χ^2/df ratio = 1.94) being below the acceptable maximum value of 2. Moreover, the final model shows good alternative indices: RMSEA is 0.064, NNFI value is 0.933, and CFI is 0.947. Based on these overall model fit indices, the final model is adequate. Table II presents CFA results for measurement model.

Table III Correlations and Summary Statistics of the Study Constructs (N=232)

Construct	1	2	3	4	5	6	7
1. Cross-functional Integration	1.00						
2. Marketing Synergy	.48**	1.00					
3. Technology Synergy	.59**	.63**	1.00				
4. HQ-subsidiary Cooperation	.53**	.57**	.54**	1.00			
5. NPD Timeliness	.31**	.43**	.38**	.34**	1.00		
6. INPR Timeliness	.31**	.42**	.37**	.39**	.47**	1.00	
7. International New Product Success	.34**	.48**	.46**	.47**	.29**	.38**	1.00
Composite Reliability (CR)	.87	.83	.88	.89	.78	.77	.86
Average Variance Extracted (AVE)	.70	.61	.71	.72	.65	.65	.67
Number of items	3	3	3	3	2	2	5

Table III presents correlations, reliability (composite reliability), and validity (average variance extracted) of the constructs used in the study. The measures demonstrate adequate reliability and validity. The scale composite reliability for each construct was quite satisfactory (i.e., CRη values ranged from 0.77 to 0.89, exceeding the acceptable level of 0.70) (Fornell and Larcker, 1981). The AVE (average variance extracted) for each construct ranged from 0.61 to 0.72, exceeding the acceptable level of 0.50 (Fornell and Larcker, 1981). The results also showed that the shared variance between two constructs (i.e., squared correlation) is lower than each construct's AVE (Fornell and Larcker, 1981). Consequently, they are suggestive of discriminant validity. We also examined whether a single factor model (χ^2(189) = 1801.45) fits the data better than CFA model (χ^2(168) = 325.17) (Brockman and Morgan, 2006). The difference in the chi-square statistic between the single factor model and the measurement model was significant (the change in χ^2 = 1476.28, the change in df = 21, $p < 0.01$). This result demonstrates

that the probability of common method variance occurring is minimized and common method bias was not a serious problem in this study.

2. Hypotheses testing

Following the validation of the measurement model, the structural relationships between latent variables (Garver and Mentzer, 1999) were estimated using SEM (Hoyle and Smith, 1994). The SEM results are shown in Figure 2.

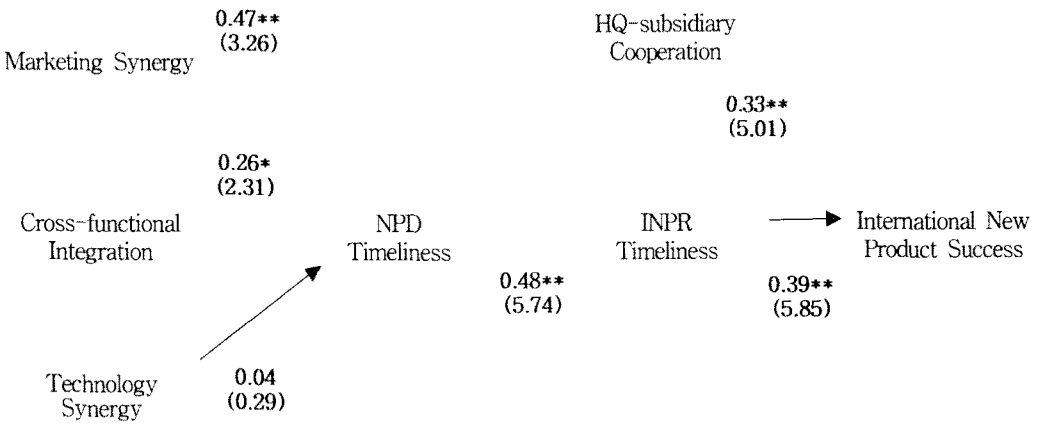

Figure 2 Path Diagram Results for the Structural Model

The results show that cross-functional integration exhibited a statistically significant and positive effect on NPD timeliness (t = 2.31, P < 0.05),supporting **Hypothesis 1**. A higher level of marketing synergy was positively associated with a higher level of NPD timeliness (t = 3.26, P < 0.01). Thus, **H2** was supported. The results also indicate that HQ-subsidiary cooperation was positively related to INPR timeliness (t = 5.01, P < 0.01), supporting **Hypothesis 4**. However, technology synergy has no significant influence on NPD timeliness (t = 0.29, P > 0.05), fails to provide support for **Hypothesis 3**. NPD timeliness exhibited a statistically significant and positive effect on INPR timeliness (t = 5.74, P < 0.01). Therefore, **Hypothesis 5** was supported. The results also indicate that INPR timeliness was positively related to international new product success (t = 5.85, P < 0.01), supporting **Hypothesis 6**.

The fit indices of the model were χ^2 = 374.19 (d.f. = 177), NNFI = 0.920, CFI = 0.932, and RMSEA = 0.069.

Ⅵ. Discussion and Conclusions

This study found that cross-functional integration exhibited a statistically positive effect on NPD timeliness. This is reflected in the fact that organizations need to build cross-functional integration among their marketing, R&D and manufacturing groups in order to support NPD timeliness (Dyer *et al.*, 1999). For the rapid development of new products, evidence is mounting in favor of cross-functional integration that facilitates both the quick dissemination and utilization of information. This leads to a case of less information dissemination and utilization among functions and, consequently, to a more cumbersome product development process. Cross-functional integration helps project workers to accelerate a development schedule even though the growing uncertainty of the tasks on NPD projects when organizations develop more complicated products requires increasing lead-time in development length. Rich communication among functions to accelerate NPD activities is thought to convey greater importance and challenge to organization members. Thus, the results indicate that mere possession of accurate knowledge about technology, customers and competition does not lead to enhanced time efficiency in new product development. Instead, exchange and sharing of knowledge across functions in line with cooperation, interaction and integration become key roles in timely developing new products.

Specifically, NPD timeliness is found to be determined, to a large extent, by marketing synergy. These findings suggest that marketing synergy plays a key role in enhancing NPD timeliness in South Korean manufacturing companies. Successful new products emerge from a combination of the firm's existing skills, and resources (Day and Wensley, 1988). Both marketing resources and marketing skills are positively associated with new product performance (Cooper, 1979) because identification of the key success factor for business performance must lead to investment in the assets (i.e., resources) and skills which are necessary and sufficient for achieving a successful position.

However, the lack of a strong association between technology synergy and NPD timeliness in the data is interesting, but not surprising. This implies that Korean manufacturers' managers do not recognize technology to be a major driving force, unlike Western manufacturers' managers. This nonsignificant

relationship between technology synergy and NPD timeliness demonstrates that technology synergy does seem to be related weakly to new product success as well as product advantage in Korean manufacturing companies. Korean manufacturers' new products do not seem to rely heavily on R&D, production and manufacturing competence. This result may be attributed to the shortage of technologically skilled manpower in Korean manufacturing companies. It is also assumed that this is due to the acknowledgement that in general terms technology is, or can be, available to each company operating in a particular industry (Sohal, 1998). Korean manufacturers respectively concentrate companies' resources on buying or developing to make their products better than the competitor's rather than allocating their resources - people, equipment, money - in ways that produce the greatest competitive impact. This is possibly because Korean industries have actually pursued the acquisition of core technology from advanced countries and most of them are still dependent on them, especially the automotive and the machine tool industries (Shin and Ho, 1997; Sohal and Ferme, 1996). Furthermore, Korean firms realize the importance of product differentiation and quality improvement rather than R&D capacity for new product success (Shin and Ho, 1997). Thus, Korean manufacturers' managers may think that their companies' new products do not have product competitive advantages in terms of technology skills and resources, compared to competitors' new products in advanced countries.

This finding provides support to the argument that HQ-subsidiary/agent cooperation is an antecedent to INPR timeliness. Although this study did not test either the link between HQ-subsidiary/agent cooperation and product competitive advantage or that between the latter and INPR timeliness, more comprehensive and varied information flows between HQ and subsidiary are likely to achieve product competitive advantage and then the latter may lead to international new product launch timeliness. This is because new product advantage (or superiority) increases the adoption rate in the commercialization stage (Rogers 1995). The quality of communication between HQ and subsidiary was emphasized as being particularly important in the innovation process (Ghoshal and Bartlett, 1988). Market knowledge competence and a customer knowledge process enhance new product advantage because they enable a firm to explore innovation opportunities created by emerging market demand and reduce potential risks of misfitting buyer needs (Li and Calantone 1998). The finding in this study indicates that organizations with rich cooperation and communication between HQ and subsidiary/agent can clearly make and implement decisions regarding rollout of their new products across target-country markets on the basis of local market information. Thus, the findings from this study validate that organizations

acquire market, customer and competitor knowledge in line with the effective and intensive HQ-subsidiary cooperation and then they tend to accelerate new product launch into target markets.

The finding in the present research confirms that more successful new product development in terms of planned time schedule is strongly associated with a much faster introduction to overseas markets. The timing decision of new product launch is also related to the degree of product advantage. High advantage new products tend to be among the first to market and those with low advantage tend to be followers (Hultink and Hart, 1998; Yoon and Lilien, 1985). More successful launches are strongly associated with a much faster introduction to overseas markets because product competitive advantage encourages a firm to quickly launch its new product into target markets (Oakley, 1996; 1997). Therefore, when a firm develops its new product on time in terms of the planned time schedule, it may acquire product competitive advantage and then the latter seems to influence INPR timeliness.

In addressing the outcomes of timeliness in INPR, the results support that there is positive effect of timeliness in INPR on international new product performance. Thus, new product performance in a local country market is found to be determined by INPR timeliness. It is important note that successful achievements of international new product success are likely to rely on INPR timeliness. Companies that achieve product competitive advantage through NPD timeliness can quickly launch their new products into target markets. NPD timeliness, product competitive advantage and INPR timeliness result in international new product performance

This research implies the importance of path analysis in providing new insights into the INPR process. Unlike some models (e.g., NPD process), previous research on NPD timeliness and INPR timeliness appeared to lack an understanding of the relationships between timely development of a new project, timely roll-out of a new product across target-country markets and performance. Despite the growing role of globalization and the increasing internationalization of corporations, most studies on new product development have focused on domestic markets. Studies regarding the subject of timeliness in NPD and INPR have been rare in the literature. Specifically, there is a lack of research yielding empirical support to the validity, in an international setting, to research results obtained in domestic markets. Based on the above, this research suggests that future studies should take into consideration the importance of the effects of time dimensions (e.g., timeliness) on performance in international markets. In addition, the findings in the present research provide management personnel responsible for new product exports with a better understanding of the role of timeliness in NPD and INPR. This underlines the necessity

of completing the rollout of new products in international markets within the planned time frame. Thus, it is crucial for manufacturers to seek to foster NPD and roll-out competencies in order to secure NPD and INPR timeliness.

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