

## Managing salespeople strategically when promoting new products—Incorporating market orientation into a sales management control framework

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Managing Salespeople Strategically When Promoting New Products –Incorporating  
Market Orientation into a Sales Management Control Framework

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### Research highlights

1. Sales management controls positively affect salespeople's innovativeness.
2. Salespeople's innovativeness positively affects new product sales performance.
3. Market orientation moderates the relationship between salespeople's innovativeness and new product sales performance.

## **Abstract**

Salespeople play a pivotal role in promoting new products. Therefore, managers need to know what control mechanism (i.e., output-based control, behavior-based control, or knowledge-based control) can improve their salespeople's new product sales performance. Furthermore, managers may be able to assist salespeople in performing better by having a strong market orientation. The literature has been inconsistent regarding the effects of sales management control mechanisms and has not yet incorporated market orientation into a sales management control framework. The current study surveyed 315 Taiwanese salespeople from publicly traded electronics companies with the aim of contributing to the sales management literature. The results show that sales management controls can directly affect salespeople's innovativeness, which, in turn, affects new product sales performance. However, sales management controls cannot affect performance directly. Furthermore, market orientation can positively moderate the relationship between salespeople's innovativeness and new product sales performance.

**KEYWORDS:** New product sales performance, knowledge-based control, market orientation, salesperson's innovativeness

## **1. Introduction**

The purpose of this paper is to examine the influence of perceived sales management controls on salespeople's new products sales performance (i.e., electronic goods) in a business-to-business (B2B) context. The moderating influences of market orientation on the relationship between salespeople's innovativeness and new product sales performance will also be investigated. New product development and promotion is an expensive and time-consuming process that suffers from a high failure rate (Jonash & Sommerlatte, 1999; Krishnan & Zhu, 2006). Although there are additional risks associated with new product promotion (e.g., financial and brand image), the introduction of innovative new products is a critical success factor (e.g., the ability to generate sales and gain market share) for many corporations (Jonash & Sommerlatte, 1999; Krishnan & Zhu, 2006). According to Kim and Atuahene-Gima (2010), successful new products can improve corporate image, attract new customers while retaining existing clients, recruit new talent, and generate significant revenues and profits. Given the importance of new products for firm performance and given that only a small percentage of new product initiatives survive in the marketplace, additional research is needed on the factors that lead to the successful commercialization of new products (Fu, Richards, Hughes, & Jones, 2010).

Salespeople play an important role in selling new products. First, as Fu et al. (2010) and O'Hara (1993) noted, sales representatives are crucial for selling new products that were previously unfamiliar to consumers because these individuals interact with potential customers, identify their needs, determine how their needs can be fulfilled by available products, and explain product features to consumers when necessary. Second, several studies indicate that companies generally spend more resources on their salespeople than

they spend on advertising. Thus, it is essential for companies to ensure that their salespeople are effective and efficient (Ahearne, Rapp, Hughes, & Jindal, 2010; Zoltners & Sinha, 2005). In the case of high-tech products, which are often characterized by rapid product innovation, intense competition among competitors, and features that are challenging for some consumers to implement (Tellis, Yin, & Niraj, 2009; Thompson, 2009), the performance of salespeople in promoting new products is particularly important. In a recent industry report published by McKinsey & Company, Batra and Kaza (2012) argued that electronic companies that manufacture and sell computer components (e.g., semiconductors) can grow their businesses significantly if their salespeople can function more effectively.

Because new products are sometimes unfamiliar to salespeople and potential clients, supervisors may need to employ control mechanisms to improve sales performance (e.g., Ditillo, 2012; Evans, Landry, Li & Zou, 2007; Matsuo, 2009). These mechanisms may include implementing arrangements to measure the new product sales results of each salesperson, monitoring the input-output transformation process, or achieving the ability to transfer knowledge within the sales team. In addition to the effects of various management control mechanisms, the influence of an organization's degree of market orientation as perceived by its salespeople should be considered. Within the sales management literature, Hsieh, Tsai, and Wang (2008) and Matear, Osborne, Garrett, and Gray (2002) have noted that an organization's degree of market orientation can have profound effects on salespeople's performance.

The importance of salespeople in selling new products must be further explored (Fu et al., 2010; Spanjol, Tam, Qualls, & Bohlmann, 2011). In particular, the current literature

has not yet fully considered the combined influence of perceived sales management control and an organization's perceived degree of market orientation on salespeople's innovativeness and new product sales performance. Other than Matuso (2009), few scholars have examined the influence of knowledge-based control on innovativeness and sales performance. In knowledge-intensive industries, such as technology, finance, and marketing, the presence of employees who can transfer knowledge is an important source of advantage (Ditillo, 2012; Matsuo, 2009; Piercy, 2010). Second, the mediating effect of salespeople's innovativeness requires further research because this subject has received little attention in the new product sales management literature. Third, the understanding of the influence of market orientation on salespeople would benefit from additional investigation. Fourth, existing studies have mainly focused on managers' perceptions of their initiative's outcomes (e.g., Matsuo, 2009; Hsieh et al., 2008), but salespeople's perspectives remain to be further explored (Baldauf, Cravens, & Piercy, 2005). To contribute to the existing literature, this study investigates the new product performance of salespeople by incorporating market orientation and three sales management controls (i.e., output-based control, behavior-based control, and knowledge-based control) into its proposed framework.

This study has the following objectives. First, drawing on the literature on sales control mechanisms and market orientation studies, this study plans to examine a model explaining the factors that contribute to salespeople's innovativeness and new product sales performance. In particular, the influences of perceived knowledge-based control will be investigated. Second, this study attempts to reveal more information about the ability of salespeople's innovativeness to mediate the relationship between perceived



sales management controls and new product sales performance. Third, the ability of market orientation to moderate the relationship between innovativeness and performance will be further investigated. Fourth, the current research aims to explore salespeople's perceptions of the influence of management control and market orientation. Finally, considering information obtained from practitioners who work in high-technology firms, this paper will discuss the managerial implications of the research.

## **2. Literature Review**

### 2.1 Previous literature on sales management control and market orientation

Of the researchers who have studied the performance of salespeople based on sales management control mechanisms and market orientation, the works of Bonner, Ruekert, and Walker Jr. (2002), Evans et al. (2007), Matsuo (2009), and Matear et al. (2002) are most relevant to the current research. First, Bonner et al. (2002) examined how formal controls (i.e., process control, output control, and team rewards) and interactive controls (i.e., team operational control influence, team strategic control influence, and management intervention) can affect a business unit's performance on a project. In addition, these authors examined the moderating effects of product innovativeness on the relationship between formal controls and performance. For formal controls, the authors found that only process control affects sales performance negatively and significantly. With regard to their research method, 95 participants with the titles of product manager, project manager, marketing manager, or product development manager were included in the study.

The research of Bonner et al. (2002) contributed to the literature on the way that

upper management can affect a business unit's performance when given a new project. However, the authors note opportunities for future research. For instance, their research focused on project performance rather than sales performance. The measurement items that they used were related to budgeting and scheduling rather than to the ability of salespeople to meet the sales objectives established by their organizations. Another research opportunity involves considering an organization's degree of market orientation. Several scholars (e.g., Hsieh et al., 2008; Matear et al., 2002) have noted that market orientation can moderate salespeople's behavior and performance.

In addition to the work of Bonner et al. (2002), Matear et al. (2002) influenced the current research. By examining 231 firms that have developed new services, Matear et al. (2002) examined how market orientation can contribute to firm performance. Their study is unique and important because it is one of the few studies that have investigated the direct effect of market orientation on performance, its indirect effect on performance by first influencing sales innovativeness, and its ability to moderate the relationship between sales innovativeness and performance. Their results show that all three relationships are significant. In other words, market orientation can affect firm performance both directly and indirectly. Moreover, market orientation can moderate the relationship between innovativeness and performance.

The research of Matear et al. (2002) is significant to the sales management literature because of its comprehensive examination of the effects of market orientation. However, the current research suggests that several unexplored research opportunities remain. In particular, Matear et al. (2002) focused only on the influence of market orientation. Other factors that may influence the innovativeness of salespeople have not been considered. It

is possible to further the research of Matear et al. by formulating a framework that incorporates the antecedents that may contribute to the innovativeness and performance of salespeople. More specifically, some scholars have suggested that the mechanisms used by a management team to control salespeople have significant effects on sales performance (Bonner et al., 2002; Jaworski, 1988; Piercy, Cravens, & Lane, 2009).

Another study that has significantly influenced the current study is the study by Evans et al. (2007), which examined salespeople's performance by considering sales management controls and salespeople's organizational sales-related psychological climate perceptions. These authors found that output-based control can directly affect sales performance, whereas capability control does not have such an effect. Their study is important to the current research because it confirms that some control mechanisms can affect sales performance. Additionally, Evans et al.'s work is one of the few recent sales management studies that examines salespeople's perspectives. However, opportunities for further research remain. For instance, the authors of the previous study did not examine the relationship between behavior control and sales performance.

Finally, the study conducted by Matsuo (2009) has also influenced the current study. In Matsuo's research, a framework that examines the factors that affect salespeople's performance was proposed and tested. Based on an examination of the responses of 199 Japanese sales managers, the results show that management's attempts to control salespeople through behavior-based control and knowledge-based control positively influence salespeople's innovativeness, which, in turn, affects sales performance. However, Matsuo (2009) also found that output-based control does not significantly negatively affect salespeople's innovativeness—a result that is contrary to Matsuo's

expectation. Although the work of Matsuo (2009) is significant to the sales management literature, there are additional opportunities for further research. Matsuo (2009) suggested that future researchers should continue to investigate the relationship between output-based control and innovation because the literature pertaining to this relationship is still inconsistent. Additionally, Matsuo's research did not consider the influences of market orientation despite the comments of other scholars regarding its influence when examining the performance and innovativeness of salespeople.

## 2.2 Research framework and construct definition

Through the literature reviewed above and the identified research opportunities, this paper proposes its research framework (Figure 1). In terms of the antecedents of new product sales performance, this research focuses on the effects of salespeople innovativeness (Matsuo, 2009). In Lumpkin and Dess's (1996) study, innovativeness is defined as a firm's tendency to develop new products, services, or business processes by engaging in and supporting new ideas, experiencing new approaches, and demonstrating creativity in its business operations. In the current study, salespeople's innovativeness refers to salespeople's perceptions of their tendency to engage in and support new ideas, to attempt new approaches, and to be creative in their selling operations. Grant and Cravens (1996) defined sales performance as an evaluation of a salesperson based on the way that he / she contributes to the objectives established by the organization. The current study adapts Grant and Cravens' definition but focuses on salespeople's perceptions of their new product sales performance.

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Second, based on the works of Evans et al. (2007) and Matsuo (2009), this study proposes that perceived sales management controls (i.e., behavior-based control, knowledge-based control, and output-based control) both directly and indirectly affect new product sales performance. According to Anderson and Oliver (1987) and Oliver and Anderson (1994), output-based control can be defined as a management approach that minimizes the burden of governance by permitting employees to determine the method that they will use and the level of effort that they will exert to achieve their firm's goals. Based on Matsuo (2009), Oliver and Anderson (1995), and Piercy et al. (2009), behavior-based control is used to describe managers who emphasize activity control and who prefer to focus on sales behavior, to monitor salespeople extensively and to provide direct feedback on salespeople's performance. In the work of Matsuo (2009), knowledge-based control is defined as managers' attempts to evaluate and review salespeople based on their ability to generate transferable knowledge and to share this knowledge with other salespeople. For Ditillo (2012), knowledge can be concrete (e.g., ways of meeting organizational objectives and methods of being more efficient and effective at work) or abstract (e.g., identifying new and previously unrealized opportunities).

Finally, this study investigates the moderating effects of an organization's market orientation on the relationship between innovativeness and performance (Matear et al., 2002). Morgan, Vorhies, and Mason (2009) define market orientation as the extent to

which an organization can generate, distribute, and respond to market information regarding the needs of future and current customers, competitor strategies, and the broader business environment. The current research focuses on salespeople's perceptions of their organization's degree of market orientation. The next section presents the hypotheses proposed in this study.

### 2.3. The relationship between management controls and salespeople innovativeness

The first hypothesis that will be examined in this research is the relationship between output-based control and salespeople's innovativeness. Managers who use an output-based control system evaluate the performance of sales representatives on the basis of results such as sales figures or products sold (Ahearne et al., 2010; Piercy et al., 2009). Additionally, salespeople's rewards and bonuses are typically based on end results when output-based control is used (Atuahene-Gima, 1997; Hultink & Atuahene-Gima, 2000; Piercy et al., 2009). Recent studies (e.g., Evans et al., 2007; Flaherty, Arnold, & Hunt, 2007) have found this relationship to be positive and significant regardless of whether the participants are sales managers or salespeople. Based on the works of Evans et al. (2007) and Flaherty et al. (2007), the following hypothesis is proposed:

H1: Output-based control has a positive influence on new product sales performance

In relation to studies on the influence of output-based control on performance, Matsuo (2009) is one of the few scholars who has examined the effect of output-based control on sales innovativeness. Matsuo hypothesized that output-based control negatively affects sales innovativeness because sales volume is a relatively short-term

indicator that can be affected by events outside of salespeople's control. For this reason, salespeople will be more conservative in their sales approach when managers focus on output-based control. Interestingly, the results obtained by Matsuo (2009) rejected this hypothesis, showing that output-based control actually has an insignificant but positive effect on sales innovativeness. Based on Matsuo's results, the current study proposes the following hypothesis to further examine the influence of output-based control on salespeople's innovativeness:

H2: Output-based control has a positive influence on the innovativeness of salespeople when selling new products.

The third hypothesis that will be examined pertains to the effect of behavior-based control on salespeople's innovativeness. According to Piercy et al. (2009), managers who rely on behavior-based controls monitor, direct, evaluate, and reward employees based on their job inputs. Oliver and Anderson (1995) indicated that personal qualities such as aptitude, activities such as new account generation, and sales strategies can all be considered forms of job input. Furthermore, Flaherty et al. (2007) and Piercy et al. (2009) noted that managers who favor using behavior-based control often provide task-specific guidelines for their subordinates. As Ahearne et al. (2010) and Kohli, Shervani, and Challagalla (1998) argued, this management approach can affect the performance of some employees by increasing their sense of security and reducing their fear of failure. Previous studies have examined the influence of behavior-based control on salespeople, but the results have been conflicting. For instance, Miao and Evans (2013) found that activity control cannot affect sales performance, whereas Bonner et al. (2002) found this relationship to be positive when the context involves new project performance. Flaherty

et al. (2007) noted that the influence of behavior-based control varies depending on the types of performance under examination. To contribute to the sales management literature by further clarifying the effect of behavior-based control, the following hypothesis will be examined based on the works by Ahearne et al. (2010), Bonner et al. (2002), and Kohli et al. (1998):

H3: Behavior-based control has a positive influence on new product sales performance.

Matsuo (2009) examined the effects of behavior-based control on sales innovativeness and found that this relationship is positive. One of the underlying rationales is that managers are actively involved in the selling process; therefore, they are able to provide innovative ideas to support their colleagues based on their experience. Another explanation is that salespeople are likely to spend more time and effort planning their activities and strategies before they begin selling because their managers monitor them closely; hence, they are likely to be more innovative in their sales approach. Based on Matsuo (2009), the current study proposes the following hypothesis:

H4: Behavior-based control has a positive influence on the innovativeness of salespeople when selling new products.

The third sales management control this study will examine is the influence of knowledge-based control. Compared with output-based and behavior-based control, knowledge-based control is a relatively recent concept. Nevertheless, this form of management control is gaining increasing attention from researchers and practitioners because more industries are now knowledge intensive, such as technology, finance, and



marketing, and the presence of employees who can transfer knowledge is an important source of advantage (Ditillo, 2012; Matsuo, 2009; Piercy, 2010). According to Piercy (2010), the ability of employees to generate transferable knowledge and the ability of managers to increase employees' capabilities are particularly important for firms operating in the B2B context.

Of the few studies that examined the influence of sales knowledge and knowledge-based control on sales performance, the work of Verbeke, Dietz, and Verwaal (2011) is prominent. Through the use of a meta-analysis that included 268 studies and 79,747 salespeople, Verbeke et al. (2011) confirmed that salespeople's knowledge of selling has a positive effect on their performance. Based on these authors' findings, it can be inferred that salespeople's performance will improve if they perceive that their managers are using knowledge-based control to encourage salespeople to generate and share knowledge with one another. In addition to the direct influence of knowledge-based control on sales performance, Matsuo (2009) found that knowledge-based control can enhance salespeople's innovativeness. Matsuo (2009) argued that successful knowledge-based control systems allow organizations to collaborate more effectively. Matsuo (2009) is one of the few scholars who has examined the influence of knowledge-based control using a quantitative approach. Thus, the sales management literature will benefit from the current study's examination of this hypothesis by including salespeople from non-Japanese firms. Based on the aforementioned literature, this study proposes the following hypotheses:

H5: Knowledge-based control has a positive influence on new product sales performance.

H6: Knowledge-based control has a positive influence on the innovativeness of salespeople when selling new products.

#### 2.4 The relationship between salespeople's innovativeness and new product sales performance

Dess and Lumpkin (2005) and Matsuo (2009) suggested that innovation and firm support for innovative ideas are crucial to sales performance. Several studies have examined the relationship between innovativeness and new product sales performance. Matear et al. (2002) found that innovation can directly influence firms' performance. This finding was confirmed by Matsuo (2009), who verified that salespeople's innovativeness can directly influence new product sales performance. This research focuses on the non-financial aspects of salespeople's performance because non-financial data overcome difficulties related to asking participants (e.g., salespeople and sales managers) to reveal sensitive information and difficulties in comparing different sizes of firms (Matear et al., 2002). Second, Matsuo (2009) notes that objective measures are closely related to subjective measures. Silver et al. (2006) suggest that this approach is well accepted in sales survey research, and no evidence of biased responses is apparent. Based on the findings of Matsuo (2009) and Matear et al. (2002), the current study proposes the following hypothesis:

H7: Salespeople's innovativeness has a positive influence on their new product sales performance.

#### 2.5 The influences of market orientation

Given the influence of sales management controls and salespeople's innovativeness,

this section focuses on the influence of an organization's market orientation. According to Matear et al. (2002), the concept of market orientation and its influence on organizations have re-ignited interest since the 1990s. For Narver and Slater (1990), being market oriented is one of the most effective and efficient methods when building competitive advantage and providing superior value to potential customers.

In their study, Matear et al. (2002) hypothesized that market orientation can positively moderate the relationship between innovativeness and sales performance. Their results showed that this hypothesis was significant in the context of New Zealand service firms. Although the effects of market orientation on salespeople's innovativeness and performance have been examined, previous scholars have not yet examined the effects of this factor together with the effects of management controls or within the context of new high-tech products. To further contribute to the sales management literature, the current study proposes the following hypothesis:

H8: (a) For strong market orientation organization, salespeople's innovativeness is positively related to new product sales performance; (b) for weak market orientation organization, salespeople's innovativeness is not related to new product sales performance

### **3 Method**

#### 3.1 Sampling and data collection

The companies involved in this study were electronics product manufacturers that were publicly listed on the Taiwan Stock Exchange. A total of 669 companies were trading under the electronics industry category. Companies that had launched new

products within the previous six months at the time this study's researchers made their initial contact were considered. In total, 215 companies had launched a new product within the previous six months and agreed to participate in this study. EMBA and MBA students were recruited as interviewers to gather data. These students began collecting data by contacting companies with which they were familiar (e.g., previous employers or companies with which they had relationships). They subsequently contacted companies based on referrals and then contacted companies with which they had no relationship. After representatives (e.g., salespeople or administrative staff) of the target firms were contacted to request their companies' participation by allowing the researchers to access their employees, surveys were sent via postal mail to collect data from salespeople who agreed to participate.

A total of 889 questionnaires were sent to salespeople, and 315 complete responses were obtained after two months. The response rate was 35.4%. Among the respondents who completed usable questionnaires, 56.9% of the sales staff members were male, 40.1% worked in Northern Taiwan, and 45.8% of the sales staff members were between 30 and 39 years of age. Most (55.2%) of the companies that participated in this study had been established for at least 21 years, and 33.2% of the companies had more than 1,000 full-time employees (Table 1). To check for non-response bias, the procedure used by Armstrong and Overton (1977) was followed. The results showed that there were no significant differences and thus no indication of non-response bias.

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### 3.2 Measures

The participants completed a 23-question survey that evaluated behavior-based control (five items), output-based control (four items), knowledge-based control (three items), market orientation (four items), salespeople's innovativeness (four items), and new product sales performance (three items). These items were obtained from the existing literature (Evans et al., 2007; Matsuo, 2009; Morgan et al., 2009; Oliver & Anderson, 1994; Piercy et al., 2009). The target research question was, "What are the determinants of salespeople's new product sales performance?" Unless otherwise indicated, a seven-point Likert-type scale was used in designing the items. Some of the items were rephrased to maintain consistency. The items for each variable are presented in Table 2.

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## **4 Data Analysis and Results**

### 4.1 Model measurement

The data were analyzed using IBM SPSS AMOS 20. As recommended by Anderson and Gerbing (1988), a two-step approach to structural equation modeling (SEM) was used in this study. After removing items with low contributions, we found that all factor

loadings on the intended latent variable were significant and greater than 0.7 (Fornell & Larcker, 1981), and the squared multiple correlations supported the reliability of the measurement items used. Convergent validity was examined in terms of factor loadings and average variance extracted (AVE). According to Fornell and Larcker (1981), AVE is the average variance shared between a construct and its measurement. As shown in Table 2, the AVE values ranged from 0.573 to 0.782; therefore, convergent validity was confirmed (Fornell & Larcker, 1981). Finally, discriminant validity was evaluated by comparing the AVE of each individual construct with the shared variances between the individual construct and all other constructs. Because the AVE value for each construct was greater than the squared correlation between constructs, discriminant validity was confirmed (Table 3). Common method variance was checked using Harman's single-factor test. An unrotated factor analysis generated all factors with eigenvalues greater than one. The first factor accounted for 23.4% of the variance (<50%), indicating that common method bias was unlikely to be a concern in the current research (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003).

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#### 4.2 Structural model

After the overall measurement model was found to be acceptable, the structural model was tested with the entire sample again (N=315). The model fit was good ( $\chi^2=283.277$ ,  $df=142$ ,  $\chi^2/df=1.995$ , RMSEA=0.056, CFI=0.970, GFI=0.913). The results obtained from

examining the proposed hypotheses are presented in Table 4 and Figure 2. The results gathered from examining the proposed hypotheses are presented in Table 4 and Figure 2. H1 is not supported ( $t=0.389$ ;  $\beta=0.109$ ;  $p>0.1$ ), but H2 is supported ( $t=2.135$ ;  $\beta=0.343$ ;  $p<0.05$ ). Therefore, higher output-based control has a positive impact on salespeople's innovativeness, but not on their sales performance. H3 and H4 hypothesized that behavior-based control would positively influence salespeople's performance and innovativeness. The results do not support H3 ( $t=0.052$ ;  $\beta=0.011$ ;  $p>0.1$ ), but they support H4 ( $t=2.305$ ;  $\beta=0.283$ ;  $p<0.05$ ). In other words, higher behavior-based control has a positive impact on salespeople's innovativeness but not on their sales performance. This study's H5 is rejected ( $t=0.959$ ;  $\beta=0.148$ ;  $p>0.1$ ), but H6 is supported ( $t=3.331$ ;  $\beta=0.293$ ;  $p<0.001$ ) because knowledge-based control has a significantly positive impact on innovativeness but not on sales performance. Higher knowledge-based control has a positive impact on salespeople's innovativeness but not on their sales performance. This study's H7 is supported ( $t=3.234$ ;  $\beta=0.424$ ;  $p<0.001$ ). Salespeople's innovativeness positively influences new product sales performance.

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Place Figure 2 here

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#### 4.3 Moderating effect

H8a hypothesizes a positive relationship between salespeople's innovativeness and new product sales performance when salespeople perceive their organization as having a strong market orientation. It is supported by the results ( $\beta=0.56$ ;  $p<0.001$ ). H8b hypothesizes no relationship between salespeople's innovativeness and new product sales performance when salespeople perceive their organization as having a weak market orientation. It is supported by the result ( $\beta=0.16$ ;  $p>0.1$ ). Addition, the chi-square difference is significant ( $\Delta \chi^2=7.76$ ;  $p<0.05$ ) indicating the salespeople's innovativeness coefficient for strong market orientation case is significantly greater than the salespeople's innovativeness coefficient for weak market orientation case (Table 5).

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Place Table 5 here  
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#### 4.4 Mediating effect

Sobel tests were performed to determine the mediating effects between variables (Sobel, 1982). Because the Z value was found to be greater than 1.96, this study can conclude that salespeople's innovativeness fully mediates the relationships between management control and new product sales performance. The next section will discuss some of the implications of this study and its contributions to the literature.

### **5 Discussion and Managerial Implications**

According to Fu et al. (2010) and Spanjol et al. (2011), the importance of sales



management in selling new products needs to be further explored. For instance, the current sales management literature has not yet fully considered the combined influence of sales control and organizations' market orientation on salespeople's innovativeness and new product sales performance. Second, the mediating effect of salespeople's innovativeness requires additional research because this subject has received little attention in the new product sales management literature. Third, the understanding of the influence of market orientation on salespeople would benefit from additional investigation because few studies have tested this variable's moderating effects. Fourth, existing studies have mainly focused on managers' perceptions of their initiatives' outcomes (e.g., Matsuo, 2009; Hsieh et al., 2008), but researching salespeople's perspectives could benefit the existing sales management literature (Baldauf et al., 2005). The following sections provide additional discussions of current study's contributions to the sales management literature and provide implications for practitioners.

### 5.1 Factors affecting new product sales performance

In support of the theoretical framework proposed in this study, this research found that salespeople's innovativeness is positively linked to new product sales performance. This result confirms the influence of innovativeness on performance (e.g., Matsuo, 2009). From the perspective of salespeople, salespeople who are innovative are likely to perform better, for example, by exceeding new product sales targets.

For the effectiveness of management control, five issues are worthy of further discussion. First, Matsuo (2009) proposed that output-based control negatively affects salespeople's innovativeness; however, his findings rejected this hypothesis.

Salespeople's innovativeness is positively but insignificantly affected when output-based control is used. This study confirms that output-based control can positively and significantly influence salespeople's innovativeness. In other words, salespeople believed that they became more innovative when managers focused on end results (e.g., new product sales figure and profit margins). As Ahearne et al. (2010), Atuahene-Gima (1997), Hultink and Atuahene-Gima (2000), and Piercy et al. (2009) observed, managers who use an output-based control system often establish targets (e.g., sales figures and products sold) and reward individuals who exceed these targets through bonuses. It is likely that salespeople became more innovative in this study because the evaluation criteria were clear and because the participants knew that there were often rewards associated with achieving sales objectives.

Second, this study's findings on behavior-based control provide additional insight into the sales management literature, which has shown conflicting results (e.g., Ahearne et al., 2010; Bonner et al., 2002; Flaherty et al., 2007; Kohli et al., 1998; Miao & Evans, 2013). In this research context, which includes salespeople from high-tech, manufacturing-based, and publicly listed companies, behavior-based control can positively affect salespeople's innovativeness and new product sales performance. Managers who use behavior-based control must often lead by example, which includes focusing on the sales behavior of team members, monitoring salespeople extensively, and providing direct feedback on sales performance (Matsuo, 2009; Oliver & Anderson, 1995; Piercy, et al., 2009). Under this type of management style, the participants may perceive themselves to be more innovative because the manager, who is generally more experienced in selling new products and has more access to additional resources because of his or her position, is

more involved and contributes to the selling process.

Third, when managers reward their sales staff for generating transferable knowledge and the ability to share this knowledge with other salespeople, these managers are categorized as using knowledge-based control (Ditillo, 2012; Matsuo, 2009). This type of management control is particularly important in knowledge-intensive industries (Ditillo, 2012), such as the electronic technology companies that are investigated in this study. Similar to the participants investigated in the works of Matsuo (2009) and Verbeke et al. (2011), the participants of this study indicated that managers who recognize employees who can create and share knowledge are capable of contributing to salespeople's innovativeness and performance, likely because selling new products is a challenging task that consists of multiple stages (Fu et al., 2012; O'Hara, 1993). Therefore, salespeople are more likely to be more innovative when they perceive their managers as people who will encourage members with strong performance to share their wisdom, methods, and experiences. Apart from the work of Matsuo (2009), the current research is one of the few studies that have examined the influence of knowledge-based control.

Fourth, the results of this study do not support the contention that sales management control can directly affect sales performance when selling new technology products. This study's findings differ from those of previous studies that have examined the direct effects of sales management controls. One possible explanation is related to high-tech industry characteristics, which include rapid product innovation and intense competition among competitors (Tellis et al., 2009; Thompson, 2009). In this type of competitive environment, salespeople do not believe that management by monitoring sales outcomes (i.e., output-based control), their behavior (i.e., behavior-based control), and knowledge

(i.e., knowledge-based control) is likely to have a significant effect on performance unless the salespeople can first become more innovative.

Fifth, the influence of market orientation on salespeople's innovativeness and performance is also worthy of further discussion. The current study confirmed that market orientation can positively moderate the relationship between innovativeness and performance and has been shown to be influential when examining new product sales performance. In other words, being market-oriented remains essential for organizations. Organizations promoting new products must value the importance of updated market information, must be interested in fulfilling customer needs, must understand the strategies of their competitors, and must be able to take advantage of their environment. On the contrary, if an organization does not care about customer needs, opponents' strategies, and / or their environment, their new product sales performance will not improve even when their salespeople are innovative.

## 5.2 Managerial implications

Promoting new products in a B2B context can be a challenge for organizations, sales managers, and salespeople. Not only does new product promotion consume a substantial amount of costs and resources, but the competition can also be intense. The current study indicates that there are three strategic and managerial implications that may be useful to practitioners who are responsible for and / or involved in selling new technology products.

When promoting new products, an organization's degree of market orientation is important (Day & Bedeian, 1991; Glick, 1985). In the context of the current study,

market orientation can positively moderate the relationship between innovativeness and performance. For senior-level managers who are responsible for new product sales performance, ensuring that their organization is market-oriented in the minds of their salespeople should be their primary objective. For instance, creating an environment in which customer feedback will be taken seriously, having research teams investigate competitor strategies and performance, and rewarding cross-team collaboration are all signs of a healthy market orientation. Nevertheless, this study recognizes the difficulty associated with updating and modifying a company's degree of market orientation, which may be related to long-standing corporate culture and politics. For this reason, mid-level sales managers may want to devote resources to ensuring that their salespeople are innovative because mid-level managers are likely to have more control over their salespeople than over their organization's degree of market orientation.

To improve salespeople's innovativeness, managers can resort to output-based control, behavior-based control, and/or knowledge-based control. All of these types of control can influence innovativeness, which, in turn, contributes to new product sales performance. The results of the statistical analysis show that output-based control has the strongest effect on salespeople's innovativeness; therefore, managers should focus on salespeople's end results (e.g., the number of products sold and revenues earned). Managers can set clear and sensible sales objectives for staff members who want to demonstrate their abilities and to perform better than their colleagues do. In addition, bonuses and other forms of direct rewards for achieving sales targets could further motivate these staff members.

Alternatively, considering the concepts of these control mechanisms, this study

advocates that managers highlight knowledge-based control. Knowledge-based control may be most suitable for managers to use when selling new products. The presence of experienced and successful colleagues who generate and share selling knowledge and skills with other salespeople has effects that are similar to the use of behavior-based control while allowing managers to have time to attend to other matters. Managers who are responsible for multiple products or who have other duties are less likely to have this leisure when behavior-based control is used. Furthermore, using knowledge-based control will give managers the opportunity to adjust their selling strategy accordingly if managers can obtain feedback from the experienced sales staff members who were entrusted to generate and share knowledge with other salespeople. With output-based control, managers may not be able to adjust their strategy because it may affect how members will be evaluated and rewarded. With the managerial implications of this study discussed, the final section presents research limitations and areas in which further study is needed.

## **6 Limitations, Future Studies, and Conclusion**

This study contributes to the sales management literature and practice by examining the influence of sales management control on salespeople's innovativeness and new product sales performance in a B2B context. Additionally, the study incorporates market orientation into a sales management control model. The results show that sales management controls (i.e., output-based control, behavior-based control, and knowledge-based control) positively affect salespeople's innovativeness but cannot influence new product sales performance directly. Additionally, salespeople's innovativeness has a positive influence on new product sales performance. Market orientation can moderate the relationship between salespeople's innovativeness and new

product performance.

Although this study contributes to the existing sales management literature by investigating the effects of sales management control and market orientation on salespeople's new product sales performance, the research also has several limitations. First, this research considered only self-reported, non-financial measurements when examining new product sales performance. Although there are benefits to this approach, future studies should consider using both financial and non-financial items when examining new product sales performance. Second, this study examined salespeople's perceptions of their manager and organization, but these perceptions may differ from those of management. Future scholars may thus seek to include data from both sales managers and team members. Third, this study investigated only one industry sector within a single country. Therefore, future researchers should apply this research framework to other industries and countries. Fourth, this study did not differentiate new products that are highly innovative and products developed through line extensions (i.e., less innovative new products). Future research should evaluate whether product innovativeness can affect salespeople's innovativeness.

## References

- Ahearne, M., Rapp, A., Hughes, D.E., & Jindal, R. (2010). Managing sales force product perceptions and control systems in the success of new product introductions. *Journal of Marketing Research*, 47 (4), 764-776.
- Anderson, E., & Oliver, R.L. (1987). Perspectives on behavior-based versus outcome-based salesforce control systems. *Journal of Marketing*, 51, 76-88.
- Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modelling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103 (3), 411-423.
- Armstrong, S. J., & Overton, T.S. (1977). Estimating non-response bias in mail surveys. *Journal of Marketing Research*, 14, 396-402.
- Atuahene-Gima, K. (1997). Adoption of new products by the sales force: The construct, research propositions, and managerial implications. *Journal of Product Innovation Management*, 14 (6), 498-514.
- Baldauf, A., Cravens, D.W., & Piercy, N.F. (2005). Sales management control research –synthesis and an agenda for future research. *Journal of Personal Selling & Sales Management*, 25 (1), 7-26.
- Batra, G., & Kaza, S. (2012). Unlocking sales-force potential in the semiconductor industry. *McKinsey on Semiconductors*, Autumn (2), 66-75.
- Bonner, J.M., Ruekert, R.W., & Walker, Jr., O.C. (2002). Upper management control of new product development projects and project performances. *Journal of Product Innovation Management*, 19, 233-245.
- Day, D.V., & Bedeian, A.G. (1991). Predicting job performance across organizations: The interaction of work orientation and psychological climate. *Journal of Management*, 17, 589-600.
- Ditillo, A. (2012). Designing management control systems to foster knowledge transfer in knowledge-intensive firms: A network-based approach. *European Accounting Review*, 21 (3), 421-460.
- Evans, K.R., Landry, T.D., Li. P., & Zou, S. (2007). How sales controls affect job-related outcomes: The role of organizational sales-related psychological climate perceptions. *Journal of Academy of Marketing Science*, 35, 445-459.
- Flaherty, K.E., Arnold, T.J., & Hunt, C.S. (2007). The influence of the selling situation on the effectiveness of control: Toward a holistic perspective. *Journal of Personal Selling and Sales Management*, XXVII (3), 221-233.



- Fornell, C. & Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement errors. *Journal of Marketing Research*, 18, 39-50.
- Fu, F.Q., Richards, K.A., Hughes, D.E., & Jones, E. (2010). Motivating salespeople to sell new products: The relative influence of attitudes, subjective norm, and self-efficacy. *Journal of Marketing*, 74 (6), 61-76.
- Glick, W.H. (1985). Conceptualizing and measuring organizational and psychological climate: pitfall in multilevel research. *Academy of Management Review*, 10, 601-616.
- Grant, K., & Cravens, D.W. (1996). Examining sales force performance in organizations that use behaviour-based sales management processes. *Industrial Marketing Management*, 25 (5), 361-371.
- Hsieh, M-H., Tsai, K-H., & Wang, J-R. (2008). The moderating effect of market orientation and launch proficiency on the product advantage-performance relationship. *Industrial Marketing Management*, 37 (5), 580-590.
- Hultink, E.J., & Atuahene-Gima, K. (2000). The effect of sales force adoption on new product selling performance. *Journal of Product Innovation Management*, 17 (6), 435-450.
- Jaworski, B.J. (1988). Toward a theory of marketing control: Environmental context, control types, and consequences. *Journal of Marketing*, 52, 23-39.
- Jonash, R., & Sommerlatte, T. (1999). *The Innovation Premium Reading*. MA, USA: Perseus Books.
- Kim, N., & Atuahene-Gima, K. (2010). Using exploratory and exploitative market learning for new product development. *Journal of Product Innovation Management*, 27 (4), 519-536.
- Kohli, A.K., Shervani, T.A., & Challagalla, G.N. (1998). Learning and performance orientation of salespeople: The role of supervisor. *Journal of Marketing Research*, 35 (2), 263-274.
- Krishnan, V., & Zhu, W. (2006). Designing a family of development-intensive product. *Management Science*, 52 (6), 813-825.
- Lumpkin, G.T., & Dess, G.G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21 (1), 135-172.
- Matear, S., Osborne, P., Garrett, T., & Gray, B.J. (2002). How does market orientation contribute to service firm performance? *European Journal of Marketing*, 36 (9/10), 1068-1075.

- Matsuo, M. (2009). The influence of sales management control on innovativeness of sales departments. *Journal of Personal Selling and Sales Management*, XXIX (4), 321-331.
- Miao, C.F., & Evans, K.R. (2013). The interactive effects of sales control on salesperson performance: a job-demands-resources perspective. *Journal of the Academy of Marketing Science*, 41, 73-90.
- Morgan, N.A., Vorhies, D.W., & Mason, C.H. (2009). Marketing orientation, marketing capabilities, and firm performance. *Strategic Management Journal*, 30, 909-920.
- Narver, J.C., & Slater, S.F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54 (4), 20-35
- O'Hara, B.S. (1993). Evaluating the effectiveness of trade shows: A personal selling perspective. *Journal of Personal Selling & Sales Management*, 13 (3), 67-77.
- Oliver, R. & Anderson, E. (1994). An empirical test of the consequences of behavior-and outcome-based sales control systems. *Journal of Marketing*, 58, 53-67.
- Piercy, N. (2010). The evolution of strategic sales organizations in business-to-business marketing. *Journal of Business and Industrial Marketing*, 25 (5), 349-359.
- Piercy, N., Cravens, D.W., & Lane, N. (2009). Sales management control level and competencies: Antecedents and consequences. *Industrial Marketing Management*, 38, 459-467.
- Podsakoff, P., MacKenzie, S., Jeong-Yeon, L., & Podsakoff, N. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88 (5), 879-903.
- Silver, L.S., Dwyer, S., & Alford, B. (2006). Learning and performance goal orientation of salespeople revisited: Performance-approach and performance-avoidance orientation. *Journal of Personal Selling and Sales Management*, 26 (1), 27-38.
- Sobel, M.E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Eds.), *Sociological methodology* (pp.290-312). Washington, DC: American Sociological Association.
- Spanjol, J., Tam, L., Qualls, W.J., & Bohlmann, J.D. (2011). New product team decision making: Regulatory focus effects on number, type, and timing decisions. *Journal of Product Innovation Management*, 28 (5), 623-640.
- Tellis, G.J., Yin, E., & Niraj. R. (2009). Does quality win? Network effects versus quality in high-tech markets. *Journal of Marketing Research*, XLVI, 135-149.
- Thompson, S. (2009). Price competition in the presence of rapid innovation and imitation: The case of digital cameras. *Economic of Innovation and New Technology*, 18 (1),

93-106.

Verbeke, W., Bietz, B., & Verwaal, E. (2011). Drivers of sales performance: a contemporary meta-analysis. Have salespeople become knowledge broker?. *Journal of the Academy of Marketing Science*, 39 (3), 407-428.

Zoltners, A.A., & Sinha. P. (2005). Sales territory design: Thirty years of modeling an implementation. *Marketing Sciences*, 24, 313-331.

**Table 1****Characteristics of the participants and companies (N=315)**

	Demographic traits	%
Gender	Male	56.9
	Female	43.1
Respondent's working area	Northern Taiwan	40.1
	Central Taiwan	20.6
	Southern Taiwan	31.1
	Eastern Taiwan	7.3
Respondent's working experience	Less than 1 year	21.1
	Between 1-3 years	23.9
	Between 4-6 years	23.9
	Between 7-9 years	8.3
	Between 10-12 years	3.7
	Between 13-15 years	6.4
	More than 16 years	12.8
Respondent's age	25 years old or below	9.2
	Between 26-30 years old	22.0
	Between 31-35 years old	33.9
	Between 36-40 years old	11.9
	Between 41-45 years old	14.7
	Between 46-50 years old	7.3
	51 years old or above	0.9
Company's age	Between 1-5 years old	4.2
	Between 6-10 years old	8.8
	Between 11-15 years old	7
	Between 16-20 years old	24.7
	21 years old or above	55.3
Company size (# of employees)	Less than 100	29.8
	101-500	15.3
	501-1000	21.9
	More than 1000	33.0

**Table 2****Measurement items**

<b>Construct/ Adoption</b>	<b>Items</b>	<b>Factor loading</b>	<b><math>\alpha</math></b>
Output-based control (OC) / Evans et al. (2007)	OC1: Specific quantitative performance goals are established when I sell new products.	.759	.83
	OC2: When selling new products, the extent to which I attain my quantitative performance goal is critically evaluated.	.733	
	OC3: When selling new products, feedback concerning the extent to which I achieve the assigned goals is provided to me on a regular basis.	.808	
	OC4: My pay increases are based upon how my new product sales performance compared with my goals.	.725	
Behavior-based control (BC) / Matsuo (2009); Oliver and Anderson (1994)	BC1: When selling new products, supervisor stays in close touch with the salespeople.	.870	.90
	BC2: When selling new products, supervisors make sure every salesperson knows what to do and how to do it.	.870	
	BC3: When selling new products, supervisors often ask salespeople for information on how they are doing.	.883	
	BC4: When management rate salespeople's new product sales performance, they take many things	.842	

	into consideration.		
	BC5: When selling new products, management here stays very well informed of salespeople's activities.	.673	
	KC1: When selling new products, our manager positively evaluates sales people who share their knowledge with others.	.788	.91
Knowledge-based control (KC) / Matsuo (2009)	KC2: When selling new products, we are encouraged to generate sales proposals that can be shared in a team.	.841	
	KC3: A salesperson's reputation in a team is determined by the quality of his / her new product sales proposals	.864	
	SI1: When selling new products, my ability to function creatively is respected by the leadership.	.884	.94
Salespeople's innovativeness (SI) / Matsuo (2009); Evans et al. (2007)	SI2: When selling new products, creativity is encouraged here.	.858	
	SI3: When selling new products, I am allowed to try to solve the same problems in different ways.	.893	
	SI4: When selling new products, this organization is open and responsive to change.	.824	
	MO1: We do a lot of in-house market research.	.830	.92
	MO2: We periodically review the likely effect of changes in our business environment on customers.	.842	
Market orientation (MO) / Piercy et al. (2009); Morgan et al. (2009)	MO3: Intelligence on our competitors is generated independently by several teams.	.858	
	MO4: We meet with customers at least once a year to find out what products / services they will	.855	

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	need in the future.		
New Product sales performance (NPSP) / Matsuo (2009)	NPSP1: I make sales of those new products with the highest profit margin	.861	.91
	NPSP2: In terms of new product sales performance, I perform very well.	.912	
	NPSP3: In terms of new product sales performance, I generate high level of dollar sales	.879	

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CFA model:  $\chi^2=485.165$ ;df=215;CFI=.953; RMSEA=.063

**Table 3**

**Correlation between constructs following CFA**

	Mean	SD	CrA	CR	AVE	OC	BC	KC	SI	MO	NPSP
<b>1. OC</b>	5.13	1.04	0.83	.842	.573	<b>.757</b>					
<b>2. BC</b>	5.34	1.04	0.90	.917	.691	.744	<b>.831</b>				
<b>3. KC</b>	5.11	1.16	0.91	.870	.692	.698	.707	<b>.831</b>			
<b>4. SI</b>	5.20	1.20	0.94	.922	.749	.698	.702	.680	<b>.866</b>		
<b>5. MO</b>	5.57	1.18	0.92	.910	.716	.588	.598	.630	.496	<b>.845</b>	
<b>6. NPSP</b>	5.06	1.22	0.91	.915	.782	.238	.216	.186	.305	.160	<b>.884</b>

<sup>a</sup>. Bold numbers on the diagonal parentheses are square root of each construct's AVE value

<sup>b</sup>. SD= Standard deviation; CrA= Cronach's Alphas; CR= Composite reliability; AVE= Average variance extracted

<sup>c</sup>.OC= Output-based control; BC= Behavior-based control; KC= Knowledge-based control; SI= Salespeople's innovativeness; MO= Market orientation; NPSP= New product sales performance



**Table 4**

**Correlation between constructs following CFA**

Hypotheses	t-value (standardized coefficient)	Test result
H1: OC→NPSP(+)	.389(.109)	Not supported
H2: OC→SI(+)	2.135(.343)*	Supported
H3: BC→ NPSP(+)	.052(.011)	Not supported
H4: BC→SI(+)	2.305(.283)*	Supported
H5: KC→ NPSP(+)	.959(.148)	Not supported
H6: KC→SI (+)	3.331(.293)***	Supported
H7: SI→NPSP (+)	3.234(.424)***	Supported

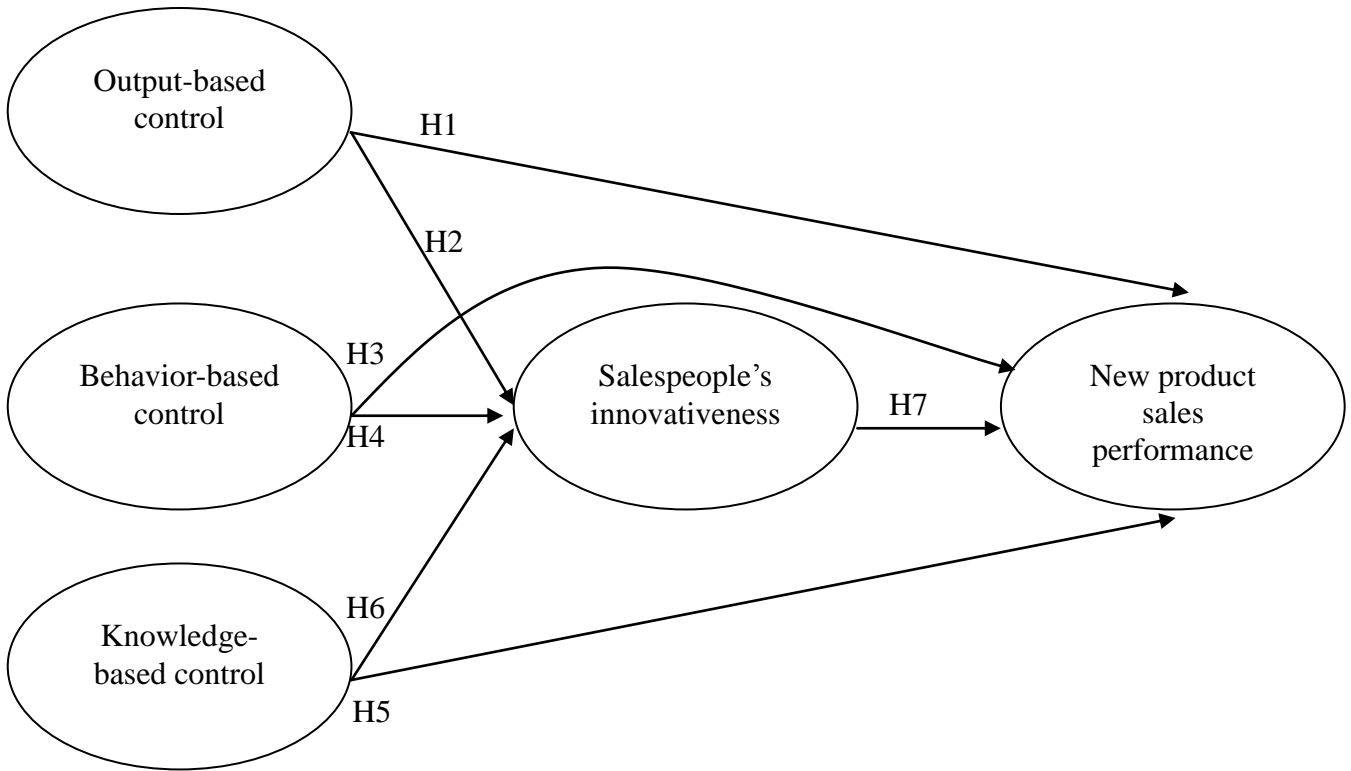
-OC= Output-based control; BC= Behavior-based control; KC= Knowledge-based control; SI= Salespeople's innovativeness; MO= Market orientation; NPSP= New product sales performance

.\*p< .05. \*\*p< .01. \*\*\*p< .001.

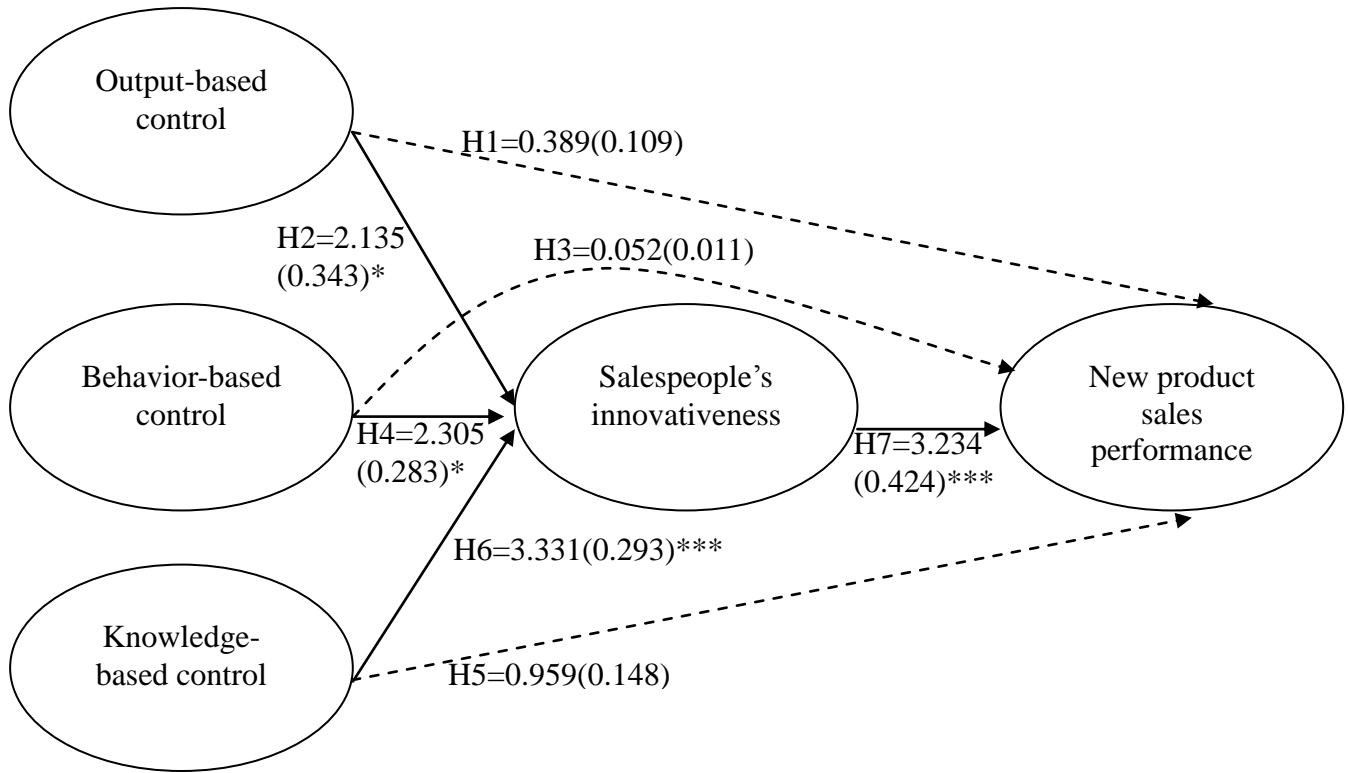
**Table 5.**  
**Two group path model estimate**

Path estimated	Market orientation		Chi-square difference ( $\Delta df=1$ )
	Highly market orientation	Lowly market orientation	
Salespeople's innovativeness → New product sales performance	.56**	.16	$\Delta\chi^2=7.76^*$

**Fig. 1. Research framework**



**Fig. 2. Results from hypotheses testing**



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