

# **Product Launch Performance in Hi-Tech SMEs: Newness to the Firm and the Role of Management Controls**

## **Abstract**

We investigate the impact of management control mechanisms on the success of new product launches in high-technology SMEs. We argue that internal management controls will alleviate problems associated with product newness. Using survey data from 76 SMEs we find newness to the firm to be negatively related to product launch success, while the use of informal and formal controls to have positive effects. Furthermore, informal controls within the SME moderate the negative relationship between newness and launch success. The results add to the debate on the impact of control mechanisms on innovative activities in SMEs.

## **Key words:**

Product newness, product launch performance, SME, management control theory

## **Introduction**

In this paper we examine the impact of informal and formal control on product launch success in small- and medium-sized enterprises (SMEs). New product development is critical to firm survival and competitiveness (Brown and Eisenhardt 1997; Cooper and Kleinschmidt 2011). However, failure in launching new products to the market is commonplace: “Only one out of four development projects succeeds commercially and one-third of all launches of new product fail” (Cooper 2000, p. 55). The success of a new product launch is influenced by product-specific characteristics (Edgett et al. 1992), but also by organizational characteristics. We analyse the way in which the design of an organization’s management control system interacts with the product’s newness (Bonner 2010; Jin 2000) in influencing this success in SMEs.

Management control systems are implemented by firms to ensure that the organizational goals are met (e.g., Merchant and Van der Stede 2012). They involve both informal mechanisms such as cooperation, information sharing and organizational culture (Voss and Brettel 2014) as well as formal mechanisms, such as planning procedures and performance management systems. The impact of informal and formal management control mechanisms on innovative performance has received substantial attention in the recent literature (e.g., Davila et al. 2009b; Jansen et al. 2006; Ylinen and Gullkvist 2014), but without any specific attention to SMEs. The SME context is relevant since smaller firms have only limited resources for non-operational tasks (Davila 2005): for example, Hudson, Lean, and Smart (2001) observed how operational performance measures often lack formal structure in SMEs. At the same time, innovative activities by their nature are assumed to be difficult to control through formal mechanisms (Amabile 1998). Due to their size and the relative lack of formal structure, formal control mechanisms are less prevalent for SMEs (Chenhall 2003).

As Voss and Brettel (2014) note, there have been few studies that integrate perspectives on management control and product launch performance in SMEs. Indeed, scholars have called for more theoretically-grounded research and highlight the need for researchers to use a management control system perspective in SME research (Garengo et al. 2005). We address this call in the current study. The empirical context for our fieldwork is SMEs competing in high-technology industries in Western Europe. New product development is a critical strategy and management issue for such SMEs (Zarzevska-Bielawska, 2012); their industries are technology-driven and knowledge-intensive (Cooper and Kleinschmidt 1987; Cooper and Kleinschmidt 1993; Cooper and Kleinschmidt 1995).

We collect a unique sample of 76 product launches in 76 different high-technology SMEs, with both successful and less successful product launches in our data. We hypothesize and find that the newness of the product or service is negatively related to product launch success, confirming that the extent of innovation complicates the achievement of success. We also find that the use of informal and formal controls is positively related to success. Additionally, the use of informal controls – but not formal controls – mitigates the negative effect of newness. This suggests that rather than being a threat to innovation (Amabile 1998), management control mechanisms are conducive to achieving innovative performance success. Furthermore, some control mechanisms are more useful in overcoming problems of product newness than others.

The main contribution of our research is to highlight the importance of management control theory to our understanding of product development and launch performance in SMEs in fast-moving industries. While recent research has examined strategic orientation in SMEs from a resource-based perspective (Lonial and Carter 2015) and from a dynamic capabilities perspective (Mosey, 2005), we offer an alternative view and show how management control theory is useful in understanding product launch performance; in particular how different

control mechanisms have different impacts on product launch. This offers an alternative perspective to that using resource and capability-based theory seen in recent work on SMEs, and builds on recent interest in the management control perspective (Voss and Brettel 2014) as a basis for understanding competitiveness of SMEs.

## **Hypothesis Development**

### **Product Newness to the Firm**

The links between product-specific characteristics and performance of launched products has received a significant amount of research attention over the years (Atuahene-Gima and Ko 2001; Cooper 1979; Cooper and Kleinschmidt 1987, 2011). A major theme in these studies is a focus on product newness. The literature on product innovation identifies various principal dimensions of product newness (Jin 2000): product newness to customers (sometimes referred to as new to the market – Bonner, 2010, Goldenberg et al. 2001), and product newness to the firm (Atuahene-Gima 1996), as well as new product uniqueness (Avlonitis and Salavou 2007). We focus on product newness to the firm as we are interested in how internal (i.e., within firm) control mechanisms may interact with newness in influencing product launch outcomes.

A number of arguments have been offered as to why there will be a negative relationship between product newness to the firm and product launch performance. First and foremost, newness entails a “general lack of understanding about the product and its application” (Bonner 2010: 487). The firm will be relatively inexperienced with its new product and production technology (Olson et al. 1995) leading to ambiguity about how to market the new product, and how the product might be used and valued, as well as increased task difficulty and internal information flows. Secondly, some have argued that firms may be reluctant to adopt inventions not consistent with their technology base, and that managers

traditionally have not adjusted well to new technologies (Goldenberg et al. 2001). Others argue that, given the pressures for young firms to bring their products to market speedily (Schoonhoven, Eisenhardt and Lyman 1990), new product innovation creates uncertainty for the new venture, where the “best way to proceed is seldom apparent” (Schoonhoven, Eisenhardt and Lyman 1990: 180). Also, product newness is conveyed through its visual design (Radford and Bloch 2011; Talke et al. 2009), and this presents a challenge to the innovating firm in terms of how to differentiate a new product’s design from competitive products.

Despite these arguments, there are alternative perspectives suggesting a positive impact of product newness on product success, such as (1) newness being beneficial because it attracts publicity and attention from the media and consumers (Centeno and Hart 2012); (2) firms developing high-risk, high-technology, complex products having high-impact product programs (Cooper 1985); (3) newness in terms of design having an immediate and persistent effect on new product sales (Talke et al. 2009); (4) product newness to the firm to be more prevalent in active entrepreneurs compared to passive entrepreneurs (Avlonitis and Salavou 2007).

Nevertheless, when we consider the concept of newness to the firm when the firm in question is an SME, we believe that arguments relating to lack of resources and experience in the consumer need served, and coping with uncertainty to be more relevant. SMEs are likely to face constraints in financial and human capital that will impinge on their ability to manage the media and consumers, draw on deep pockets and other buffering mechanisms when problems arise as a result of being new to the specific need served and develop high-impact launch programs in multiple markets. Various empirical studies provide empirical evidence for a negative link between newness to the firm and launch performance. Cooper (1985) found technologically aggressive firms to have a lower success rate with their products.

Atuahene-Gima (1996) found that both product newness to customers and product newness to the firm have negative impacts on performance outcomes. Goldenberg et al. (2001) found that a high technology leap for the firm will be linked with product failure. We hypothesize:

*H1: Product newness to the firm is negatively related to product launch success in an SME.*

### **Management Control Systems**

Management control is the process of implementing a firm's strategy: once a firm has decided to aim for a certain goal, it has to make sure that it achieves this goal by designing and applying control mechanisms (Anthony and Govindarajan 2004; Merchant and van der Stede 2012). Management control mechanisms specifically aim to influence employee behavior to achieve the organization's goals (Merchant 1982). Such mechanisms can be formal, based on defined procedures and regulations, or they can be informal, resulting from the way employees can relate to the organization's goals and their colleagues, and the way in which they interact and share information (Ouchi 1979; Voss and Brettel 2014). Formal controls are often subdivided into controls at the behavioral or process level, and controls at the results or output level, while informal controls focus on the human input into organizational processes: the existence of an organizational culture that leads to goal alignment between firm and employee as well as interaction and communications among employees (Merchant 1982; Merchant and van der Stede 2012). Control mechanisms involving action controls consist of prescription at the task level and frequent monitoring of whether employees follow the prescriptions, while results controls measure whether targets are achieved. Action and results controls are more formal in that they consist of predefined procedures and targets. They necessarily require planning, monitoring and measurement. Simons (1995, p. 5) describes such formal management control systems as "formal,

information-based routines and procedures managers use to maintain or alter patterns in organizational activities.”

As informal controls facilitate information exchange and shared objectives between employees, the impact on innovation is expected to be positive (Turner and Makhija 2006). Janssen et al. (2006) suggest that employee interaction enables them to draw on shared knowledge, including experiences regarding specific innovative activities which have not been codified in the formal controls. Additionally, the interaction may lead to higher levels of trust and cooperation among employees, which are supportive of innovative activities to the extent that they facilitate intrinsic motivation and freedom of employees to achieve innovations (Abernethy and Brownell 1997; Amabile 1998). The empirical evidence on the impact of informal controls provides support for this. Janssen et al. (2006) find that informal control is positively related to both explorative and exploitative innovation, while Ylinen and Gullkvist (2014) find a positive impact for exploitative innovation, but no relationship with explorative innovation. We posit:

*H2: The use of informal controls is positively related with product launch success in an SME.*

A significant amount of literature has suggested that formal controls have a negative impact on innovative activities (Damanpour 1991; Davila et al. 2009b; Ouchi 1979; Shalley et al. 2004). The definition of innovation as deviation of existing practice or knowledge (Rogers 1983) leaves little room for predefined courses of action or targets as a means of control. This suggests that formal controls are not conducive to goal achievement. However, the literature also offers a different view on the relationship between innovative activities and control, particularly in high-technology environments (Olausson and Berggren 2010). Control mechanisms can be used to mitigate the risks of employees spending time developing ideas

that are not in line with company strategy, or consistent with the company's experience in the market. Furthermore, formal controls may help in improving the information flow within an organization, helping to close the gap between the new knowledge required to innovate, and the existing knowledge within the organization (Turner and Makhija 2006). Reviewing the literature, Davila, Foster and Li (2009a, 295) stress that the routines enforced by formal controls provide a stable background for innovations: "Control provides stable yet adaptive frameworks and mental models that facilitate communication among team members and consistent objectives in a setting with new information that requires quick reactions".

The literature has empirically investigated the relationship between control and innovative performance in relation to the nature of the innovative activities. For example, Janssen et al. (2006) find that exploitative or incremental innovation is *positively* related to formalization, while explorative or radical innovation is *negatively* related to centralization of organizational authority. Cardinal (2001) finds that radical innovation (new drug innovation) is facilitated by more formalization involving standard procedures and strict enforcement of rules, but that incremental innovation (drug enhancement) is negatively related with such formalization. Cardinal (2001, p. 30) suggests that this is the result of drug enhancement "limit[ing] the variance of activities that can be pursued" – in other words, the organizational environment is more structured in this case. Likewise, Ylinen and Gullkvist (2014) find that formal controls are positively related to explorative innovation but not to exploitative performance. Thus, the empirical literature provides a mixed picture of the impact of formal controls on innovation, but formal controls appear to be more facilitating in achieving innovation than suggested by e.g. Amabile (1998). This leads us to the following hypothesis:

*H3: The use of formal controls is positively related to product launch success in an SME.*

## **Dealing with the Issue of Newness through Management Controls**

In addition to these direct effects of informal and formal control mechanisms on product launch success, we also argue that management controls will enable the firm to deal with the challenge of product newness internally. From a knowledge-sharing perspective, control mechanisms that encourage members of staff to meet and interact will help alleviate issues related to the firm's inexperience and unfamiliarity with the newly developed product or service (Bisbe and Malagueño 2015). These issues of ambiguity, lack of experience and uncertainty will require the firm to create and share knowledge internally. Research has shown that introducing feedback and iteration between those involved in the product development process will support 'learning and probing', essential in situations where the product is new to the firm (Jin 2000). Internal knowledge sharing will be essential to solving problems and misunderstandings related to the new product. Problems that may need to be addressed include how to differentiate the new product from other products in the company's portfolio, how to differentiate the new product from competitor products, explaining to customers why certain product features were developed and not others, providing clarity on outcomes from product testing and how adherence to standards were met, and any other questions that may be raised internally by those responsible for pursuing the product launch activities (Henri 2006; Simons 1995). Management control mechanisms that support an internal environment in which knowledge sharing can be carried out efficiently will be beneficial to the product launch process (Mosey, 2005). Obstacles to sharing knowledge will hinder the product launch process, possibly to the extent that the launch schedule is delayed or competitors step in to launch their own products in the interim period. We argue that informal controls aimed at encouraging an internal environment that stimulates interaction and knowledge sharing will dampen the negative association between newness to the firm and product launch success.

*H4: The use of informal controls positively moderates the impact of product newness to the firm on product launch success in an SME.*

The argument that “the newer the product, the less knowledge there will be regarding the activities needed to complete the innovation process and launch the product successfully” is one that could imply the use of formal controls will be difficult. Formal controls that require decisions relating to product launch activities to be sanctioned from higher levels of management may incur delays and involve an unnecessary bureaucracy that slows down the product launch schedule. However, the hypothesized direct effect of formal control through an improved flow of information may be more relevant when the level of newness is higher: in this case, higher levels of uncertainty require more information exchange (Bisbe and Otley 2004; Jørgensen and Messner 2009; Turner and Makhija 2006). Furthermore, in the case of SMEs formal controls may involve less bureaucratic delays. Firstly, by their nature, SMEs will be smaller and more nimble and it is more likely that different layers of managers will be physically co-located. This will enable discussions around key decisions to be made quickly. Secondly, new product launches in SMEs will receive intense attention from senior decision-makers who themselves are more likely to have been involved in the founding of the enterprise. Leaders will be available to consider any resource trade-offs in an intrinsically uncertain setting. They will also be readily available to consider if and how any established administrative procedures might need to be adjusted for the launch of the new product. Furthermore, they will be able to readily assess whether additional funding or hiring external expertise will help in meeting challenges associated with newness to the firm. We posit the following:

*H5: The use of formal controls positively moderates the impact of product newness to the firm on product launch success in an SME.*

## **Methodology**

### **Sample**

We used a questionnaire survey of general managers in SMEs competing in high-technology industries to test our model. To select our target firms, we used industry lists from the Dutch Chamber of Commerce. Specifically, we targeted the following industries: ICT and electronic equipment, knowledge-intensive services (ICT services and consulting) and chemicals / pharmaceuticals. We chose these industries as they are highly knowledge-intensive, characterized by constant innovation and high levels new product introduction (D'Aveni 1994; Williams and Lee 2009). The sampling approach was part-purposive networking, and part-random. Networking with senior managers of high-technology SMEs provided us with 35 usable questionnaire responses and 15 in-depth interviews. All of the key informants who took part in interviews completed the questionnaire. Purposive sampling can be used in exploratory entrepreneurship research to construct a heterogeneous dataset (Dess et al. 1997). We were able to obtain heterogeneity in terms of type of product launched to the market by the firm (e.g., services as well as tangible products, business-to-business as well as business-to-consumer products), successful and less-successful products, as well as industry. In addition, networking by referral is a particularly useful data collection strategy in projects involving sensitive data (Berg 1988).

Following this, we ran a postal survey in The Netherlands targeting a randomly chosen sample of 500 SMEs competing in high-technology industries. The target frame for these firms was active incorporated firms with less than 250 employees, selected from the Dutch Chamber of Commerce trade registry. We conducted follow-up calls to non-

respondents after two weeks. The questionnaire captured data regarding a specific recent product launch made by the firm, as well as data at enterprise level relating to knowledge creation through market orientation and innovative orientation. This phase provided a further 53 usable responses (10.6% response). The feedback we received from our key informants regarding our low response rate was that many SME managers are reluctant to complete product launch surveys in part due to survey fatigue, and in part due to the sensitivity of performance information regarding recently launched products. Importantly, we found no significant differences for our variables of interest between the two sub-samples. After cases with missing values were eliminated, the final sample size for analysis was 76. Reflecting the competitiveness of fast-moving high-technology industries, the majority of the launched products were reported by the respondents as “first to market” or “early follower”.

The respondents reported their positions in various terms, with the majority as owner / founders, managing partners, managing directors, CEO, VP, head of business development, head of R&D, project manager and the like. Through personal contact with the participants, we were able to establish confidence that the respondents could understand the concepts of interest in this study. This personal contact also enabled us to verify that the respondents had sufficient experience of their enterprise and product launches in order to answer the items on the questionnaire accurately.

## **Measures**

The survey contained Likert style statements against which respondents were asked to indicate agreement on a 7-point scale (1 = disagree strongly, 7 = agree strongly). The items are listed in Table 1, which also gives the results of the factor analysis. This analysis was conducted using principal components with a Varimax rotation. Table 1 shows that all Likert-

based constructs load on separate factors with eigenvalues above 1, demonstrating acceptable discriminant validity. All constructs are measured by taking the average score of the items relating to each construct.

***Product launch performance.*** The dependent variable was based on Griffin and Page's (Griffin and Page 1993) advice for not restricting the measurement of market acceptance to a single aspect of product performance. Thus we followed Atuahene-Gima and Ko's (2001, p. 58) definition of new product performance: "the degree to which a new product is perceived to have achieved its market share, sales growth, and profit objectives" (4 items,  $\alpha = 0.91$ ).

***Newness.*** We measured newness asking for the extent to which the product was new to the firm in terms of need served, production process and production technology (3 items,  $\alpha=0.71$ ).

***Informal and formal controls.*** We measured the extent of informal and formal control with items from Jaworski and Kohli (1993) and from Capon et al. (Capon et al. 1992). Informal controls following Ouchi's (1979) clan interpretation were measured with items asking for perceptions of a friendly atmosphere, and accessibility of and cooperation between colleagues (4 items,  $\alpha=0.85$ ). Formal hierarchical control was measured using items on the importance of following the hierarchical line in decision making (3 items,  $\alpha=0.72$ ). The two constructs measure separate concepts. An organization can be formal in the way it requires employees to follow correct procedures (such as referring to higher ranking individuals within the organization) in decision making, even while it has a very open culture which fosters clan-like behaviour. The empirical results confirm this, with the factor analysis in Table 1 shows that the items load adequately on separate factors.

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Insert Table 1 about here  
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## **Control variables**

In addition to our main variables, we use six control variables. We controlled for firm size measured by the number of employees and for age of the firm, since larger and older firms have a longer track record regarding product launch success. These both were log transformed, as advised by Wooldridge (2006, p 198). By transforming these variables, the coefficients indicate the impact of a percentage change in the original variable rather than a change measured with an absolute number: an increase of 5 employees is very different from a base level of 20 (growth is 25%) than from a base level of 2000 (growth is 0.25%). However, the regression results do not change when we use the level variables rather than the log-transformed variables for employees and age.

We also included two dichotomous dummy variables controlling for whether the firm was in a services industry or high-technology manufacturing (with 1 indicating services, 0 otherwise), and whether the firm exported its products or services abroad (with 1 indicating an exporting firm, and 0 a non-exporting firm). Although we have a relatively homogenous sample of high-tech SMEs, the different nature of services versus manufacturing firms (e.g. Roth and Menor, 2003; Choi and Williams, in press) suggest that it is prudent to control for this characteristic. Burton and Schlegelmilch (1987) find that exporting firms are more committed to the development of new products and services.

Market orientation is seen in the literature as an important antecedent of new product performance, with higher market orientation correlated with better performance (Atuahene-Gima 1996b; Slater and Narver 1994). We constructed a scale for capturing market orientation based on listening to – and responding to – the opinions of customers. The items were adapted from Ruekert (1992), and included: the degree to which a firm listens to opinions of customers, the degree to which promises made to customers are held, whether

objectives are based on customer needs and whether ideas are obtained from customers to improve products (4 items,  $\alpha = 0.71$ ).

Additionally, the firm's attitude towards innovative behavior has been identified as an important predictor of its profitability (Galende and de la Fuente, 2003). Mohr (1969, p. 112) stressed that a sense of readiness of an organization to adopt new patterns of behaviour is crucial for the development of new products and their successful launch. We constructed a scale for innovative orientation based on top management support for innovation within the firm. We used items relating to management commitment and involvement in innovation (Atuahene-Gima and Ko 2001; Cooper and Kleinschmidt 1987; Jaworski and Kohli 1993) (3 items,  $\alpha = 0.86$ ). The factor analysis in Table 1 shows that these two constructs load adequately on separate factors.

## **Results**

Table 2 presents the descriptive information and Table 3 the bivariate correlations. The correlation matrix suggests product launch performance is associated with informal control, as well as with market orientation and innovative orientation. Newness and formal control do not exhibit a bivariate relationship with product launch performance. None of the correlation coefficients are exceedingly high, suggesting that multi-collinearity will not affect how we interpret the results. Variance inflation factors in subsequent regression models were also within acceptable levels.

Regarding the control variables, we see that market orientation has a strong impact on product launch success, as expected from the literature, while innovative orientation has a smaller but still significant positive effect. The other control variables do not correlate with product launch success, but the pattern of significant correlations with the main independent variables connects well with the existing literature. Firm size, as measured with the number

of employees affects the control system design. It is known from past research (e.g. Child, 1972; Jaworski et al., 1993) that larger firms have higher levels of formal control, and lower levels of informal control, and this is what we find within our sample of SMEs: larger SMEs rely less on informal controls ( $r = -.23, p < .05$ ) and more on formal controls ( $r = .21, p < .1$ ). At the same time, we see no significant relationship between size and product launch success ( $r = -.07, p > .1$ ) or newness ( $r = -.04, p > .1$ ) within our sample. As expected, service firms use more informal controls ( $r = .26, p < .05$ ) and less formal controls ( $r = -.22, p < .1$ ) than manufacturing firms in our sample, supporting previous literature highlighting difficulties of using formal control mechanisms in services relative to a manufacturing setting (Atuahene-Gima, 1996a; Chenhall, 2003). Finally, more mature firms use less informal controls ( $r = -.46, p < .01$ ), and experience lower levels of newness in product launch activities ( $r = -.26, p < .05$ ) (Moore and Yuen, 2001).

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Insert Table 2 and Table 3 about here  
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Table 4 presents the regression models with product launch performance as the dependent variable, using robust standard errors (Wooldridge, 2006). To facilitate interpretation of the interaction models, we report regression results using standardized variables for all multi-item constructs (Jaccard, Turrisi & Wan, 1990). The first model contains control variables only (Model 1). We see that of the control variables only market orientation is significantly related to product launch performance. This pattern for the control variables remains the same for all other models, confirming existing findings regarding ties with customers and product launch performance (Fredberg and Piller 2011). Next, we introduce the independent variables in a stepwise fashion, starting with the direct effects (Models 2 and 3) and continuing with the indirect effects (Model 4). In Models 2 and 3 we

see that the coefficient on newness is significantly negative, supporting Hypothesis 1: if a product is newer to the firm, the success of the product launch is lower. We also see that both informal and formal types of management control have a positive relationship with product launch success, as Hypothesis 2 and 3 predicted. Finally, Model 4 shows that informal control interacts positively with product newness, but the interaction of newness with formal controls is not significant. Thus Hypothesis 4 is supported, but we do not find support for Hypothesis 5. The interaction plot for Hypothesis 4 is shown in Figure 1.

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Insert Table 4 and Figure 1 about here  
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## **Discussion**

We take a management control approach to analyse new product launch performance in high-technology SMEs. Management control is the process of implementing a firm's strategy and making sure that the firm achieves its goals (Anthony and Govindarajan 2004; Merchant and van der Stede 2012). One of the most critical aspects of strategy in an SME is the firm's approach to launching new products to the market, and how it deals with the issue of newness (Bonner, 2010; Goldenberg et al., 2001; Jin, 2000). Undertaking this successfully represents a significant challenge to SMEs, especially when the product or service in question involves new consumer needs being addressed, as well as fundamentally new process and production technology that the firm has not used in the past. Our study views product launch in terms of the interaction between organizational-level management control mechanisms and this product-level newness. We find that informal controls interact positively with newness in determining launch success, while formal controls only have a direct effect.

There are two main contributions to the SME literature from our study. Firstly, the research highlights the importance of management control theory to our understanding of

product launch performance and competitive advantage of high-technology SMEs in fast-moving industries. In other words, management control matters in achieving product launch success: in addition to good ideas as a basis for relevant products and services, and a good understanding of customer needs, the way in which the organizational environment is controlled will impact the success. Our approach shows how it is possible to understand competitiveness and performance of SMEs through a management control lens by considering both the direct and the moderating effects that different control mechanisms have on the relationships between attributes of the SME's products and subsequent outcomes. This provides an alternative to recent approaches using a resource-based and dynamic capability lenses (Mosey 2005; Voss and Brettel 2014) and puts a focus instead on the internal organizational environment that managers have direct control over.

Secondly, while we show that it is important to consider the management control of SMEs when analysing activities within SMEs that are aimed at their competitiveness and survival, it is necessary to consider the moderating effects of different mechanisms. Our study helps explain how high-technology SMEs can leverage their innovative environment. Given that the link between innovation and performance is sometimes unclear, moderating factors that help overcome issues relating to innovativeness become more important (Li and Atuahene-Gima 2001, p. 1123). In our study, we find that informal control mechanisms involving easy information exchange and accessibility of organization members may help in dealing with negative aspects of higher levels of newness; however, this does not mean that formal controls such as having to go through higher management for decision making become less relevant. While this may vary from context to context, the general point here is that there are a range of management controls available to the firm (Anthony and Govindarajan 2004; Merchant and van der Stede 2012) and it will be necessary to consider differences in how they apply to constraints that face SMEs as they attempt to compete.

The results have important implications for managers, particularly those in high-technology SMEs. Firstly, while the negative impact of newness to the firm on product launch success is a reinforcement of existing findings, our research shows that the firm can act to overcome the potency of this effect through a conducive social environment within the firm. It can do this through establishing an appropriate social environment which allows for accessibility and openness between employees from various departments, and building a cooperative environment in which employees interact. Secondly, our study suggests that formal controls still matter (indeed, they have a significant direct effect), although they may not be as important as informal controls for dealing with newness. Managers will still need to engage in effective and responsive decision-making and keep tight control over the launch process. Internal innovative orientation is not without risk. Mitigating this risk and optimizing the chance of successful deployment of innovative resources can be achieved in part through formal controls. These allow managers to keep track over any decisions made by lower level managers and employees, especially those that may deviate from company strategy and make the market acceptance for new product or services less likely.

The present study also has limitations. Firstly, we were limited in terms of our sampling strategy, using a part-purposive, part-random approach to build a unique set of recent product launches within high-technology SMEs. Care must be exercised when generalizing the findings reported here to larger firms, and to firms from different types of industries and countries. Secondly, the sample size reported here is relatively small. Thirdly, our variables of interest are restricted to newness to the firm and not other types of newness (Bonner 2010; Goldenberg et al. 2001) and to informal and formal controls. The selection of these variables was made on the basis of prior literature, evidence gained through the interviews, and suitable loadings. However, there may be other variables, such as competitive and institutional pressures, technology-specific developments and trends (Lusch and

Laczniak 1987) that may explain product launch performance and that were not captured here.

Future research should extend the sample in terms of scope and size. Future work could also develop the scales used here into more refined aspects of newness and the firm environment. In addition, a deeper examination of the relationships between innovative orientation and product launch performance, and product launch performance, would benefit our understanding of strategy and management within high-technology SMEs. In particular, the trade-off in terms of costs and benefits between and innovativeness should be examined more precisely in light of more subtle forms of control available to managers. Overall, these avenues for further work would build on the current research in order to deepen our understanding of product launch success in high-technology industries from a management control perspective.

**Table 1. Questionnaire Items and Factor Analysis**

|  | Launch<br>Success | Newness     | Informal<br>Control | Formal<br>Control | Market<br>Orient | Innovative<br>Orient |
|--|-------------------|-------------|---------------------|-------------------|------------------|----------------------|
| Product achieved market share target                               | <b>0.77</b>       | -0.17       | 0.03                | -0.01             | 0.27             | 0.04                 |
| Product achieved sales target                                      | <b>0.86</b>       | -0.08       | 0.05                | -0.09             | 0.14             | 0.21                 |
| Product achieved profit target                                     | <b>0.91</b>       | -0.07       | 0.08                | 0.02              | 0.07             | 0.07                 |
| Product achieved acceptable return on investment                   | <b>0.88</b>       | 0.04        | 0.25                | 0.16              | 0.11             | -0.01                |
| Product (need served) was new to the firm                          | -0.14             | <b>0.61</b> | 0.39                | 0.18              | 0.22             | -0.09                |
| Production process was new to the firm                             | -0.06             | <b>0.87</b> | -0.09               | -0.05             | -0.06            | 0.07                 |
| Production technology was new to the firm                          | -0.09             | <b>0.83</b> | -0.05               | 0.00              | 0.02             | 0.06                 |
| There is cooperation among people in getting things done           | 0.19              | -0.08       | <b>0.76</b>         | -0.16             | 0.08             | 0.25                 |
| A friendly atmosphere prevails in this firm                        | 0.01              | -0.20       | <b>0.80</b>         | -0.08             | 0.18             | 0.14                 |
| It is easy to talk to with virtually anyone in this firm           | 0.25              | 0.04        | <b>0.72</b>         | -0.16             | 0.17             | 0.32                 |
| People are quite accessible to those in other departments          | 0.20              | 0.22        | <b>0.72</b>         | -0.09             | -0.04            | 0.38                 |
| Decision making style of management is authoritarian               | -0.06             | 0.11        | -0.27               | <b>0.60</b>       | 0.11             | -0.36                |
| A person who wants to make his own decision is quickly discouraged | -0.02             | -0.03       | -0.10               | <b>0.67</b>       | -0.05            | -0.46                |
| Even small matters have to be referred higher up                   | 0.14              | -0.02       | -0.12               | <b>0.84</b>       | -0.17            | 0.00                 |
| We listen to opinion of customers                                  | 0.21              | -0.05       | 0.20                | -0.29             | <b>0.60</b>      | 0.34                 |
| Our objectives are based on customer needs                         | 0.30              | 0.17        | 0.36                | -0.06             | <b>0.64</b>      | 0.23                 |
| Our strategy relies on market research                             | 0.35              | -0.09       | -0.10               | 0.29              | <b>0.59</b>      | 0.30                 |
| Our ideas are market-derived                                       | 0.34              | 0.01        | 0.17                | -0.26             | <b>0.67</b>      | -0.04                |
| Top management commitment to innovation is high                    | 0.09              | 0.12        | 0.28                | -0.12             | 0.28             | <b>0.75</b>          |
| Top management is highly involved in daily innovation management   | 0.07              | 0.02        | 0.28                | -0.08             | -0.03            | <b>0.83</b>          |
| Top management provides much resources for innovations             | 0.14              | 0.00        | 0.19                | -0.11             | 0.17             | <b>0.82</b>          |
| Cronbach alpha   | .91               | .71         | .85                 | .72               | .71              | .86                  |
| Explained variance   | .31               | .07         | .15                 | .05               | .06              | .10                  |
| Eigenvalue   | 6.58              | 1.39        | 3.08                | 1.04              | 1.21             | 2.02                 |

Bold numbers indicate measures loading above |.5| on the factor.  $N = 76$ .

**Table 2. Descriptives**

| Variable               | Mean | Median | S.D. | Min  | Max  |
|------------------------|------|--------|------|------|------|
| Launch Success         | 4.22 | 4.25   | 1.41 | 1    | 7    |
| Newness                | 4.29 | 4.33   | 1.58 | 1    | 7    |
| Informal Control       | 5.96 | 6      | 0.94 | 2    | 7    |
| Formal Control         | 3.15 | 3      | 1.28 | 1    | 6    |
| Market Orientation     | 4.16 | 4.2    | 0.78 | 1.6  | 5.6  |
| Innovative Orientation | 5.36 | 5.33   | 1.23 | 2    | 7    |
| Log Employees          | 3.74 | 3.4    | 1.59 | 0    | 9.1  |
| Log Age                | 3.03 | 2.94   | 1.01 | 0.41 | 5.34 |
| Exporting              | 0.76 | 1      | 0.43 | 0    | 1    |
| Services               | 0.46 | 0      | 0.5  | 0    | 1    |

**Table 3. Correlations**

|                           | 1                 | 2                 | 3                  | 4                  | 5                 | 6                  | 7                 | 8                  | 9                 | 10   |
|---------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|------|
| 1. Launch Success         | 1.00              |                   |                    |                    |                   |                    |                   |                    |                   |      |
| 2. Newness                | -0.16<br>(0.17)   | 1.00              |                    |                    |                   |                    |                   |                    |                   |      |
| 3. Informal Controls      | 0.33***<br>(0.00) | 0.08<br>(0.50)    | 1.00               |                    |                   |                    |                   |                    |                   |      |
| 4. Formal Controls        | -0.03<br>(0.79)   | 0.01<br>(0.90)    | -0.42***<br>(0.00) | 1.00               |                   |                    |                   |                    |                   |      |
| 5. Market Orientation     | 0.57***<br>(0.00) | 0.03<br>(0.80)    | 0.44***<br>(0.00)  | -0.22*<br>(0.05)   | 1.00              |                    |                   |                    |                   |      |
| 6. Innovative Orientation | 0.24*<br>(0.04)   | 0.08<br>(0.48)    | 0.60***<br>(0.00)  | -0.46***<br>(0.00) | 0.45***<br>(0.00) | 1.00               |                   |                    |                   |      |
| 7. Log Employees          | -0.07<br>(0.55)   | -0.04<br>(0.76)   | -0.23**<br>(0.04)  | 0.21*<br>(0.07)    | -0.01<br>(0.91)   | -0.11<br>(0.32)    | 1.00              |                    |                   |      |
| 8. Log Age                | -0.04<br>(0.73)   | -0.26**<br>(0.02) | -0.46***<br>(0.00) | 0.11<br>(0.34)     | -0.20*<br>(0.09)  | -0.35***<br>(0.00) | 0.35***<br>(0.00) | 1.00               |                   |      |
| 9. Exporting              | 0.09<br>(0.46)    | -0.17<br>(0.13)   | -0.15<br>(0.20)    | 0.16<br>(0.18)     | 0.06<br>(0.62)    | -0.10<br>(0.40)    | 0.36***<br>(0.00) | 0.24**<br>(0.03)   | 1.00              |      |
| 10. Services              | -0.10<br>(0.41)   | -0.04<br>(0.76)   | 0.26**<br>(0.02)   | -0.22*<br>(0.05)   | -0.05<br>(0.65)   | 0.14<br>(0.23)     | -0.06<br>(0.59)   | -0.45***<br>(0.00) | -0.29**<br>(0.01) | 1.00 |

\* Significant at  $p < .10$

\*\* Significant at  $p < .05$

\*\*\* Significant at  $p < .01$

**Table 4. Regression Analysis**

|                             | (1)               | (2)               | (3)               | (4)               |
|-----------------------------|-------------------|-------------------|-------------------|-------------------|
| Constant                    | 4.06***<br>(0.00) | 4.40***<br>(0.00) | 4.05***<br>(0.00) | 3.82***<br>(0.00) |
| Log Employees               | -0.10<br>(0.21)   | -0.08<br>(0.36)   | -0.10<br>(0.28)   | -0.09<br>(0.33)   |
| Log Age                     | 0.13<br>(0.42)    | 0.04<br>(0.84)    | 0.16<br>(0.33)    | 0.24<br>(0.13)    |
| Exporting                   | 0.23<br>(0.53)    | 0.12<br>(0.75)    | 0.10<br>(0.77)    | 0.05<br>(0.90)    |
| Services                    | -0.04<br>(0.90)   | -0.16<br>(0.57)   | -0.11<br>(0.73)   | -0.13<br>(0.68)   |
| Market Orientation          | 0.81***<br>(0.00) | 0.80***<br>(0.00) | 0.74***<br>(0.00) | 0.74***<br>(0.00) |
| Innovative Orientation      | 0.02<br>(0.93)    | 0.02<br>(0.93)    | -0.00<br>(0.99)   | 0.01<br>(0.95)    |
| Newness                     |                   | -0.24*<br>(0.09)  | -0.23*<br>(0.08)  | -0.24*<br>(0.06)  |
| Informal Controls           |                   |                   | 0.32*<br>(0.10)   | 0.44**<br>(0.04)  |
| Formal Controls             |                   |                   | 0.25*<br>(0.09)   | 0.25*<br>(0.09)   |
| Newness x Informal Controls |                   |                   |                   | 0.26**<br>(0.03)  |
| Newness x Formal Controls   |                   |                   |                   | 0.17<br>(0.13)    |
| $R^2$                       | 0.338             | 0.362             | 0.403             | 0.433             |
| Adjusted $R^2$              | 0.281             | 0.297             | 0.322             | 0.336             |
| F                           | 8.494             | 8.343             | 8.661             | 7.505             |

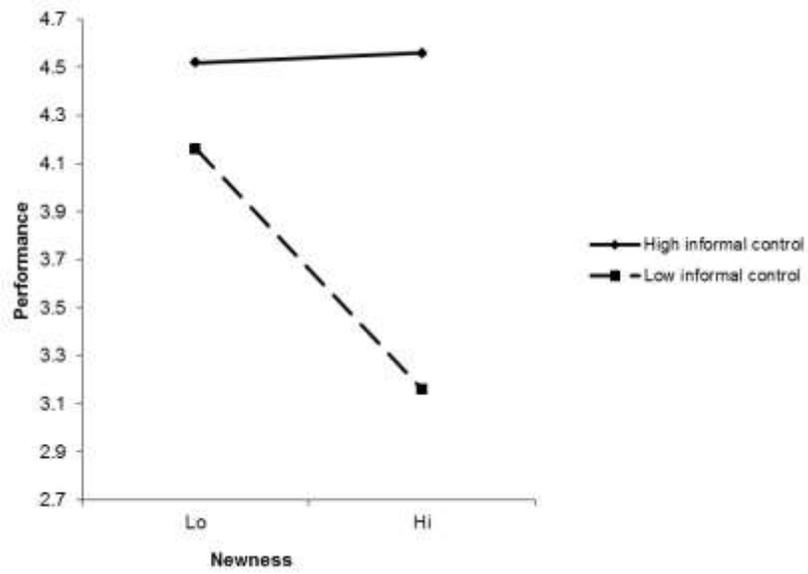
Dependent variable: Launch Success; N = 76. Robust standard errors in parentheses.

\* Significant at  $p < .10$

\*\* Significant at  $p < .05$

\*\*\* Significant at  $p < .01$

**Figure 1: Interaction Plot Newness and Informal Controls**



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