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Foresight capabilities and SME product/service adaptiveness: the moderating effect of industry dynamism

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Abstract

This study empirically examines the impact of 'first-order' foresight capabilities on SME product/service adaptiveness (PSA). It further tests the moderating effect of environment dynamism (IND) on the associations between these first-order foresight capabilities and SME product/service adaptiveness (PSA). The results of the study have endorsed that foresight capabilities, specifically, environmental scanning, developing network ties, analysing, industry dynamics, and planning and visioning all have high level of direct impact on SMEs ability to strategically adapt their products or services to the market and customer needs. However, the results find no support for the interaction effect of industry dynamics on these associations. These findings *contribute to the foresight and capabilities literature. Research and practical implications are discussed.*

Key Words: Foresight capabilities, industry dynamism, product/service adaptiveness, network ties, environmental scanning, planning and visioning, Croatia.

Introduction

The concept of strategic foresight has become an important research agenda among scholars in management and futures studies (Amsteus, 2011; Paliokaitė et al., 2014). This is occasioned by the complexity, dynamism and uncertainty of the shifting external business landscape within which organisations operate (Vecchiato, 2015). Organisations are encountering a variety of political, economic, environmental, technological and societal changes that impact consumer

preferences, requiring sustained rapid responses from organisations (Chermack et al., 2001). Particularly, fast paced innovations of products and business models, coupled with the globalisation of markets are intensifying competition and pressure on productivity (Burmeister et al., 2004; Vecchiato, 2015). As the world progresses into the knowledge age, changes and complexities are likely to intensify. Organisations will require more thorough ability to creatively capture and synthesis relevant information into meaningful future-oriented knowledge in order to survive and perhaps create and capture sustainable value (Chermack et al., 2001; Paliokaitė et al., 2014).

This situation has positioned foresight as a dominant logic for organisations operating in this fast-paced business environment (Paliokaitė et al., 2014), and an important research agenda among scholars (Vecchiato, 2015). While research on foresight is relatively recent and increasing (Amsteus, 2011; Wilkinson, 2009), scholars have acknowledged the numerous and sometimes conflicting conceptualisations of the concept (Paliokaitė et al., 2014; Sarpong et al., 2013). Previous research has also suggested a positive role of foresight practices and capabilities on firm performance (Amsteus, 2008; 2011; Paliokaitė et al., 2014; Rohrbeck, 2012). Yet, scholars have bemoaned the lack of empirical studies on foresight and called for empirical and quantitative examination of the concept and its relationship with firm performance (Amsteus, 2008). Hideg et al. (2014) further point out lack of empirical examination of the interaction between foresight practices and processes. Few studies have however empirically examined the direct association between foresight and firm performance but at the broadest level (Paliokaite, 2013; Vecchiato, 2015), normally in large organisations with few exceptions (Hideg et al., 2014; Jannek and Burmeister, 2007). Nevertheless, we are less knowledgeable about the concrete impact and value of foresight practices and the interaction of the environment dynamism on firm performance (Vecchiato, 2015).

Within the SME context, some scholars suggest a number of difficulties that hinder SMEs from engaging in foresight activities (Gilmore *et al.*, 2001; Nyuur, 2015; Robinson and Pearce, 1984). Others however acknowledge that SMEs indeed do engage in strategic foresight practices in order to survive in the sophisticated and uncertain business environment (Bianchi, 2002). Jannek and Burmeister (2007) observe that SME foresight needs are substantial but have stayed below the scholarly radar notwithstanding the immense contribution of SMEs. To enhance our understanding of this issue and move research on strategic foresight forward, we accept the call to empirically examine the association between Paliokate et al., (2014) conceptualised second-order foresight capabilities and SME performance. Specifically, this paper empirically examines (1) the ability of SMEs to engage in foresight activities, and (2) the relationship between SME foresight capabilities and their product/service adaptiveness, (3) the moderating effect of industry dynamism on these relationships.

Following this introduction, the next section explores the literature on foresight and develops hypotheses to be tested. The next stage discusses the methodology adopted in collecting and analysing the data. This section is followed by the results and discussion sections. Research and practical implications are then discussed before limitations and recommendations for further studies presented.

Theory and hypotheses

Foresight has been referred to variously as an assortment of future oriented practices, process, behaviour, programmes, techniques, tools, and sometimes capabilities (Asmteus, 2008; Fink et al., 2005; Horton, 1999; Oner and Saritas, 2005; Paliokaitė et al., 2014). Terms such as corporate foresight, managerial foresight, strategic foresight and at times national foresight have been used interchangeably within the literature to refer to future-oriented techniques and practices (Hirsch et al., 2013; Major et al., 2001; Rohrbeck, 2012). Perceived as the absence of

randomness or luck (Ahuja et al, 2005), foresight is defined as the process of analysing present conditions based on both past and present events and projecting likely events in the future (Amsteus, 2008; 2011; Slaughter, 1996).

A number of practices and techniques have equally been suggested as essentials of foresight with notable ones being scenario planning, environmental scanning, technology road mapping, trend analysis, and real options analysis (Boyd and Fulk, 1996; Sarpong, 2011; Schoemaker, 1993; Vecchiato, 2015). Accordingly, these techniques enable firms to reduce the level of uncertainty and improve the ability of perceiving plausible future changes and challenges that can affect the firm or the entire industry (Amer *et al.*, 2013; Chermack, 2005; Chermack *et al.*, 2001; Paliokaitė et al., 2014). Some researchers have therefore acknowledged the numerous conceptualisations of foresight with subtle differences/contradictions coupled with the difficulty in measuring the value and impact of these concepts on firm performance (Paliokaitė et al., 2014). Scholars have however questioned the reliability of these techniques to forecast future events with certainty and as a result have criticised the theoretical foundations of these tools. Accordingly, the accuracy of such future oriented practices and techniques in predictions usually diminish in the medium to long run (Vecchiato, 2015). The reasoning behind this argument is that, economic, social, political, environmental and technological factors interact with one another over time in an unpredictable and novel ways (Eisenhardt et al., 2010).

Researchers have also acknowledged the lack of theory development in foresight studies (Paliokaitė et al., 2014). Notwithstanding, the arguments and conceptualisation of foresight practices and techniques align very much with the industrial organisation (IO) theory, the complexity theory and the capabilities theory. The industry organisation (IO) theory (Grant, 2013; Tirole, 1988) acknowledges the complexity and dynamism of the external business environment making the future uncertain for firms (Amer et al., 2013). The theory recommends

the consistent and systematic probing of the political, economic, socio-cultural, technological and environmental drivers and their interplay to comprehend and adapt to the dynamism in the external environment. Similarly, the complexity theory emphasise that the external business environment is made up of numerous and varied factors impacting, mediating and moderating each other and actors in complex manner within the external environment (Stacey, 1995).

The capability theory and the industrial organisation theory are both relevant lenses in foresight studies as organisational capabilities, referred to as foresight practices, are important in scanning and making sense of the drivers and dynamism of the external environment (Barney, 1991; Mahoney and Pandian, 1992; Penrose, 1959). According to the capability theory, organisations that develop and deploy foresight capabilities (practices and techniques) have a much better chance of meeting and managing potential future shocks and changes in the external business environment (Schwartz, 1991; Wack, 1985). These capabilities can be leveraged into new business lines, product lines, or innovative marketing strategies.

Drawing on capabilities and foresight literature, Paliokaitė et al. (2014) conceptualised first-order and second-order foresight capabilities. The second-order foresight capabilities consist of environmental scanning, strategic selection and integrating capabilities. The first-order foresight capabilities on the other hand include among others networking, scanning, coordination, visioning, leadership, analysing, learning, and knowledge based. The first-order capabilities serve as subcomponents that underpin the second-order foresight capabilities. Accordingly, a firm that systematically deploys these capabilities effectively would be able to reduce its uncertainty, cope with industry turbulence, and better create and capture sustainable value than competitors (Paliokaitė et al., 2014; Vecchiato, 2015).

A number of researchers have speculated the link between these foresight capabilities and a number of performance mesures such as innovation, ambidexterity, organisational learning and

inter-firm performance (Amsteus, 2011; Andriopoulos and Gotsi, 2006; Bodwell and Chermack, 2010). In this study we adapt and empirically examine a number of these conceptualised first-order foresight capabilities and their impact on SME product/service adaptiveness (PSA). Specifically we examine the value of scanning, networking, planning and visioning, industry dynamism, and analysing as foresight capabilities on SME PSA. Furthermore we test the interaction effect of environment dynamism on the association between these first-order foresight capabilities and PSA.

Industry Dynamism

The foresight scholarship has acknowledged the increasing dynamism and hostility of the global business environment (Jannek and Burmeister, 2007; Moreno and Casllas, 2008; Sarpong et al., 2013; Vecchiato, 2015). The emergence of the internet, rapid technological changes, and the constant interaction of political, economic, social and technological factors have contributed to numerous fast-paced changes and genuine uncertainties in the business environment (Sarpong et al., 2013; Vecchiato, 2015) as underscored by the complexity theory (Amer *et al.*, 2013; Stacey, 1995). Research suggests that the dynamism of the business environment has a direct impact on firm performance (Lumpkin and Dess, 1996). Accordingly, more opportunities are greater in such dynamic environments and can be derived from product adaptation, new product development, and access to new markets (Moreno and Casillas, 2008).

Dynamic and hostile business environments also tend to motivate firms to be more proactive and aggressive in search of better performance and the capture of sustainable competitive advantage (Lumpkin and Dess, 2001). Studies have argued that such dynamic environments are good and suitable for small and medium enterprises because of their entrepreneurial orientation and behaviour (Coven and Slevin, 1989; Miller and Firesen, 1983). Such firms are quick to identify opportunities and have the propensity for proactive innovation

(Lumpkin and Dess, 1996). Accordingly, dynamic and hostile environments are conducive for carrying out radical adaptation and strategic innovations by firms (Porter, 1985). Based on the above arguments we are of the view that the dynamism of the business environment will influence SMEs product or service adaptiveness. Summing up these arguments, we therefore hypothesise that:

H1: *Industry dynamism is positively associated with SME Product/Service adaptiveness.*

Environmental Scanning (ES)

Environmental scanning (ES) involves the systematic and continual evaluation of key driving forces of change in the firms' external environment (Paliokaitė et al., 2014). It is through the scanning process that relevant past and present data as well as future projections in the external environment are collected and collated for further analysis (Amsteus, 2008). It spans political, economic, social, technological and competitive forces interacting and impacting dynamism and change in the firm external environment (Amer et al., 2013; Jannek and Burmeister, 2007). The relevance of these forces in shaping competitive position and survival chances of firms has been underscored by the industrial organisation theory. Theory holds that these core external factors determine the achievement and sustainability of competitive advantage (Grant, 2013; Tirole, 1988). Environmental scanning is suggested to be one of the most important foresight practice and capability (Vecchiato, 2015).

Research has suggested a positive association between environmental scanning and other desirable organisational outcomes such as ambidexterity, innovation, adaptive learning, and strategic agility (Bodwell and Chermack, 2010; Paliokaitė, 2013; Rohrbeck and Gemünden, 2011; Sarpong et al., 2013). This foresight practice and capability enables firms to gather the necessary information in order to understand the dynamics prevailing in its industry and be in a position to promptly adapt its products or services to changing market needs. We therefore

argue that, the systematic probing of drivers in the external environment will enhance SME product/service adaptiveness. Notwithstanding, scholars have questioned the reliability and accuracy of some these foresight techniques to deliver value to firms in the medium to long run (Vecchiato, 2015). They argue that the impact these foresight practices tend to diminish in the medium to long run, because factors in the external environment interact with one another over time in an unpredictable ways (Eisenhardt et al., 2010). Some scholars have thus suggested a moderating effect of environment dynamism on firm performance (Lumpkin and Dess, 2001; Moreno and Casillas, 2008; Zahra and Garvis, 2000). We therefore argue that when the dynamism or hostility in the external environment is so intense, the direct impact of the scanning on firm performance would diminish. For this reason, we hypothesise that:

H2-1: *Environmental scanning capability is positively associated with SME Product/Service adaptiveness.*

H2- 2: *The industry dynamism moderates association between environmental scanning and SME Product/Service adaptiveness, such that the more dynamic the firm industry, the lower will be the impact of scanning capability on SME Product/Service adaptiveness.*

Networking ties (NT)

Developing network ties enables firms to share information with relevant stakeholders in the business environment. Some of these stakeholders include, competitors, customers, suppliers and politicians (Peng and Luo, 2000; Wu, 2011). Such networks also help SMEs proactively and strategically posture themselves as well as adapt their products/services for good performance (Moreno and Casillas, 2008). Scholars have suggested that SMEs have substantial constraints which inhibit their ability to use a wide range of foresight practices or techniques and therefore rely heavily on developing network ties in order to understand the

external environment and strategically adapt to changes in the external environment (Gilmore et al., 2001; Nyuur, 2015; Wu, 2011). Moreover, SMEs are found to struggle in using more complex foresight techniques and therefore tend to use networking and other simple foresight methods such as brainstorming, desk research, and expert interviews for monitoring and understanding the business environment (Jannek and Burmeister, 2007; Johnston et al., 2008).

The positive association between networking and SME strategic adaptiveness, ambidexterity, as well as its overall performance has be emphasised (Gilmore et al., 2006; Moreno and Casilas 2008; Paliokaitė, 2013). Accordingly, such networks facilitate the recognition of market and technological opportunities that enable SMEs to effectively adapt their products/services in line with market demands (Paliokaitė et al., 2014). We are therefore of the view that, developing network ties enhances SME product/service adaptiveness. However, when the hostility and dynamism of the external business environment is so intense, the value of networking to SMEs' ability to strategically adapt their products and services would diminish. The above arguments lead to the next hypotheses that:

H3-1: *Networking with other stakeholders has a positive impact on SME Product/Service adaptiveness.*

H3- 2: *The industry dynamism moderates association between networking and SME Product/Service adaptiveness, such that the more dynamic the firm industry, the lower will be the impact of networking on SME Product/Service adaptiveness.*

Planning and visioning (PLV)

Planning and visioning involve the deployment of organisational resources and expertise for envisioning and goal-setting that support the organisational image in the future (Paliokaitė et al., 2014). Planning and visioning eliminates randomness and informs good decisions and actions (Ahuja et al., 2005; Amsteus, 2011). Scholars have associated planning and visioning

as foresight activities with good performance (Hideg et al., 2014; Paliokaitė, 2013). We therefore argue that planning and visioning will have a direct positive impact on SMEs' ability to strategically adapt their products and services to market needs. However, following the complexity theory (Stacey, 1995) and SME resource constraints argument (Gilmore et al., 2001; Nyuur, 2015), it is likely that the value of planning and visioning on SME performance would diminish with increase in dynamism and hostility in the external business environment. Based on the above, we hypothesise that:

H4-1: *Planning and visioning have a positive impact on SME Product/Service adaptiveness.*

H4- 2: *The industry dynamism moderates association between planning and visioning and SME Product/Service adaptiveness, such that the more dynamic the firm industry, the lower will be the impact of planning and visioning on SME Product/Service adaptiveness.*

Analysing (AN)

This foresight capability entails the interpretation of the collated data from the external environment to make sense of the potential future conditions and possible alternative future pathways (Paliokaitė et al., 2014). It involves examining present contingencies and moving the analysis over time into the future by evaluating courses of actions in the future a degree ahead in time (Amsteus, 2011). Techniques such as scenario analysis, real options analysis, trend analysis, simulations as well as econometric techniques are usually employed during this analysing process (Jannek and Burmeister, 2007; Vecchiato, 2015). Analysis techniques are central in making sound and informed decisions about present and future actions (Amsteus, 2011).

Foresight scholarship has suggested an association between the effective use of these analysis techniques in evaluating the plethora of data gleaned from the external environment and firm ambidexterity, innovation, and strategic adaptiveness (Bodwell and Chermack, 2010; Paliokaitė, 2013; Rohrbeck and Gemünden, 2011). We argue that effective analysis of relevant external data collected would enhance the quality of SME actions and decision making going into the future. It would further enhance their ability to strategically respond promptly and adapt their products/services to changing market needs. Notwithstanding, we are also of the view that, SMEs would struggle to effectively employ these analytical techniques in very high-velocity and hostile business environment because of their inherent resource limitations. Thus, in a very dynamic and intensely volatile business environment, we expect the impact of analysing on SME product/service adaptiveness to diminish. Summing up these arguments, we propose the following hypotheses:

H5-1: *Analysing has a positive impact on SME Product/Service adaptiveness.*

H5- 2: *The industry dynamism moderates the association between analysing and SME Product/Service adaptiveness, such that the more dynamic the firm environment, the lower will be the impact of analysing on SME Product/Service adaptiveness.*

METHOD

Sampling and Data Collection

We tested our hypotheses on a sample of 194 Croatian SMEs. Croatia is a transition country that recently joined the European Union and firms in this context have suddenly found themselves exposed to further competition within the widen Union. By focusing our data collection in Croatia, we respond to calls for studies in transition economies examining the impact of some foresight capabilities such as networking on SME performance (Peng and Luo

2000). The questionnaire used in this study was similar to the one developed by Paliokaitė (2013). Before the final questionnaire was administered, we pilot tested a draft with 5 SME managers and 2 academics. The piloting resulted in some changes made to the questionnaire before the actual data collection. Responses from the pilot sample were not included in the final sample. The official Croatian Finance agency database known as 'Business Croatia' (Poslovna Hrvatska) was used as it contained all the contact details of all SMEs in the country. A sample of 500 SMEs was randomly selected for the data collection.

The questionnaires were mailed to SME owners, directors or managers with a self-addressed and stamped envelope included for each respondent to mail the completed questionnaire back to the researchers. We began this process in early March, 2015 and closed the data collection at the end of May, 2015. Each SME in the sample was required to complete only one questionnaire and so one questionnaire was emailed to each of the 500 SMEs randomly selected in the sample. Out of the 500 questionnaires administered, a total of 194 fully completed and useful questionnaires were returned. The resulting effective response rate of 38.8% is acceptable in comparison to similar mail surveys (Agarwal and Ramaswami, 1992; Nakos and Brouthers, 2002), and higher than response rates in other recent studies (Sarkar et al., 2009; Scleimer and Pedersen, 2014). To test the nonresponse bias, we statistically compared the questionnaires we received at the beginning of the data collection with those received at the end and no significant statistical differences were observed.

The final sample of SMEs represented a broad spectrum of industries including, Telecommunication, construction, education, information technology (IT), security, manufacturing, service, tourism, retail, agriculture, medical, chemical, consulting, etc. The responding firms were also geographically scattered. Additionally, 62 percent of the firms were micro businesses with 10 or fewer employees, 27 percent were small sized firms with a maximum of 49 employees, and 11 percent were medium companies with more than 50

employees. Moreover, 39 percent of the firms operated not more than five years, 19 percent operated between six and ten years, 9 percent operated between eleven and fifteen years, 11 percent existed between sixteen and twenty years, and finally 22 percent operated for more than twenty years.

Measures

We introduce in this section the constructs used in our subsequent empirical tests. We used and where necessary adjusted items in existing scales from recent studies in measuring our variables (Jannek and Burmeister, 2007; Paliokaitė, 2013; Paliokaitė et al., 2014). The dependent and all the independent constructs were measured using multiple items on a 5-point Likert-type scale anchored by 1 (strongly disagree) and 5 (strongly agree). Each respondent was required to indicate how accurate each item captured their foresight capabilities examined in this study. The constructs as operationalised in this study are provided below.

Dependent Variable

SME's Product/Service Adaptiveness (PSA): The dependent variable was measured using eight-items borrowed from Paliokaitė (2013) and Paliokaitė et al. (2014) and adjusted accordingly to fit the purpose of this study (Cronbach alpha = 0.864). These items centred on refinement and improvement of products and services. Examples include '*We frequently refine the precision of existing products and services'*; *'we regularly implement small adaptations to existing products and services*'; '*we improve our provision's efficiency of products and services*' (see **Table 1** below for all the items of the construct).

Independent variables

Environmental scanning (ES): To develop the scale for measuring scanning (ES) as a foresight capability, eight items were borrowed and adapted for the purpose of this study from Jannek and Burmeister (2007), Paliokaitė (2013), and Paliokaitė et al. (2014). These items constituting the adjusted scaled measured the extent to which SMEs probe and gather information from the external environment through variety of means (Cronbach alpha = 0.785). **Table 1** contains the items of the construct.

Networking Ties (NT): Networking ties as a foresight capability was measured using four items borrowed from Paliokaitė (2013), and Paliokaitė et al. (2014) and adapted for this study. This scale lends itself for measuring SME networking with suppliers, customers and other stakeholders (Cronbach alpha = 0.586). See **Table 1** for all the items of this construct.

Analysing (AN): To measure this construct, six items were adapted from Jannek and Burmeister (2007), Paliokaitė (2013), and Paliokaitė et al. (2014). The items captured the extent to which SMEs use various techniques and approaches for interpreting and making sense of collated data (Cronbach alpha = 0.868).

Planning and Visioning (PLV) was measured with five items adapted from recent studies of Paliokaitė (2013), and Paliokaitė et al. (2014). These items examined SME capabilities in developing plans and objectives that align well with their vision (Cronbach alpha = 0.906). The items measuring this construct are illustrated on **Table 1**.

Industry Dynamism (IND): Finally, industry dynamism (IND) was measured using three Likert-type items (Cronbach alpha = 0.847). The items examined the dynamism and technological changes affecting SMEs in their industry. These three items were adopted from Paliokaitė (2013), and Paliokaitė et al. (2014). **Table 1** presents all the items of this construct.

Control variable

Two control variables were included in this study. We controlled for any potential influence caused by *Firm Size* (FS) and *Firm Age (FA).* This is because prior studies have revealed that firm size may influence the development of some foresight capabilities (Coviello et al., 2000; Peng and Luo 2000). Moreover, we are of the view that the longer a firm operates and gains experience and knowledge of the business environment, the more foresight capabilities it would develop. Firm size was therefore equated with the total number of employees in a firm (Peng and Luo 2000) while firm age was measured by the number of years the firm had operated.

[Insert Table 1 here]

Analysis and Results

We examined the reliability levels of the scales using Cronbach's alpha reliability analysis. The Cronbach alpha (α) values from this analysis satisfy the level of acceptable reliability criteria (Nunally 1978). Moreover, the presence of common method variance (CMV) was checked via confirmatory factor analysis of the survey items. The extraction of the six factor solution (see **Table 1)** using Harman's single factor test, confirms that CMV is not an issue to be concerned about in this study (Podsakoff and Organ, 1986). Additionally, the potential presence of multicollinearity in our dataset was further investigated. When correlation coefficients of variables are 0.9 or above and are highly correlated, Multicollinearity is usually considered to exist (Pallant, 2007). **Table 2** depicts the descriptive statistics (means, standard deviations) and correlation coefficients for the independent, dependent, and control variables. The strong correlation of the variables may suggest some presence of multicollinearity, however most of the coefficient values are below +/-.60.

[Insert Table 2 here]

Moreover, further analysis of the variance inflation factors (VIF) in our regression output (see **Tables 3 and 4**) showed that the VIF scores of between 1 and 3. These together eased concerns about multicollinearity in our data set (Nakos and Brouthers, 2002). Notwithstanding, we further checked if the inclusion of the interaction term in our hierarchical regression analysis resulted in multicollinearity problems. To do this we mean-centred the variables before forming the interaction terms. These results as reported in Table 4, were not materially different from the earlier results not reported here, indicating that multicollinearity was not a problem with the data set.

[Insert Table 3 here]

The hierarchical regression results on **Table 3** summarise the direct effects of the foresight capabilities on SME product/Service adaptiveness. Model 1 is the baseline model comprising the control variables, whilst models 2 to 6 show the direct effects of the independent variables. The predictive power of models 2 to 6 as denoted by the R^2 values is relatively strong as they are above the common threshold of 0.1 (Falk and Miller, 1992). This indicates that each model (except the base model) explains a high amount of the variation in SME product/service adaptiveness. All the models are highly significant and the effect of each independent variable represents a significant improvement over the baseline model (all $p< 0.001$). Specifically, industry dynamism ($\beta=0.513, p < 0.001$), environmental scanning ($\beta=0.288, p < 0.001$), networking ties ($\beta=0.451, p < 0.001$), analysing ($\beta=0.338, p < 0.001$), and planning and visioning ($\beta=0.417, p < 0.001$) were all significantly related to SME product/service adaptiveness in the predicted direction.

The results provide support for hypotheses: (1) **H1**, industry dynamism is positively associated with SME product/service adaptiveness; (2) **H2-1**, scanning the environment is positively associated with SME product/service adaptiveness; (3) **H3-1**, networking with other stakeholders has a positive impact on SME product/service adaptiveness; (4) **H4-1**, planning and visioning have a positive impact on SME product/service adaptiveness; and (5) **H5-1**, analysing has a positive impact on SME product/service adaptiveness. Finally, the results of the control variables are noteworthy. Model 1 which contains only the control variables (CVs) reveals that the CVs explain 5.5 percent of the variance in the SME product/service adaptiveness. Moreover, while firm age is not significant, firm size is significant in three of the six models.

[Insert Table 4 here]

In H2-2, H3-2, H4-2 and H5-2 we implied an interaction effect of industry dynamism (IND) on the association between the independent variables (ES, NT, AN, and PLV) and SME product/service adaptiveness. Table 4 presents the moderated regression models. Model 1 of Table 4 again is the baseline model of only the control variables, model 2 shows the direct effects of the foresight capability variables, and model 3 presents the interaction effect of industry dynamism (IND) with the IVs. The results show that introducing the interaction terms in model 3 neither significantly improves nor reduces the variance explained (R^2 value) when compared with model 2 that excludes them. Specifically, model 3 explains 43.1 percent (R^2 = 0.431, Adjusted R^2 = 0.391, *F* change = 0.52) while model 2 explains 43.0 percent (R^2 = 0.430, Adjusted R^2 = 0.405, *F* change = 21.082) of the variance in SME product/service adaptiveness (PSA). The change in the R^2 value in model 3 (that is a 0.001 increase) due to the inclusion of

the interaction terms is lower than the recommended threshold figure of 0.02 (Aryee et al. 2013; Huang et al., 2010).

Moreover, the interaction coefficients of IND with environmental scanning ($\beta=0.012$, $p > 0.05$), networking ties ($\beta=0.011$, $p > 0.05$), analysing ($\beta=0.023$, $p > 0.05$), and planning and visioning ($\beta=-0.023$, $p > 0.05$) are not statistically significant. The CVs in both models 2 and 3 also are not significantly related to SME product/service adaptiveness (PSA). These findings provide no support for our hypotheses **H2-2, H3-2**, **H4-2**, and **H5-2**. These hypotheses are therefore rejected.

DISCUSSION

Although previous research in foresight has suggested the role of foresight practices and capabilities on firm performance (Amsteus, 2008; 2011; Paliokate et al., 2014; Rohrbeck, 2012), few studies have empirically examined this association but at the broadest level (Paliokaite, 2013; Vecchiato, 2015) normally in large organisations except a limited number (Hideg et al., 2014; Jannek and Burmeister, 2007). Paliokaite (2013) examined the impact of environmental scanning capabilities, strategic selection capabilities, and integrating capabilities on organisational ambidexterity. Extending this line of research, the focal objective of this study was contribute to the limited but surging and mainly conceptual foresight literature by empirical examining the influence of foresight capabilities on SME product/service adaptiveness and the interaction effect of industry dynamism on these relationships. Altogether 9 hypotheses were tested with H1, H2-1, H3-1, H4-1 and H5-1 receiveing supported while H2-2, H3-2, H4-2, and H5-2 were not supported by the results. These findings have some important research and practical implications.

Implications and Contributions

Our study makes a number of contributions to the literature. First, the study takes a step further in a more refined way to examine some of the sub-components of the broader "second-order" foresight capabilities (Hideg et al., 2014; Paliokaite, 2013; Paliokate et al., 2014) and SME product/service adaptiveness in the competitive business environment. Building on the foresight and capabilities literature, the results of this study have endorsed that foresight practices and capabilities, specifically, scanning, developing network ties, analysing, industry dynamics, and planning and visioning all have high level of direct impact on SMEs ability to strategically adapt their products/services to the market and customer needs.

Second, scholars have acknowledged the lack of empirical examination of the interaction between foresight practices and processes (Hideg et al., 2014). This study therefore fills this gap by also examining the interaction effect of industry dynamism on the association between foresight capabilities and SME product or service adaptiveness. No significant interaction effect on these associations was found. These findings deviates from the argument that, industry dynamism due to the interaction of political, economic, social and technological factors in an unforeseeable ways, diminishes the accuracy of foresight activities in the medium to long term (Eisenhardt et al., 2010; Galbraith and Merrill, 1996). These groups of scholars recommend that firms should avoid foresight approaches such as planning, and visioning, and rather focus on adaptive approaches in the turbulent, uncertain and dynamic business environment. Our finding rather suggest that in order to continuously and effectively adapt their products and services to customer preferences in the ever changing business environment, foresight activities would be helpful. By this, the study has enriched the literature and provides a basis for scholars to further evolve the empirical examination of these issues.

Third, the introduction of PSA as an important performance measure in the foresight literature has important theoretical relevance. Though "adaptive approaches" have been mentioned in some previous foresight studies and conceptualised as the process of responding

to change events as they emerge (Doz and Kosonen, 2008; Vecchiato, 2015), the examination has not been systematic and detailed. In this study, product/service adaptiveness (PSA) is conceptualised as the ability of an SME to change the features of its products or services in response to consumer preference, or challenges caused by environmental turbulence. This conceptualisation and empirical examination also serve as grounding for future research to examine this issue more comprehensively.

Finally, while research acknowledges that SMEs have substantial limitations which inhibit their ability to use systematic foresight approaches (Bianchi, 2002; Jannek and Burmeister, 2008; Will, 2007), this study found that SMEs do indeed engage in foresight practices and in developing foresight capabilities. These practices enable them to strategically adapt their products and services in response to market dynamics. The study also established that SMEs do not depend only on developing network ties in order to understand the external environment and be able to react to changes in the external environment (Gilmore et al., 2001; Wu, 2011). They are able to develop foresight techniques and practice activities. In this sense, the findings in this study extend previous research claims that SMEs rely on heavily on networks in their strategic adaptation efforts (Coviello et al., 2000).

Practically, the findings in this study also present some implications. First, the findings imply that SMEs have foresight needs in their survival and competitive efforts. They are able to engage in foresight practices and in developing foresight capabilities such as scanning, networking, analysing, planning and visioning. These foresight capabilities are essential to SMEs' ability to effectively adapt their products and services in high velocity business environment in order to meet market changing needs. The results further underscore that SMEs do not have to only rely heavily on developing network ties in order to respond to industry and market changing demands, but also other foresight practices and techniques.

Finally, the non-significant effects concerning the moderating role of industry dynamism (IND) in the relationship between the IVs and PSA implies that all the measured foresight capabilities are very effective in helping SMEs strategically adapt their products and services, despite the intensity of changes taking place in their industry. It further implies that, as the changes in global business environment go into overdrive, foresight needs of SMEs would become stronger going into the future. Thus, those SMEs depending only on developing network ties while neglecting other foresight practices because of their limitations would struggle to understand the change drivers in the business environment. Such SMEs may therefore not be able to respond effectively by adapting their products and services promptly and effectively to the market needs and would struggle to create and capture competitive advantage.

Limitations and Future Research Directions

This study has a number of limitations that future work might address notwithstanding the important contributions it makes to literature and practice. First, not all the first-order foresight capabilities covered in the literature were empirically examined in this study. Future research can look to examining a comprehensive list of foresight "first-order capabilities" and practices and their impact on SME performance. This approach will further enhance our understanding of the relevance of various foresight activities on SME performance.

Secondly, SME product/service adaptiveness was used in this study as the performance measure. Further studies could employ different performance measures instead of focusing on SME product/service adaptiveness, innovation and ambidexterity as used in this study and other prior studies. Other performance measures such as return on assets (ROA), return on equity (ROE), sales growth, efficiency and productivity could be examined by future research. Despite the above limitations, the findings in this study have filled a research gap in the

foresight literature. The findings also provide scholars, SME owners, managers, policy makers, and practitioners with insights of how foresight capabilities affect different SME ability to strategically adapt their products/services in line with market needs particularly in the study context.

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Table 1: Varimax Rotated Factor Analysis for the Six Constructs

Construct Code: factor	Reference	Measurement Variable	Factor loadings
Environmental Scanning (ES)	ES1	We survey experts on their opinions, for example by using questionnaires, panels, focus groups, workshops, interviews, one to one meetings	.738
	ES2	We also scan for long-term developments in the markets and industries that we are not currently involved in.	.726
	ES3	We are scanning in all areas (technological, political, competitor, customer and socio-cultural environment).	.692
Cronbach's α=0.785	ES4	We also consider new issues, trends and technologies whose relevance to our business cannot yet be assessed.	.624
	ES5	We attend scientific conferences.	.597
	ES6	We participate in professional or industry association activities.	.564
	ES7	We conduct Internet and media research	.560
	ES8	We read specialized journals and magazines to keep abreast of market and technical trends	.546
Networking Ties (NT)	NT1	Employees of my company work jointly with customers to develop solutions	.827
	NT2	Employees of my company work jointly with suppliers in order to develop solution	.816
	NT3	Bringing external information into the company and maintaining an external network is encouraged by top management.	.600
Cronbach's α=0.586	NT4	We have an active network of contacts with the scientific community	.546
Analysing (AN)	AN1	In our company, we analyze the potential future conditions.	.818
	AN2	We use modelling for analysing future conditions (e.g. econometric modelling, simulation or systems models / systems analysis).	.816
	AN3	We forecast the potential future conditions.	.806
Cronbach's α=0.868	AN4	We use scenarios to describe and/or analyse potential futures.	.793
	AN5	We have a systematic vision development process.	.760
	AN6	We apply methods such as balanced scorecard, appreciation inquiry, road-mapping.	.661
Planning and Visioning (PLV)	PLV1	Our company develops activity plans that optimize progress toward the organisational strategy.	.918
	PLV2	Our company sets long term objectives that are consistent with its vision and values.	.870
	PLV3	We explore a variety of potential options to achieve the long term objectives.	.868
Cronbach's α=0.906	PLV4	There is total agreement on our organisational vision across all levels, functions and divisions.	.817
	PLV5	Our company applies rigorous measurement of business performance against goals and objectives.	.788
Industry Dynamism (IND)	IND1	Technological changes provide big opportunities in our industry	.940
	IND2	The technology affecting our industry is changing rapidly.	.845
	IND3	A large number of new product ideas have been made possible through technological breakthroughs in our industry.	.840
Cronbach's α=0.847			
SME's Product/ Service Adaptiveness (SME's PSA)	PSA1	We frequently refine the precision of existing products and services	.797
	PSA2	We commercialize products and services that are completely new to our company.	.780
	PSA3	We invent new products and services.	.744
	PSA4	We improve our provision's efficiency of products and services.	.732
	PSA5	We frequently utilize new opportunities in new markets.	.730
	PSA6	We regularly implement small adaptations to existing products and services.	.726
Cronbach's α=0.864	PSA7	Our company regularly uses new distribution channels.	.613
	PSA8	We regularly search for and approach new clients in new markets.	.602

Table 2: Means, Standard Deviations, and Correlations

Variable	Mean	S.D	1	2	3	4	5	6	7
1. Firm Age	2.75	1.64							
2. Firm Size	1.44	0.66	0.438**						
3. Environmental Scanning (ES)	4.01	1.11	-0.059	0.102					
4. Networking (NT)	4.19	1.26	0.035	0.168*	0.586**				
5. Analysing (AN)	4.33	1.27	-0.003	0.219**	0.608**	0.509**			
6. Planning and Visioning (PLV)	4.93	1.36	-0.006	0.078	0.542**	0.547**	0.727**		
7. Industry Dynamism (IND)	5.65	1.13	0.087	0.208**	0.223**	0.280**	0.208**	0.361**	
8. Product/Service Adaptiveness (PSA)	5.48	1.00	0.102	0.234**	0.305**	0.477**	0.369**	0.431**	0.540**

[a]*N*=194; **p*<.05; ** p<.01; *** p<.001.

Table 3: Main effects of EC, NT, AN and PLV on PSA (Standardized Coefficients)

Variables	*Model 1*	*Model 6*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	VIF
Control variables							
Hypothesis		*H5*	*H1-1*	*H2-1*	*H3-1*	*H4-1*	
Firm Age	-.001	.001	.036	.020	.040	.019	1.254
Firm Size	.235**	.127	.189*	.150	.143	.194*	1.263
Main effects							
Industry Dynamism (IND)		.513***					1.045
Environmental Scanning (ES)			.288***				1.025
Networking (NT)				.451***			1.031
Analysing (AN)					.338***		1.064
Planning and Visioning (PLV)						.417***	1.008
R^2	.055	.307	.136	.252	.162	.227	
Adjusted R^2	.043	.294	.120	.239	.147	.213	
F Change	4.789	59.700***	15.371***	43.274***	21.051***	36.586***	
Durbin Watson	1.890	1.918	1.867	1.961	1.522	1.875	

[a]*N*=194; * p<.05; ** p<.01; *** p<.001.

Table 4: Moderating Effect of IND on ES, NT, AN and PLV with PSA (Standardized Coefficients)

Variables	Model 1	Model 2	Model 3	VIF
Hypothesis			H1-2, H2-2, H3-2 and H4-2	
Step 1: Control variables				
Firm Age	-.001	.022	.024	1.280
Firm Size	.235*	.069	.064	1.443
Step 2: Independent (IV) and Moderator Variable (MV)				
Environmental Scanning (ES)		-.071	-.075	1.972
Networking (NT)		.269***	.299***	1.864
Analysing (AN)		.104	.106	7.758
Planning and Visioning (PLV)		.081	.079	2.870
Industry Dynamism (IND)		.406***	.404***	1.263
Step 3 Interaction terms				
Environmental Scanning (ES) x IND			.012	1.884
Networking (NT) x IND			.011	1.763
Analysing (AN) x IND			.023	2.315
Planning and Visioning (PLV) x IND			-.023	2.233
R^2	.055	.430	.431	
Adjusted R^2	.043	.405	.391	
ΔR^2	-	.375***	.001	
F Change	1.890	21.082***	0.52	
Durbin-Watson			1.673	

[a]*N*=194; * p<.05; ** p<.01; *** p<.001.