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Entrepreneurial alertness and product innovativeness: Firm-level and environmental contingencies

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Abstract

Although scholars have recognized that alertness is critical in identifying and exploring opportunities, empirical studies exploring when alertness drives innovation are lacking. Drawing insights from the cognitive and contingency perspectives, the current study addresses this gap in by arguing that variations in firm product innovativeness is a function of degree of entrepreneurial alertness and levels of internal firm capabilities and environmental conditions. Data were collected from from 385 small and medium-sized enterprises (SMEs) in Ghana. This study used the hierarchical regression estimation technique to analyses the data and found that a significant positive relationship between entrepreneurial alertness and firm product innovativeness. Moreover, the findings showed that entrepreneurial alertness is beneficial for firms to innovate when pressures from customers and competitors are intense. Finally, the results revealed that stronger market information sharing and technological opportunism also amplify the alertness-innovativeness relationship.

***Key words:** Entrepreneurial alertness, competitive intensity, customer demandingness, market information sharing, technological opportunism, innovation*

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1. Introduction

Scholarly studies have investigated the beneficial effect of alertness on opportunity recognition and identification in entrepreneurship (Minniti, 2004; Short et al., 2010; Tang, Kacmar, and Busenitz, 2012). Insights derived from these studies suggest that being alert is a precursor to spotting exploitable opportunities and this process involves a cognitive element (Ardichvili, Cardozo, and Ray, 2003; Gaglio and Katz, 2001; Tang, Kacmar, and Busenitz, 2012). Despite the potential of alertness for providing a direction for entrepreneurs to pursue new

opportunities in the marketplace (Kaish and Gilad, 1991; Minniti, 2004), the beneficial effects of this cognitive attribute on a firm's ability to innovate remains less understood. Specifically, the literature is not clear whether nurturing and developing individuals to be alert to opportunities is appropriate for firms to innovate or not.

Accordingly, this paper examines the value derived from deploying superior cognitive attribute of alertness on firm innovativeness. Product-level product innovativeness reflects a “measure of the potential discontinuity a product (process or service) can generate in the marketing and/or technological process . . . ,” (Garcia and Calantone, 2002, p. 113) whilst firm-level product innovativeness denotes the level of newness and novelty of the product (Akgun, et al, 2007; Story, Boso and Cadogan, 2015; Wang and Ahmed, 2004). The current study focuses on incremental firm-level product innovativeness because, in the developing world, innovation is said to focus on the incremental changes to practices rather than radical new products (e.g., Robson, Akuetteh, Westhead, and Wright, 2012). A major insight is that opportunity recognition and identification may not be restricted to creating only new businesses but may be also crucial for existing firms to innovate. In addition, the conditions under which entrepreneurial alertness is potent in driving innovation is not clear. That is, efforts to investigate when entrepreneurial alertness drives firm product innovation is non-existent in entrepreneurship and innovation studies. In response, this study uses insights from the cognitive and contingency theories to argue that the strength of entrepreneurial alertness in driving firm product innovativeness depends on environmental and internal firm capabilities. Thus, this study addresses these gaps in the entrepreneurship and innovation literature.

This study contributes to the entrepreneurship and innovation literature in three important ways. First, it examines the impact of entrepreneurial alertness on product innovativeness. The

existing literature has mostly focused on the role of alertness in opportunity identification and exploitation (e.g., Baron, 2006; Kirzner, 1999; Kaish and Gilad, 1991; Minniti, 2004; Short et al., 2010). However, the potential benefits of alertness in helping firms to innovate lacks theoretical clarity. In addressing this gap in our knowledge, this study investigates the potential role of alertness in driving firm-level outcomes such as innovation. In doing so, this study extends the prior entrepreneurship studies that have examined the effects of alertness on opportunity identification and exploitation. Integrating entrepreneurial alertness into the innovation literature will inform inquiry about the role of cognitive attributes in driving firm product innovation. Second, the current study investigates the moderating role of environmental conditions (competitive intensity and customer demandingness) on the alertness-innovativeness nexus. Investigating the moderating effects of these variables enhances scholarly understanding on the buffering roles of exogenous factors in improving the potency of alertness in driving firm-level outcomes such as innovation. Third, the role of internal firm capabilities in facilitating the effect of entrepreneurial alertness on firm-level outcomes is less understood. Hence, this study examines whether the linkage between entrepreneurial alertness and a firm's degree of innovativeness is contingent on internal firm capabilities (market information sharing and technological opportunism).

In the next section, the relevant literature is discussed, and hypotheses derived. This is followed by a description of the methods used in the study. Following the description of the methods, the study's estimation procedure and results are presented. Finally, limitations and implications of the study are subsequently discussed.

2. Theoretical background and hypotheses development

2.1 Firm-Level Product Innovativeness

Product innovativeness is a critical factor that helps firms achieve greater opportunities for expansion, differentiation, and competitive advantage. However, introducing new products is crucial for firm success and economic growth (Seebode et al., 2012). As such, product innovativeness is seen as a crucial research agenda for new product development studies (McNally, Cavusgil, and Calantone, 2010). However, many scholars have highlighted the difficulty in defining and operationalizing innovativeness (e.g., Akgün, Keskin, and Byrne, 2012; Tajeddini, Trueman, and Larsen, 2006; Wang and Ahmed, 2004). Researchers have applied the term *innovativeness* at both product level (e.g., Szymanski, Kroff, and Troy, 2007) and firm level (e.g., Wang and Ahmed, 2004). Although, it has been viewed as expensive and risky to introduce new product to the marketplace, research shows that innovative products enhance financial returns (e.g., Langerak et al., 2004; Li and Calantone, 1998; Song and Parry, 1997) and long-term survival (e.g. Banbury and Mitchell, 1995; Soni, Lilien, and Wilson, 1993). Consequently, researchers have paid much attention to the antecedents of product innovativeness (Ahlstrom, 2010; Akgun, Keskin, Byrne, and Aren, 2007; McNally et al., 2010; Seebode et al., 2012; Talke, Salomo, and Rost, 2010). However, our knowledge of the role of cognitive attribute of alertness in driving product innovativeness is limited.

2.2 Entrepreneurial alertness

Entrepreneurial alertness is characterized by the potential to recognize opportunities unnoticed by other individuals and has the potential to affect individual actions in the marketplace (Kirzner, 1973, 1979, 1999). The entrepreneurship literature portrays alertness as a cognitive capability and process derived from experience, information processing skills, social interactions and pattern recognition (Ardichvili et al., 2003; Gaglio and Katz, 2001). Individuals who are alert to opportunities are characterized by readiness to opportunities (Kaish and Gilad, 1991). This

indicates that alertness offers individuals with a mental preparedness to seek and discover opportunities in the environment. This helps individuals to judge and move towards action (McMullen and Shepherd, 2006). Thus, alertness can lead to entrepreneurial actions when there is a sense of judgement and a move towards an action. A high degree of alertness within individuals drive them to search for opportunities. These individuals find significant environmental alterations, and this allows them to adjust to the status quo (Gaglio and Katz, 2001).

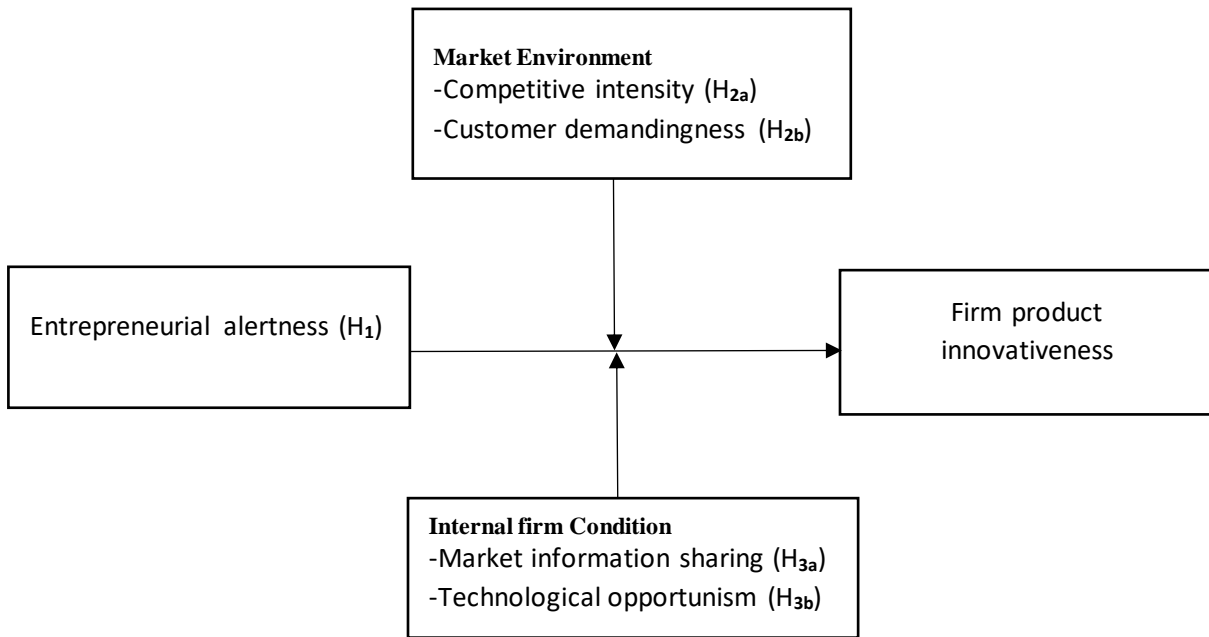
This study defines alertness as a three-dimensional behavioural construct which includes scanning and searching, association and connection, and evaluation and judgement (e.g., Tang, Kacmar, and Busenitz, 2012). Alertness scanning and searching reflects a proclivity to scrutinize the environment for new information and alterations not noticed by others. This is linked to earlier studies that suggests that alertness represents an awareness of gaps which emanates from prior knowledge that allows individuals to sense new environmental opportunities (e.g., Alvarez and Busenitz, 2001; Mitchell et al., 2007). Alertness association and connect refers to an ability to put together some pieces of information and using it for meaning outcomes. This reflects how individuals uses the cognitive capability to respond to and process information in the environment (Tang, Kacmar, and Busenitz, 2012). Lastly, alertness evaluation and judgment involve how individuals examine new changes or information in the environment. That is, how individuals evaluate information to decide on the profit potential of a business opportunity (McMullen and Shepherd, 2006; Tang, Kacmar, and Busenitz, 2012).

In examining the effects of entrepreneurial alertness on firm product innovativeness, this study uses insights from the Kirzner's works (Kirzner, 1973, 1979, 1985) to argue that variations in firm product innovativeness is a function of degree of entrepreneurial alertness. Kirzner's

central thesis is that, entrepreneurial alertness enables entrepreneurs to profitably discover opportunities. That is, entrepreneurship is about opportunity discovery and the actions taken thereafter.

In addition to Kirzner’s thesis, this study draws from the contingency theory to examine the potential mechanisms through which entrepreneurial alertness affects innovation. Consequently, this study included internal firm capabilities as well as environmental conditions to understand how they relate to the efficacy of alertness (Eisenhardt, 1989). This notion is captured in the study’s proposed conceptual model (Figure 1), which argues that alertness drives firm product innovativeness, such that the relationship is strengthened when internal firm capabilities and environment conditions are stronger.

Figure 1: Conceptual model of the study



2.3 Entrepreneurial alertness and firm product innovativeness

One of the major aims of the current study was to examine the potential link between alertness and firm product innovativeness. As entrepreneurial alertness influences personal behaviour, there

might be a possibility of alertness having a relationship with firm innovativeness (Busenitz and Barney 1997). Alertness reflects proclivity to search for information unnoticed by others in the environment (Kirzner, 1997). In emerging market context, there is a high degree of information asymmetry due to institutional voids and infrastructural underdevelopment (Abor and Biekpe, 2006). This results in the requirement for entrepreneurs to go beyond the formal codes and contracts in order to trade profitably and protect themselves against malfeasance (Peng, 2004). As such, entrepreneurs who are sensitive to information are likely to get better business opportunities than those who are not. This can lead to innovativeness because entrepreneurs' reconfiguration and recombination of different resources may be affected by his or her alertness to opportunities. In addition, the situational awareness about the environment helps entrepreneurs to identify, process, and understand the status quo (Sewell, 1992). This may help entrepreneurs who are knowledgeable about the environment to identify the opportunities that can produce innovative and profitable products.

Furthermore, entrepreneurial alertness helps individuals to interpret same piece of information differently from those who are not alert to information. That is, individuals who are alert to opportunities may be able to see the potential unnoticed by others because more alert individuals are susceptible to new information and are conjectured to be more creative; hence they are more innovative. Moreover, scholars have argued that entrepreneurial alertness is crucial for entrepreneurial behavior and innovation behavior (Baron 2006; Ma, and Huang, 2016). That is, when entrepreneurs are open to new information and ideas, it facilitates new knowledge acquisition. For example, earlier research has revealed that when individuals are open to information and new ideas, a firm's R&D intensity is enhanced (Fey and Birkinshaw, 2005). Based on this argument, it is suggested that:

H₁: *Entrepreneurs' level of alertness is positively related to a firm's degree of innovativeness.*

2.4 Moderating effect of market environment

Apart from the direct effect hypothesis, this study examines the moderating role of market environment (competitive intensity and customer demandingness) on the alertness-innovativeness relationship. Competitive intensity is defined as a condition characterised by fierce competition due to intense rivalry which leads to inadequate opportunities for further expansion (Auh and Menguc, 2005). Under conditions of low competition, firms do not suffer in terms of growth even if much attention is not paid to customer requirements. This is because customers do not have alternatives; hence they stick to the offering on the market (Cadogan, Cui, and Li, 2003). On the other, in conditions of intense competition, customers can shift to alternatives as there are many competitors in the market. As such, firms that pay much attention to customer requirements are likely to be alert to information that can help them to innovate, to meet requirements of customers (He and Nie, 2008; Murray, Gao, and Kotobe, 2011).

Similarly, customers are highly demanding for ecologically friendly products from their producers (Banerjee, Iyer, and Kashyap, 2003). Customer demandingness refers to a belief that customers have high expectations about products and service offerings (Wang and Netemeyer, 2004). As such, a cooperation of the firm with customers' demand is likely to boost the link between alertness and product innovativeness.

Overall, the notion here is that in a hyper competitive and a demanding customer marketplace, all firms, irrespective of the institutional setting within which they operate (developed or developing), cannot afford to ignore their primary responsibility towards

innovation. When competition for demonstrating which firm cares best about innovation intensifies, and when customers demand greater firm involvement in innovation activities, it may then become the case that the basis for sustaining superior competitive advantage may be predicated on firms' level of expenditure on innovation, enabling firms to generate greater positive standing to secure societal legitimacy and goodwill. Hence, it is suggested that:

H₂: *The positive effect of entrepreneurial alertness on firm product innovativeness will become more positive when: (a) competitive intensity is higher; and (b) customer demandingness is greater.*

2.5 Moderating effect of internal firm conditions

This study proposed that when there is a high degree of market information sharing, the impact of entrepreneurial alertness on product innovativeness will be amplified. Market information sharing is defined as interaction and sharing of ideas and knowledge regarding market situations within an organization (Jaworski and Kohli, 1993; Wei, O'Neill, Lee, and Zhou, 2013). Market information serves as an important internal resource that can generate competitive advantage (e.g., Raju and Roy, 2000). When there is a high level of coordination and communication among individuals in an organization, there is a high degree of efficiency (Wei, O'Neill, Lee, and Zhou, 2013). In a firm characterized by a high degree of market information sharing, individuals working in the organization are privy to market information which allows them to commit to the movement of the organization. This is likely to interact with alertness to produce high innovation outcomes. Thus, the effect of entrepreneurial alertness on firm innovativeness is likely to be stronger when there is a high degree of market information sharing among employees in the organization.

Moreover, when entrepreneurs are alert to opportunities, they require market information to be able to work on the opportunities. As such, the degree to organizational members share

market information is likely to enhance the positive effect of alertness on innovativeness. The rationale is that such information sharing culture helps entrepreneurs to develop a better understanding of a situation on market (Kohli, Jaworski, and Kumar, 1993). Thus, it is argued that market information sharing is likely to help entrepreneurs to be more alert to opportunities which is likely to have a stronger effect on firm product innovativeness.

Similarly, technological opportunism (defined as the process that offers a firm an ability to actively sense appropriate technologies and quickly respond to these technologies (Sarkees 2011; Voola, Casimir, Carlson, and Agnihotri, 2012) is likely to convert alertness into higher degree of innovativeness. The dynamic capabilities framework discusses a firm's ability in shaping, reshaping, configuring and reconfiguring its resources to respond to dynamic technology and markets (Teece, Pisano, and Shuen, 1997). Technological opportunism is a dynamic capability which helps a firm to sense different aspects of technological developments in the market (Eisenhardt and Martin, 2000).

As entrepreneurs who are more alert are characterized as having an "antenna" that helps to sense and identify opportunities in the market (Kirzner, 1973, 1979), entrepreneurial alertness is likely to interact with technological capabilities when the entrepreneur is more alert.

Technologically opportunistic firms regularly scan the environment for information regarding new technology opportunities that will allow them to grow (Daft and Weick, 1984). As such, entrepreneurial alertness is more likely to lead to firm product innovativeness in firms with degree of technological opportunism than in firms with low levels of technological opportunism. This logic is based on the notion that a high degree of technological opportunism allows firms to be aware not only of new technological developments but are also inclined to take advantage of new technologies as these firms are more likely to receive the resources required to respond to

these technologies (Srinivasan, Lilien, and Rangaswamy, 2002). Moreover, technologically opportunistic firms are more likely to sense and respond to and integrate technological advancements with the needs of their customers, hence enhancing the influence of alertness on innovativeness. Based on this argument, it is expected that the effect of alertness on innovativeness will be stronger in firms with high levels of technological opportunism than in firms with low levels of technological opportunism. Overall, this study argues that when market information sharing and technological opportunism are higher, the benefit (in terms of innovations) a firm obtains from its founder's alertness is greater. Based on this, the following hypothesis is thus suggested:

H₃: *The positive effect of entrepreneurial alertness on product innovativeness will become more positive when (a) market information sharing is greater; (b) technological opportunism is greater.*

3. Method

3.1 Study setting

Ghana was selected for testing the study's hypotheses for two major reasons. First, Ghana has chalked much success in its growth trajectory and Ghana's industry as a proportion of GDP has increased due to its market-friendly policies (World Bank, 2019; Chironga, Leke, Lund, and van Warmelen, 2011). This has in turn increased its private sector entrepreneurs. Second, Ghana has a stable democratic tradition and rule of law, making it a favorable business environment destination for investors in sub-Saharan Africa (World Bank, 2019). Thus, studying entrepreneurs' cognitive attributes in Ghana provides a powerful but typical emerging market perspective on debates about SME innovation.

3.2 Sample and data collection

The sample frame for the current study was developed from the Ghana’s Company Register Database and Ghana Business Directory. The sample was made up of privately-owned firms, companies employing fewer than 250 full-time employees and manufacturers of physical goods. A sample of 1450 SMEs from the Registrar General’s Department (i.e. 700 companies out a total of 25,550) and the Ghana Business Directory (i.e. 750 companies out of a total of 39,000) were contacted through telephone to take part in the study. Subsequently, the questionnaires were administered to 800 companies using door-to-door delivery. This study received 385 completed questionnaires, which represents 48.12% response rate. Respondents were owner-managers or entrepreneurs who had taken part in the startup phase of the business. To ensure that the data were collected from the right firms, a sample of the data collected from the field was taken and checked with entrepreneurs who agreed to take part in the study. Statistically, the firms that took part in the study were relatively young. Table 2 presents the characteristics of the firms. On the average, the participating teams had been in business for 9 years since their inception. The firms had an average of 19 full-time employees. On the average, entrepreneurs were aged 42 years. To address non-response bias in the data, early and late responses were compared and that no significant differences were found. This suggests that non-response bias was not a problem in the study (Armstrong and Overton, 1977).

3.3 Measures

All the measures used in the current study were taken from prior literature. Table 1 portrays the constructs, measurement items, reliability and validity of the items.

Table 1: Measurement items, reliability and validity tests

Item description	Loadings (t-values)
Alertness scanning and searching (Tang, Kacmar and Busenitz, 2012): $\alpha=.89$; CR=.85; AVE=.72	
-I have frequent interactions with others to acquire new information	.79 (fixed)
-I always keep an eye out for new business ideas when looking for information	.91 (16.50)
-I read news, magazines, or trade publications regularly to acquire new information.	.82 (16.11)

-I browse the Internet every day	.86 (13.07)
-I am an avid information seeker.	.78 (20.87)
-I am always actively looking for new information	.68 (28.09)
Alertness association and connection (Tang, Kacmar and Busenitz, 2012): $\alpha=.95$; CR=.88; AVE=.64	
-I see links between seemingly unrelated pieces of information	.80 (16.73)
-I am good at “connecting dots.”	.63(21.04)
-I often see connections between previously unconnected domains of information	.83 (12.79)
Alertness evaluation and judgment (Tang, Kacmar and Busenitz, 2012): $\alpha=.91$; CR=.89; AVE=.60	
-I have a gut feeling for potential opportunities.	.68(23.51)
-I can distinguish between profitable opportunities and not-so-profitable opportunities.	.88(17.09)
-I have a knack for telling high-value opportunities apart from low-value opportunities.	.75(27.44)
-When facing multiple opportunities, I am able to select the good ones	.69(10.71)
Competitive intensity (Jansen, Van Den Bosch, and Volberda, 2006): $\alpha = .93$; CR = .90; AVE = .78	
-Competition in our local market is intense.	.70(fixed)
-Our organizational unit has relatively strong competitors	.89 (18.40)
-Competition in our local market is extremely high	.88(17.62)
-Price competition is a hallmark of our local market	.94(14.45)
Perceived market information sharing (Kohli et al., 1993): $\alpha = .86$; CR = .79; AVE = .61	
-Our marketing staff regularly discusses customers’ needs with other departments.	.64(fixed)
-Customers’ suggestions and comments are regularly distributed to all departments	.69(22.45)
-We frequently hold cross-departmental meetings to discuss market trends	.81(13.34)
-In our company, if a certain department gets to know where our competitors are going, other departments will be notified promptly.	.75(17.22)
Technology-sensing capability (Srinivasan, Lilien, and Rangaswamy, 2002): $\alpha = .95$; CR = .88; AVE = .59	
-We are often one of the first in our industry to detect technological developments that may potentially affect our business.	.85 (Fixed)
-We actively seek intelligence on technological changes in the environment that are likely to affect our business.	.80 (26.33)
-We are often slow to detect changes in technologies that might affect our business (r).	.90 (17.29)
- We periodically review the likely effect of changes in technology on our business.	.83 (24.60)
Technology-responding capability (Srinivasan, Lilien, and Rangaswamy, 2002): $\alpha = .87$; CR = .83; AVE = .68	
-We generally respond very quickly to technological changes in the environment	.64(Fixed)
-This business unit lags behind the industry in responding to new technologies	.91(16.45)
-For one reason or another, we are slow to respond to new technologies	.85(17.12)
-We tend to resist new technologies that cause our current investments to lose value (r)	.78(22.34)
Customer demandingness (Wang and Netemeyer, 2004): $\alpha = .92$; CR = .85; AVE = .63	
-The customers we serve demand very high standards of quality	.82 (Fixed)
-Our customers require a perfect fit between their needs and our offerings	.66 (22.62)
-Our customers expect the highest levels of product quality	.79(20.45)
Environmental uncertainty (Jaworski and Kohli, 1993): $\alpha = .94$; CR = .86; AVE = .69	
-It is hard to know customers’ needs.	.71(fixed)
-It is hard to understand competitors’ strategies	.77(25.34)
-It is hard to predict competitors’ product announcement.	.89(18.56)
-It is difficult to acquire technology	.86(21.78)
-Technology changes rapidly	.68(29.23)
Firm product innovativeness (Covin and Slevin, 1989; Sandvik and Sandvik, 2003; Deshpandé, Farley and Webster, 1993): $\alpha=.94$; CR=.72; AVE=.65	
-Our company has produced more new products for our customers than our key competitors during the past three years	.78(fixed)
-On average, each year we introduce more new products in our markets than our key competitors	.88(31.57)
-Industry experts would say that we are prolific when it comes to introducing new products	.85(32.44)

Note: r=reverse coded

Entrepreneurial alertness. In this study entrepreneurial alertness was measured by using the scale developed by Tang, Kacmar, and Busenitz (2012). Respondents rated the items on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). In all, thirteen items were used to measure entrepreneurial alertness. The combined mean of the scale measures constitutes the variable score for entrepreneurial alertness ($\alpha=.91$).

Competitive intensity. The items that measured competitive intensity ($\alpha = .93$) were taken from Jansen, Van Den Bosch, and Volberda (2006). Four items measured competitive intensity (see Table 1). These items were rated using a seven-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”).

Customer demandingness. Customer demandingness ($\alpha = .92$) is conceptualized as the entrepreneur's perception of how demanding their customers are relative to their expectations of quality and technical sophistication of products (Wang and Netemeyer, 2004). Customer demandingness was captured using a three-item instrument. These items were rated on a seven-point Likert Scale (1=strongly disagree; 7=strongly agree). Entrepreneurs that scored high levels of customer demandingness constitutes greater perception of customer demandingness.

Perceived market information sharing. Market information sharing ($\alpha = .86$) was measured by using the scale developed by Kohli, Jaworski, and Kumar (1993).

Technological opportunism. Technological opportunism ($\alpha=.91$) (sensing and responding) was captured using items developed by Srinivasan, Lilien, and Rangaswamy (2002).

Firm product innovativeness. Product innovativeness ($\alpha = .94$) was conceptualized as a firm's ability to launch new products into the market (Wang and Ahmed, 2004). Three items captured firm innovativeness.

Control variables. This study controlled for several firm level variables to account for their effects on the dependent variable. This study controlled for firm size and age. This is because the innovation literature shows that they can influence the outcome variable (innovativeness) (e.g., Weiner and Mahoney, 1981). Firm age was measured by using the of number of employees, while firm age was measured as the number of years since a firm's inception (Akgün, Keskin, and Byrne, 2012). Since exporting is linked to innovation (e.g., Kleinknecht, 1996), exporting was controlled for as a dummy variable (0=local; 1=international). This study also controlled for environmental uncertainty (Akgün, Keskin, and Byrne, 2012). The environmental uncertainty items were taken from Jaworski and Kohli (1993).

3.4 Validity and reliability tests

This study followed convention practice (e.g., Cote and Buckley, 1987) to test for potential common method bias in the data. Hence, three competing method models were estimated. First, a trait-only model was estimated to allow all indicators to load on a single latent factor. Second, a method-only model was estimated where each factor could load on its respective latent factor. Third, the trait and method models were combined to estimate a trait-method model. In this model, a common factor linked all the indicators in Model 2 was estimated. To assess whether common method bias was a concern in the data, a comparison was made with all the three models. Results suggest that Model 2 and Model 3 were better than Model 1. Yet, Model 3 was not too different from Model 2. On this basis of these results, it was concluded that common method bias was not a concern in the data (Cote and Buckley, 1987).

Table 2. Characteristics of the firms

	Minimum	Maximum	Mean	Standard deviation
Total number of full-time employees	3	250	19.62	3.04

Firm age (in years)	3	25	9.33	1.77
Total annual sales (in 000s of US\$)	30	2,119	542.33	741.90
Annual sale growth (%)	1	100	11.23	8.59
Annual profit growth (%)	0	100	9.52	6.23

Subsequently, a confirmatory factor analysis (CFA) performed using the maximum likelihood estimation technique to establish the reliability and validity of the multi-item constructs. The LISREL 8.5 software package was used for the analyses. Table 1 shows the factor loadings and t-values of the items. The results of the CFA revealed that the composite reliabilities were higher than the standard threshold value of .70 (Lattin, Carroll, and Green, 2003). Convergent validity was established because each factor loading was greater than the conventional threshold value of .40 (e.g., Anderson and Gerbing, 1988). To establish discriminant validity of the constructs, average variance extracted (AVE) of each construct was compared with the shared variances between constructs. The results of this test indicate that AVEs were greater than the shared variances between the constructs. This indicates that discriminant validity has been established (Fornell and Larcker, 1981).

Table 3. Descriptive Statistics and Correlations (Square Roots of AVE in Diagonal)

	Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1.	Firm size	19.62	3.04										
2.	Firm age	9.33	1.77	-.05*									
3.	Exporting	.58	.42	.19**	.18**								
4.	Environmental uncertainty	2.85	.72	-.09*	-.02	.04	(.83)						
5.	Entrepreneurial alertness	5.70	2.41	-.15**	.06*	.20**	.18**	(.80)					
6.	Competitive intensity	3.68	1.34	-.07*	-.01	.19**	-.13*	.23**	(.88)				
7.	Market information sharing	5.42	1.08	.03	.00	.22**	.33**	.18**	.23**	(.78)			
8.	Technological opportunism	3.44	1.79	.22**	.14**	.34**	.42**	.25**	.03	.11*	(.76)		
9.	Customer demandingness	4.05	1.01	.00	-.18**	.14**	.24**	.17**	.12**	.07*	-.04	(.79)	
10.	Firm product innovativeness	4.91	.87	.21**	.17**	.39**	.31**	.38**	.21**	.14**	.15**	.37**	(.80)

N = 385; *p<0.05; **p<.01 (2-tailed test); S.D. = Standard Deviation

4. Results

This study used hierarchical regression to analyze the data. When evaluating contextual and configuration models, hierarchical regression has been found to be useful (Cohen, Cohen, West, and Aiken, 2003). In the hierarchical regression technique, the variables, including the interaction variables, are entered sequentially in order to examine whether the next higher-order interaction(s) account for a statistically significant difference in the total explained variance (Wiklund and Shepherd, 2005).

The variables were mean centered before the interaction terms were created (Aiken and West, 1991). The potential effect of multicollinearity was examined using the variance inflation factor (VIF) approach. The VIFs obtained ranged from 1.05 to 2.18, which are lower than the threshold value of 10. The results of the VIF test indicated that multicollinearity was not a concern in this study. Consequently, the mean-centered values were used to plot the interactions (Dawson and Richter, 2006).

Table 4: Results of standardized moderated regression analyses

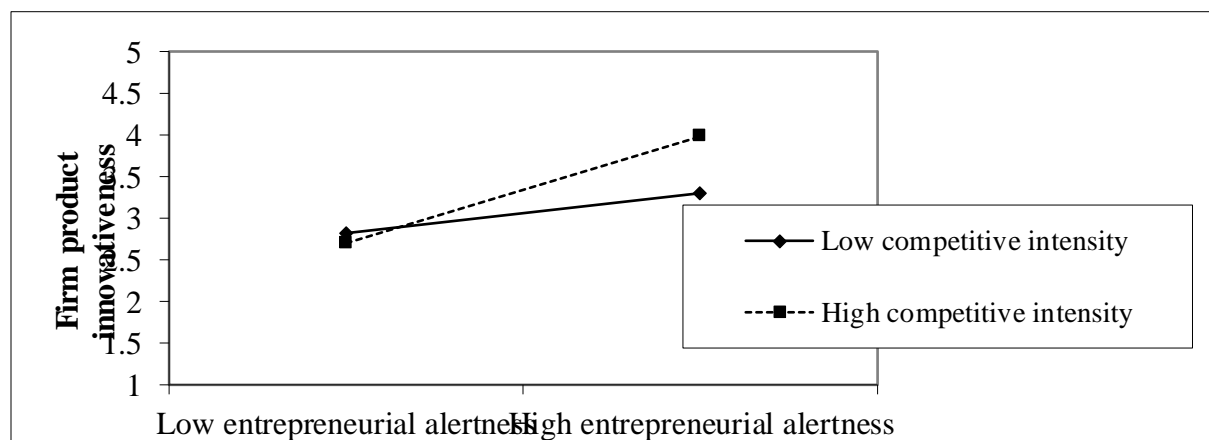
Dependent variable: Firm product innovativeness (N = 385)						
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Control variables</i>						
Firm age	-.11*	-.12*	-.11*	-.12*	-.11*	-.11*
Firm size	.04	.03	.05*	.04	.03	.03
Exporting	.23***	.26***	.27***	.29***	.22***	.24***
Environmental uncertainty	.19***	.21***	.25***	.21***	.25***	.28***
<i>Direct effects</i>						
H ₁ : Entrepreneurial alertness (EA)		.19***	.18***	.14**	.20***	.24***
Competitive intensity (CI)		.15***	.19***	.20***	.16***	.19***
Market information sharing (MIS)		.09*	.07*	.11*	.08*	.12*
Technological opportunism (TO)		.18***	.14**	.17***	.20***	.23***
Customer demandingness (CD)		.29***	.27***	.26***	.28***	.31***
<i>Moderating effects</i>						
H _{2a} : EA x CI			.48***	.49***	.47***	.48***
H _{2b} : EA x CD				.39***	.41***	.43***
H _{3a} : EA x MIS					.42***	.45***
H _{3b} : EA x TO						.38***
<i>Model fit statistics</i>						

F-value	2.9***	3.2***	3.6***	4.5***	6.04***	7.55***
R ²	.13	.15	.22	.28	.33	.35
ΔR ²	-	.02	.07	.06	.05	.02
Largest VIF	1.05	1.38	1.46	3.24	1.39	2.18

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Critical t-values are 2.325, 1.645 and 1.282 respectively (one-tailed test as all hypotheses are one-directional).

Table 3 provides the means, standard deviations, and correlations between the constructs. In Model 1, all the control variables were entered. Model 2 included the main effects variables while Model 3 included the interaction term of entrepreneurial alertness and competitive intensity (EA x CI). In Model 4, added the interaction of entrepreneurial and customer demandingness (EA x CD) while Model 5 included the interaction between entrepreneurial alertness and market information sharing (EA and MIS). Finally, Model 6 added the interaction of entrepreneurial alertness and technological opportunism (EA x TO).

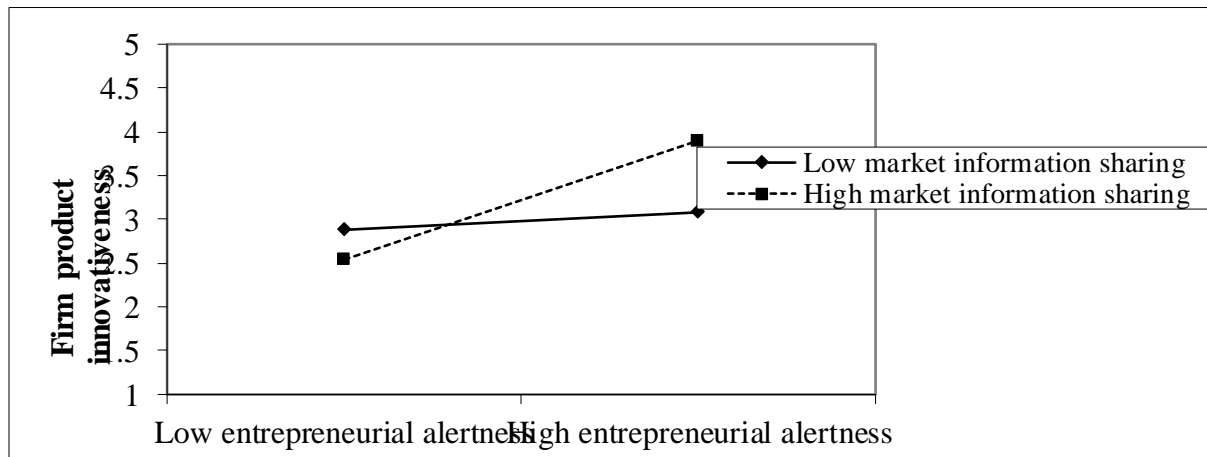
Figure 2. Interaction of entrepreneurial alertness, and competitive intensity on firm product innovativeness.



Hypothesis 1 argued for a positive link between entrepreneurial alertness and product innovativeness. In Model 1, this hypothesis was confirmed, because a significant regression coefficient for entrepreneurial alertness was obtained ($\beta = .19, p < .01$).

Hypothesis 2a suggested that competitive intensity positively moderates the relation between the level of entrepreneurial alertness and product innovativeness. Model 3 confirms this hypothesis. Thus, the interaction of intense market competition with the level of entrepreneurial alertness is positive and significant for product innovativeness ($\beta = .48, p < .01$). Hypothesis 2b, argued that firm-level product innovativeness is maximized when entrepreneurial alertness and customer demandingness are both high. In support of Hypothesis 2b, the product term involving entrepreneurial alertness and customer demandingness (i.e. EA x CD) is positive and significant for product innovativeness ($\beta = .39, < .01$). This supports the view that aligning high levels of entrepreneurial alertness and customer demandingness is associated with greater innovativeness.

Figure 3. Interaction of entrepreneurial alertness and market sharing information on firm product innovativeness.



Hypothesis 3a stated that market information sharing moderates the relation between entrepreneurial alertness and product innovativeness. In Model 5, the results show that the interaction term for and entrepreneurial alertness and market information sharing (i.e. EA x MIS) is significant and positive ($\beta = .42, p < .01$). Therefore, results support Hypothesis 3a. In Hypothesis 3b, it was stated that technological opportunism moderates the relation between

entrepreneurial alertness and product innovativeness. This hypothesis was confirmed in Model 6 ($\beta = .38, p < .01$).

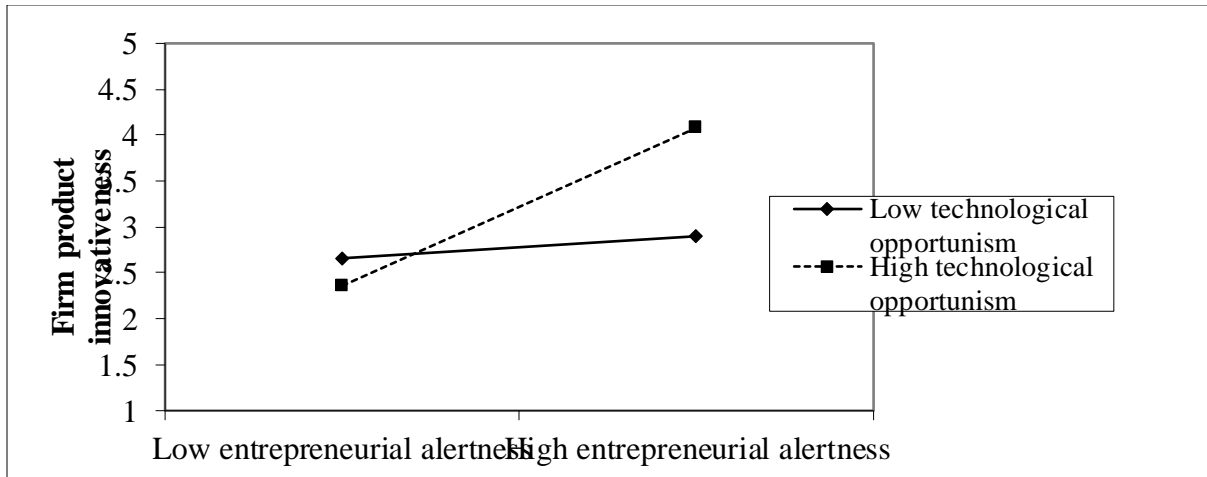
To facilitate the interpretation of the direction of the interactions, this study followed the procedure recommended by Cohen, Cohen, West, and Aiken (2003) and plotted of the interactions at ± 1 s.d (Figure 2-5). As Figure 2 shows, high levels of alertness and greater degree of competitive intensity generate higher product innovativeness. Further, linear comparisons of the slopes of the two conditions suggest that the two slopes are statistically different, however, the relatively flat slope of low levels of competitive intensity indicates that the relationship between entrepreneurial alertness and product innovativeness does not materially change among entrepreneurs who perceive low levels of competition as the level of entrepreneurial alertness increases. Similarly, Figure 3 shows that greater degrees of market information sharing facilitate the effect of alertness on product innovativeness. Again, a linear comparison of the slopes of the two lines are statistically different, however, the relatively flat slope for the low market information sharing condition suggests that the entrepreneurial alertness-product innovativeness relationship does change significantly in the presence of low levels of market information sharing. For brevity, Figure 4 and Figure 5 are interpreted in the same way.

5. Discussion

Using insights from the cognitive and contingency theories, this study was designed to investigate the impact of entrepreneurial alertness on product innovativeness and the conditions under which entrepreneurial alertness may be more or less beneficial for a firm to innovate. Specifically, this study concerns how entrepreneurial alertness impacts firm innovativeness and how this impact varies with different environmental and firm-level conditions in the form of firm-level and industry conditions, namely, market information sharing, technological opportunism, competitive intensity

and customer demandingness. Overall, this study was designed to explain how individuals' cognitive capability informs a firm's degree of innovativeness, and particularly the conditions under which cognitive capability of alertness influence the degree to which firms innovate.

Figure 4. Interaction of entrepreneurial alertness and technological opportunism on firm product innovativeness.



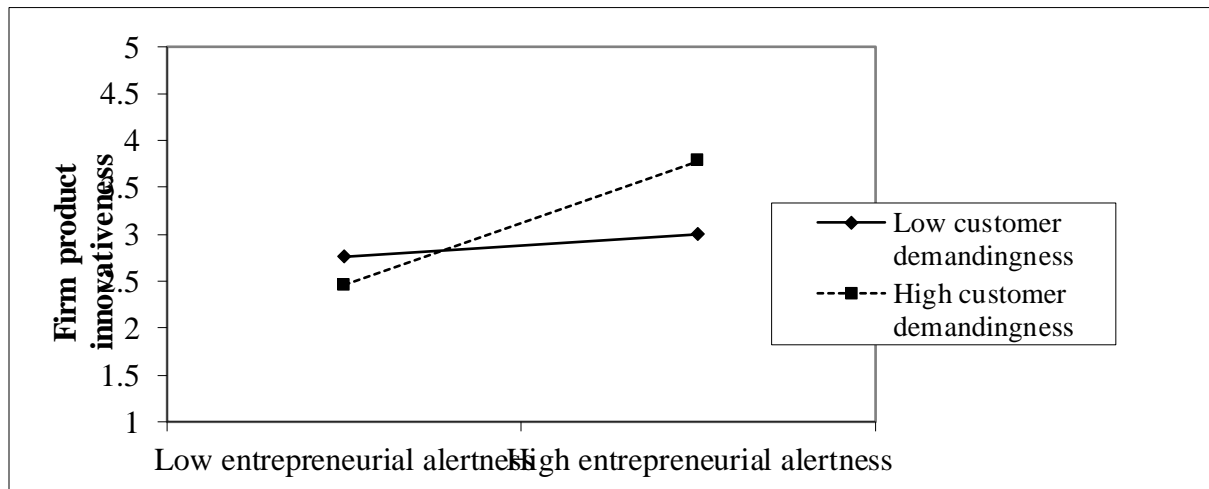
Findings from the study show that variability in entrepreneurial alertness helps explain changes in a firm's innovativeness. Additionally, the study finds that increases in entrepreneurial alertness and greater levels of market information sharing, and technological opportunism are associated with increases in firm product innovativeness. Lastly, the study finds that the positive effects of entrepreneurial alertness on innovativeness is moderated by environmental pressures (i.e. competitive intensity and customer demandingness).

These findings enable us to extend the literature in three major ways. First, in a departure from previous studies that examined the impact of alertness on "opportunity" identification and exploitation in entrepreneurship research (e.g., Baron, 2006; Gaglio and Katz, 2001; Shane and

Venkatraman, 2000; Short et al., 2010), this study investigates the effect of alertness on firm product innovativeness. This is an important extension of the entrepreneurship literature because to date, scholarly knowledge is limited with regards to alertness-innovativeness nexus. Filling this gap enables scholars to understand how cognitive capability of entrepreneurs help a firm to innovate. In doing so, this study explicitly links alertness to firm innovativeness. Alertness is a cognitive capability that can be learned and improved to help entrepreneurs enhance firm innovativeness.

Second, although some important efforts have made to understand how entrepreneurial alertness may influence entrepreneurs to identify and exploit opportunities (e.g., Gaglio and Katz, 2001; Short et al., 2010), scholarly work investigating how certain environmental conditions influence entrepreneurial alertness enhancing product innovativeness is not well developed in the entrepreneurship and innovation literature. In response, this study uses insights from the contingency theory to understand the moderating effects of two sets of environmental contingencies (i.e. pressures from customers and competitors) on the entrepreneurial alertness-innovativeness relationship. Specifically, the current study examined the role of two sets of environmental contingencies (i.e. pressures from customers and competitors). In other words, this study contends that the translation of entrepreneurial alertness into product innovativeness is heightened to the extent that pressures from customers and competitors increase the feasibility of this translation, or that the translation becomes more attractive because of external environmental pressures. Filling this gap helps to extend the entrepreneurship literature by explaining the competitor and customer related environmental factors that enhance the beneficial effects of entrepreneurs' cognitive capability on a firm's innovation activities.

Figure 5. Interaction of entrepreneurial alertness and customer demandingness on firm product innovativeness.



Third, this study revealed that the positive influence of entrepreneurial alertness on firm innovativeness is strengthened when market information sharing and technological opportunism are stronger. This finding shows that the benefits of alertness in innovation activities are not solely dependent on external environmental conditions. That is, beyond the external environment factors examined in this study, findings from this research indicate that internal firm capabilities (i.e. market information sharing and technological opportunism) play a key role in converting entrepreneurial alertness into higher innovation activities. Thus, this study extends the literature on entrepreneurial alertness by showing that market information sharing and technological opportunism condition the effect of entrepreneurial alertness on firm-level product innovativeness.

The current study makes some practical implications for entrepreneurs too. The findings of the study revealed that when entrepreneurs are alerted, the potency for a firm to innovate is stronger. Particularly, the findings of the study revealed that high levels of alertness among entrepreneurs might be crucial for firms to innovate. The value derived from this finding is important in three ways. First, founders of small businesses should particularly be mindful in hiring chief executive officers (CEOs) by assessing their alertness levels. To be able to assess future CEOs' alertness levels when hiring, business owners may wish to use the adapted questions from the Tang, Kacmar and Busenitz (2012) scale on entrepreneurial alertness (see Table 1). This may help founders and hiring managers to examine potential candidates' level of entrepreneurial alertness. Second, the study found that when market environment conditions (i.e. pressures from customers and competitors) are stronger, the effect of alertness on firm product innovation is stronger. These findings are therefore crucial for entrepreneurs to innovate to achieve a competitive edge. For example, the findings show that conditions of customer and competitor pressures moderate the relationship between alertness and firm product innovativeness. Hence, entrepreneurs who feel intense customer demands and competition should examine the alertness level in the environment they operate in. This is likely to help them successfully innovate, when customers are highly demanding and when competition is intense.

Finally, the study found that internal firm capabilities (i.e. market information sharing and technological opportunism) enhance the link between entrepreneurial alertness and firm product innovativeness. These findings are particularly important for SMEs' owners who are looking at improving innovation in their firms. The implication is that apart from environmental factors that affect an individual's level of discretion, firm-level factors are equally important when entrepreneurs are alerted to opportunities. This is particularly relevant for entrepreneurs to

innovate as cognitive resources such as alertness can affect a firm's strategic direction when internal firm capabilities are considered.

6. Limitations and further research

This study has several limitations that provides opportunities for future scholars to investigate. First, the cross-sectional nature of the study did not allow for causal claims. Although, the hypotheses were derived based on extant theory, future studies should use longitudinal design to be able to make causal effects with confidence. Second, this study relied on surviving firms and did not account survivorship bias. Although there was no reason to believe that survivorship bias affects the study's variables as both there was a good variation between the dependent and independent variables, this is a limitation that is inevitable in investigating Ghanaian firms (Adomako, Danso, Uddin and Damoah, 2016). Third, the current study focused on SMEs as these firms are mostly found in the context of emerging markets. However, since larger firms are more resourceful, they can be entrepreneurially alerted to opportunities and therefore innovate more easily. As such, future studies should examine the influence of chief-executive officers' (CEOs') alertness on firm innovativeness in larger firms. Lastly, the effects of individual level variables such as gender and educational levels of entrepreneurs were not controlled for in this study. These variables may affect a firm's degree of innovation. To improve the internal validity of future research, these variables should be controlled for.

7. Conclusion

This study has examined an important subject for scholars to study drivers of product innovativeness within a firm. Specifically, the present study examined the role of entrepreneurial alertness in driving firm product innovativeness and the firm and environmental conditions under which this entrepreneurial alertness may effectively drive firm product innovativeness. The theoretically derived research model was empirically validated by means of an empirical study of 385 SMEs in Ghana. This paper contributes to both entrepreneurial alertness and innovation research. It is believed that emerging market contexts provide scholars with an important perspective from which to study entrepreneurship and innovation. This study is relevant to inform scholars and practitioners in their quest to innovate in these contexts.

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