

The Role of Human Capital and Entrepreneurial Orientation on Radical Product Innovations in Small Scale Carpentry Workshops in Nairobi

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There is some emerging evidence that entrepreneurial orientation leads to the adoption of radical product innovations particularly in small enterprises. However, few studies have attempted to investigate how the characteristics of entrepreneurs moderate and mediate the relationship between entrepreneurial orientation and radical product innovation. This study adopts the human capital theory to address this gap in knowledge. The paper argues that human capital factors and entrepreneurial orientation influence the adoption of radical product innovations. A survey research design was adopted to test this proposition using a sample of 218 small scale carpentry workshops in Nairobi, Kenya. Estimation results using a logit model, indicate that having parents in business together with entrepreneurial orientation lead to the adoption of radical product innovations. Provision of role models and adopting an entrepreneurial orientation are strategic options that can be used to enhance radical product innovations in small enterprises.

Introduction

Innovation is a key defining aspect of entrepreneurship (Schumpeter 1942). It is the primary instrument of competition for many firms (Baumol 2002). Bird (1989) defines the term innovation as the commercialization of ideas and/or implementation and change to existing systems, products and resources. Innovation, just like many other

aspects of entrepreneurship, is the result of the process of discovering an opportunity and exploiting it. In other words, the two key elements for innovation are identifying an opportunity (that is what the innovation would solve/satisfy) and then attempting to exploit this opportunity (that is by releasing a new product or service to the market that would provide a solution to the problem/need).

An important way of classifying innovations involves using an incremental versus radical framework. Salavou and Lioukas (2003) describe radical innovations as revolutionary or discontinuous changes, while incremental innovations are conventional or simple extensions in a line of historical improvements. The impact of radical innovation is considerably more dramatic. They can transform existing markets, create new ones, and make an enormous economic contribution (Khalil, 2002). Therefore, understanding of the drivers of radical product innovations is of critical importance.

Understanding how individuals create breakthrough innovations has rich theoretical and practical implications for entrepreneurship. Entrepreneurship, as a scholarly field, seeks to understand how, by whom, and with what effects opportunities to create future goods and services are discovered and exploited (Ventakaraman 1997; Shane and Venkataraman 2000). Existing literature provides evidence that aspects of an individual's human capital facilitate the recognition or development of radical product innovations (Marvel and Lumpkin 2007; Shane 2000). Moreover, the human capital theory indicates that individuals with more or higher quality human capital will reap more desirable outcomes (Becker 1964).

Another stream of research suggests that entrepreneurial orientation is a key driver of radical product innovations (Matanda 2007; Salavous and Loiukas 2003). Entrepreneurial orientation has been largely based on the work of Miller (1983) who suggests that a firm's degree of entrepreneurship could be seen as the extent to which it innovates, takes risk and acts proactively. Innovation reflects the tendency towards novelty, experimentation, and creative processes which help firms depart from established practices and technologies. Proactiveness refers to a posture of anticipating and acting on future wants and needs, thereby creating first-mover advantages *vis-à-vis* competitors. With such forward-looking perspectives, firms capitalize on emerging opportunities. Risk taking reflects a firm's willingness to break away from the true-and-

tried and venture into the unknown. It follows then that firms that have an entrepreneurial orientation are more prone to focus attention and effort towards opportunities that lead to radical product innovations.

There is evidence that important entrepreneurship outcomes such as radical product innovations are best explained by the fit between managerial characteristics and strategies. For instance, Barney (1991) argues that the way a firm is organized, when combined with firm resources, can enhance the positive relationship between resources and performance. However, there has been little consideration in literature on the inter-relationship between human capital and the way a firm is organized. Existing literature suggests that this inter-relationship is important in enhancing entrepreneurial outcomes (Wiklund and Shepherd 2003). Without knowledge on this inter-relationship, our understanding of how small enterprises develop radical product innovations is incomplete. This implies that there is limited evidence to guide researchers, policy makers and practitioners on the drivers of radical product innovations in small enterprises. Consequently, it will continue to be very difficult to design effective technology policies and strategies for small enterprises especially those in developing countries like Kenya. This study attempted to address this gap in knowledge by examining the contingent relationship between human capital and entrepreneurial orientation in explaining radical product innovations using a sample of small-scale carpentry workshops in Nairobi, Kenya.

The remainder of this paper is organized as follows: the next section reviews the human capital theory and links it to the concept of entrepreneurial orientation. The research questions of this study are given thereafter. After that, the procedures employed in primary data generation, construct measurement and data analysis are outlined. Next, the present paper's propositions are assessed, and the results presented and discussed. The final section presents the key conclusions of the study and highlights relevant managerial and policy implications.

The Human Capital Theory

This study adopts the human capital theory as its theoretical framework. It also extends the human capital theory to incorporate both its direct and indirect effects on

radical product innovations. The human capital theory suggests that individuals with more or higher human capital achieve higher performance when executing tasks (Becker 1964). Human capital comprises the stock of knowledge and skills that reside within individuals. Specifically, human capital includes the unique insights, skills, cognitive characteristics and aptitudes of entrepreneurs (Ventakaraman 1997). It also includes achieved attributes, accumulated work and habits that may have a positive or negative effect on productivity (Becker 1964). Human capital represents a resource that is heterogeneously distributed across individuals and is thus central to understanding differences in opportunity identification and exploitation (Shane and Venkataraman 2000). In this study, radical product innovations are viewed as aspects of productivity. Since human capital can be seen as an input, this study explores the human capital determinants of radical product innovations among a sample of small scale carpentry workshops in Nairobi.

Becker (1964) suggests that human capital can be categorized in two groups, general and specific human capital. General human capital is generic, implying that it can be transferable across all industries and firms. Examples of general human capital include family background characteristics, education, age and gender. In contrast specific human capital is more or less exclusively applicable to given activities such as development of new products. It includes aspects such as prior knowledge, experience, attitude towards innovations, technical and managerial competencies and industry specific know-how. Shane (2000) isolates prior knowledge of ways to serve markets, prior knowledge of customer problems, and prior knowledge of markets as important prerequisites of entrepreneurial outcomes. Existing literature indicates that human capital has significant influences on radical product innovations by small enterprises (Marvel and Lumpkin 2007). Thus the overall human capital profile of an entrepreneur may be a key determinant of radical product innovations.

Some literature also considers social networks as part of an individual's human capital base (Shane and Eckhardt 2003). Social capital has been recognized as vital to the entrepreneurial process. Social capital is instrumental in providing a business founder access to additional financial, human and other resources that are required for entrepreneurial outcomes, such as radical product innovations. Entrepreneurs are

embedded in a larger social network structure that constitutes a significant proportion of their opportunity structure. Nascent entrepreneurs personal networks – the set of persons through which they are directly linked – affect their access to social, emotional and material support. According to Shane and Eckhardt (2003) an individual may have the ability to recognize that a given entrepreneurial opportunity exist, but might lack the social connections to transform the opportunity into a radical product innovation.

Human capital factors can influence radical product innovations in two ways. In the first way human capital factors influence radical product innovations directly. This is through making decisions based on passion. This is possible when individuals evaluate the symbolic meaning of entrepreneurial opportunities and make affective, intuitive and holistic judgments on whether to develop radical product innovations or not. The existing literature on the drivers of radical product innovations does not shed much light on this possibility.

In the second way, individuals make the decision on whether to develop radical product innovations rationally. In other words, individuals evaluate entrepreneurial opportunities' utilitarian meaning and make piecemeal, attribute-by-attribute judgment. Shane and Ventakaraman (2000) argue that on average, entrepreneurs exploit opportunities having higher expected value, the expected demand is large, industry profit margins are high, the technology life cycle is young, the density of competition in a particular opportunity space is neither too low nor too high, the cost of capital is low and population- level learning from other entrants is available. Thus individuals examine these factors and make the decision on whether to develop a radical innovation or not. It follows then that human capital factors influence the importance of the attributes of opportunities which in turn influence the decision to launch a radical product innovation or not. Consequently, human capital influences radical product innovations indirectly. This second method underscores the role of strategy in making the decision on whether to develop radical products or not.

An emergent body of literature offers support for the indirect influence of human capital on radical product innovations. For instance, Wiklund and Shepherd (2003) argue that in addition to the resources themselves, the organizational and strategic processes of firms are important because they facilitate the manipulation of resources into value-

creating strategies. Entrepreneurial orientation has been described as part of the managerial processes that allows some firms to be ahead of the competition because it facilitates firm action based upon early signals from its internal and external environments (Lumpkin and Dess 1996). Entrepreneurial orientation refers to a firm's strategic orientation, capturing specific entrepreneurial aspects of decision-making styles, methods, and practices (Rauch *et al.* 2006). Given the importance of entrepreneurship to firm performance, entrepreneurial orientation could be an important measure of the way a firm is organized-one that enhances the performance benefit of a firm's human capital by focusing attention on the utilization of these resources to discover and exploit opportunities.

Entrepreneurial orientation refers to a firm's degree of entrepreneurship which could be seen as the extent to which it innovates, takes risk and acts proactively (Miller 1983). Innovation reflects the tendency towards novelty, experimentation, and creative processes which help firms depart from established practices and technologies. Proactiveness refers to a posture of anticipating and acting on future wants and needs, thereby creating first-mover advantages *vis-à-vis* competitors. With such forward-looking perspectives firms capitalize on emerging opportunities. Risk taking reflects a firm's willingness to break away from the true-and-tried and venture into the unknown. It follows then that firms that have an entrepreneurial orientation are more prone to focus attention and effort towards opportunities that lead to radical product innovations. Existing research suggests that entrepreneurial orientation is a key driver of radical product innovations (Matanda, 2007; Salavous and Loiukas, 2003).

Empirical studies have mainly focused on the direct link between individual strands or configurations of human capital factors and radical product innovations, while less attention has been devoted on how management can utilize these factors more effectively. In other words there has been little consideration in literature on the interrelationships between human capital factors and entrepreneurial orientation in explaining radical product innovations. The above discussion leads us to the following research questions: From the human capital theory: Does a bundle of superior human capital factors enhance radical product innovations? Does a firm's entrepreneurial orientation enhance the positive benefits of human capital? The same question in terms

relevant to entrepreneurial orientation scholars asks: Is there a contingent relationship between human capital factors and entrepreneurial orientation in enhancing radical product innovations?

RESEARCH METHOD

This section begins by first outlining the research design that was adopted in this study. It then identifies the study population and sampling procedures before discussing the data collection methods. Next, it describes the methods that were used in analyzing data.

Research Design

This is a survey that aims at examining the determinants of radical product innovations in a sample of small carpentry enterprises in Kenya. This research design is useful in examining the relationship between different business phenomena (Saunders *et al.* 2003). This study was conducted in Kasarani Division in Nairobi. Small Scale carpentry workshops are a prominent economic activity in this area. The population for this study included all Small Scale Carpentry Workshops in Kasarani Division that have introduced a new product in the last twelve months. A sampling list of all Small Scale Carpentry Workshops was constructed from lists of members of trade associations in the study area. To ensure that only Small Scale Carpentry Workshops that have introduced a new product in the last twelve months are covered, a complete enumeration of all the Small Scale Carpentry Workshops in the study site was also done. From this exercise, a total of 487 Small Scale Carpentry Workshops were identified in the study site as having introduced a new product in the last twelve months.

From the sampling frame, simple random sampling procedures were used to select the study sample. Following Saunders *et al.* (2003) the minimum sample size for this study was computed as 217 enterprises. Any sampled enterprise that declined to be surveyed was replaced by the next randomly selected enterprise until the minimum sample size was attained.

The inclusion criteria for this study was any Carpentry Workshop that employs less than fifty people, operates in Kasarani Division of Nairobi, has introduced a new product in the last twelve months and voluntarily agrees to participate in the study.

Consequently, any Carpentry Workshop that did not fulfill these criteria was excluded from this study.

Measurement of Variables

Product innovativeness, the dependent variable in this study was operationalized from an internal firm perspective, as perceived by managers. Therefore, a dichotomous categorization of product innovativeness based on the managers' perception of newness was adopted in this study. In particular, the respondents were asked to identify the most important new product they had introduced into the market in the last twelve months and then to classify it as either a radical or incremental innovation. Thus in the binary construct, 1 represents radical product innovation (that is new product lines, new to the market) while zero refers to incremental product innovations (that is modifications and improvements of existing products). Product innovation, therefore, represents a perceptual measure reflecting the degree of similarity of the new product relative to others marketed by the enterprise. Measuring of product innovation in this manner is consistent with a previous study (Salavous and Loiukas 2003).

Three variables were used to measure general human capital. These were education, age and gender. The respondents were asked to indicate the highest level of education attained. This was an ordinal scale with five levels: no formal schooling, primary, secondary, college and university level. Age was measured by asking the respondents to state their year of birth. Age was then computed as the difference between year 2007 and the date of birth. Gender of the respondents was measured by asking the respondents to indicate their gender; males were labeled one and females two.

Three variables measured specific human capital. These included number of trainings attended, entrepreneurial experience and industry experience. The respondents were asked to state the number of seminars and trainings they had attended in the last three years. Two variables were used to measure entrepreneurial experience. The first asked the respondents to state the number of businesses they had previously started, while the second sought to know whether the parents of the respondents were in business or not. Industry experience was sought through asking the respondents to indicate the number of years they had worked in carpentry.

The respondents were asked to indicate whether they belong to any business associations. This variable was used to measure the respondents' social networks. The variable took two values, respondents that indicated that they belong to a business association were labeled one, otherwise zero.

Entrepreneurial orientation was measured using the Covin and Slevin (1989) scale. This is a multi-item, semantic differential scale that reflects the top management behaviour in taking strategic decisions and operating management philosophies. This scale captures three dimensions namely innovativeness, risk taking and proactiveness. The internal consistency of this scale and its predictive validity has been demonstrated (Kreissor *et al.* 2002).

Business age was operationalised as the number of years passed since the inception of the enterprise. The measurement of this variable is consistent with prior research (Salavous and Loiukas 2003).

Data Collection

A structured questionnaire was used to collect data. The research tool for this study was tested for reliability and validity in several ways. First, the variables selected for this study were obtained from previous studies and tested for relevance. Secondly, experts in entrepreneurship were used in the selection of the study variables. Finally, the correlations of key variables were also conducted to help rule out multicollinearity.

The questionnaire was double translated into Kiswahili to cater for the members of the sample that were not conversant with English. The questionnaire was pre-tested on 20 Small Scale Carpentry Workshops that operate in Githurai Division, which neighbours the study area. This exercise helped to rephrase and reorganize the format of the questionnaire.

Data was collected using interviews with the owners of Small Scale Carpentry Workshops in the study area. The pre-tested questionnaire was administered by the researcher with the help of two research assistants. The research assistants were trained on the handling of the research tool and the topic under study before being allowed to collect data. The research assistants were closely supervised by the researcher during

data collection. The questionnaire took approximately twenty minutes to administer. Data collection took 21 working days to complete.

Data Analysis

Several methods for analyzing data were adopted in this study. The survey data was initially summarized and presented using descriptive statistics such as means, standard deviation and correlation coefficients.

To examine the relationship among variables, a logit model was estimated. In this model the dependent variable was a dichotomous variable with radical product innovation one, while incremental product innovation was labeled zero. This model took the following form:

$$\begin{aligned} \text{Prob (radical product innovation)} \\ = 1 / (1 + e^{-Z}), \end{aligned} \quad (1)$$

where $Z = f (X_i , C)$, that is the linear combination of independent variables (X_i) and a constant (C).

Following Mukras (1993) this model can be written as:

$$\text{Ln } [P_{(i)}] = \text{Ln } [1 / (1 + e^{-z^{(i)}})] \quad (2)$$

Where $P_{(i)}$ is the probability that the i^{th} enterprise will develop a radical product innovation and $z_{(i)}$ is a function of n explanatory variables expressed as:

$$z_{(i)} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \mu_i \quad (3)$$

where β_0 is the intercept and β_i are slope parameters in the model. The slope shows the log of odds ratio in favour of a firm developing a radical product as the independent variables change. To allow interpretation of the coefficients, the logit model can be re-written in terms the odds and log of odds (Hosmer and Lemeshow 2004).

$$P_{(i)} / (1 - P_{(i)}) = e^{z^{(i)}}$$

Taking logarithms on both sides we obtain:

$$\text{Ln} [P_{(i)} / (1 - P_{(i)})] = \text{Ln} [e^{\beta_0 + \sum \beta_i x_i}] = z_{(i)} \quad (4)$$

If the disturbance term is taken into account, the logit model becomes:

$$z_{(i)} = \beta_0 + \sum \beta_i x_i + \mu_i \quad (5)$$

The parameters of the above model were estimated using the iterative maximum likelihood procedure since this method yields unbiased and asymptotically efficient and consistent parameter estimates (Mukras, 1993). Since the explanatory variables do not have the same level of influence on the firms decision to develop a radical product, marginal effects of these variables were estimated as well.

A significant level of ρ value of less than 0.05 was considered significant in this study. All the quantitative analyses for this study were tested using the Statistical Package for the Social Sciences (SPSS) version 13.0.

RESULTS

Characteristics of the Study Sample

The sampled enterprises had an average of 4.43 employees (SD = 4.43). Enterprises with radical product innovations had a mean of 6.3 employees while the others had 3.71 employees. There were statistically significant differences in the number of employees and the development of radical product innovations (t test = 3.51, ρ = 0.001).

The mean age of the sampled enterprises was 6.77 years (SD = 5.18). Those enterprises with radical product innovations were aged 8.72 years on average while those that had not, were aged 6.03 years on average. There were statistically significant differences in mean ages of the sampled enterprises and the development of radical product innovations (t test = 3.91, ρ = 0.000).

The mean age of the respondents was 33.46 years (SD = 10.05 years). Ninety six percent of the respondents were males. Overall, 60 percent of the respondents had above primary level education. There were no statistically significant differences in education attainment and the adoption of radical product innovations by the sampled respondents ($\chi^2 = 0.02$, $p = 0.888$).

Estimation Results

Table 1 provides means, standard deviations and correlations for all continuous variables. The table shows that the variable number of employees is moderately and significantly correlated to number of businesses previously started and entrepreneurial orientation. Further, entrepreneurial orientation is significantly associated with number of employees. Industrial experience is also strongly correlated with the age of the respondents. Following suggestions offered in Mukras (1993) the number of employees, number of businesses previously started and industry experience are not used in the estimation of the logistic model since they have the potential to cause problems of multicollinearity.

Table 1: Correlations of Continuous Variables

	<i>Mean</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Number of employees	4.43	4.43	1						
2. Number of businesses	1.19	1.56	.476**	1					
3. Seminars attended	0.24	1.09	.054	.024	1				
4. Entrepreneurial Orientation	2.96	0.73	.465**	.463**	.084	1			
5. Age	33.46	10.05	.134	.170*	.125	.178*	1		
6. Business Age	6.77	5.18	.325**	.291**	.101	.331**	.306**	1	
7. Industry experience	12.21	7.53	.089	.167*	.113	.150*	.799**	.421**	1

Key * Significant at $p < 0.10$, ** Significant $p < 0.05$

A binary logistic regression model was used to establish the predictors of radical product innovation. It appears that the model fits the data well (Nagelkerke $R^2 = 0.224$).

The classification table (Table 2) provides an additional way to assess the model fit by comparing predicted and observed outcomes. More specifically, this table compares the observed and predicted firms that access new markets when firms with a predicted probability of 0.5 or greater are classified as having accessed new markets. In other words, this table shows only whether the estimated probability is greater than one half. The off-diagonal entries show the number of small-scale carpentry workshops that were incorrectly classified. Overall, 76% of the firms were correctly classified.

Table 2: Classification Table

<i>Observed</i>	<i>Predicted</i>		
	Radical	None	Percentage Correct
Radical	21	36	36.8
None	12	134	91.8
Overall Percentage			76.4

The Hosmer and Lemeshow Test offers further evidence of the model fit. In this test, significant levels of below 0.05 indicate poor model fit (Hosmer and Lemeshow, 2004). Therefore, the estimated Logit model fits the data well since $p > 0.05$.

The estimation results are displayed in Table 3. Only two variables are significant at 95% confidence level. These are having a parent in business and entrepreneurial orientation.

The estimation results suggest that entrepreneurial orientation is negatively and statistically associated with radical product innovations. The estimated marginal effect for this parameter is -0.776 which gives an odds ratio of $e^{-1.001} = 0.368$.

The regression results show that having a parent in business has a positive and statistically significant influence on radical product innovations. A B-value of .930 means in theory that an increase in this variable by one unit is associated with an increased odds ratio of $e^{.951} = 2.588$ of introducing radical product innovations. This shows a strong influence on the decision to introduce radical product innovations.

Table 3: The Results of the Logit Model

	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>Sig.</i>	<i>Exp(B)</i>
Parents	.951*	.371	6.572	1	.010	2.588
School (Above Primary)	-.095	.363	.068	1	.795	.910
Seminars	.332	.282	1.392	1	.238	1.394
Membership	.508	.475	1.148	1	.284	1.663
Age	-.014	.017	.691	1	.406	.986
Entrepreneurial Orientation	-1.001**	.283	12.500	1	.000	.368
Business Age	-.048	.035	1.842	1	.175	.953
Gender (Male)	-.662	.868	.582	1	.445	.516
Constant	3.526**	1.500	5.523	1	.019	33.983
Nagelkerke R ²	0.22					

Key: * $\rho < 0.10$, ** $\rho < 0.05$

DISCUSSION

The number of employees was found to be statistically associated with the introduction of radical product innovations. This finding disagrees with the result reported in Salavous and Loiukas (2003). The differences in these findings are probably due to the sectors surveyed in both studies. This study focuses on carpentry while the study by Salavous and Loiukas (2003) surveyed small food processors. This means that some underlying differences in the two sectors cause the differences in findings. Since carpentry in Kenya is labour intensive, the positive association between radical product innovation and number of employees suggests that small enterprises compensate for less human capital through hiring employees who contribute their human capital.

This study established that older enterprises were more likely to introduce radical product innovations. This result is at variance with results reported in Salavous and Loiukas (2003) that the age of a business is not associated with radical product innovations. Differences in opinion are most likely as a result of the different samples used or differences in country contexts.

Males were more likely to be owners of small scale carpentry workshops in the study site. Only 4 percent of women were sampled in the study. This finding is consistent with previous reports that show that women tend to shy away from owning manufacturing based enterprises (Bird 1989; ICEG *et al.*, 1999). This finding suggests that despite the increased interest in women entrepreneurship (Brush 2007), little progress

has been made in encouraging women to venture into male dominated sectors like carpentry.

Education was found not to be associated with the introduction of radical product innovations. This finding collaborates the literature that argues that education is not associated with entrepreneurship (Bosma *et al.* 2008). The finding that education does not influence radical product innovations supports the observation that formal education impedes entrepreneurial process by reducing curiosity, visions and the willingness to take risks. This is particularly relevant in the Kenyan situation where the education system has been criticized for promoting rote learning at the expense of creativity and independence.

This study established that entrepreneurial experience was statistically associated with the development of radical product innovation. This finding collaborates the observation in literature that previous experience with entrepreneurship enhances entrepreneurial outcomes (Shane 2000; Delmar and Shane 2006). The respondents in this study obtained valuable entrepreneurial experience vicariously through growing up with entrepreneurial parents. Such prior entrepreneurial experience helps to develop key competencies, provide considerable motivation for venturing again, open new opportunities and link the entrepreneur to important resource providers.

The estimation results indicate that entrepreneurial orientation is negatively associated with the development of radical product innovations. This finding suggests that as the sampled firms become more entrepreneurial orientated they tend to focus less on radical product innovations. This finding partially collaborates the findings reported in Salavous and Loiukas (2003). The differences in the direction of association between entrepreneurial orientation and radical product innovation in these studies are not easy to explain. This situation opens up a research agenda for the future in this study.

The study found out that having parents in business was associated with radical product innovation. This finding can be explained in two ways. One entrepreneurial parents act as role models. Thus their children are able to learn on how to identify and exploit opportunities which translate into radical product innovations. Secondly, entrepreneurial parents link their children to important networks which serve as reservoirs for important information on innovations.

These findings help to answer the research questions posed in this study. Consequently, it is safe to conclude that there is a contingent relationship between human capital factors and entrepreneurial orientation in explaining radical product innovations. Further, this study offers support to the claim by Barney (1991) that the way a firm is organized, when combined with firm resources, can enhance the positive relationship between resources and performance. It also supports the empirical evidence offered by Wiklund and Shepherd (2003) that the inter-relationship between human capital and the way a firm is organized is important in attaining entrepreneurial outcomes.

The findings of this study have important implications for theory, policy and practice. An important theoretical contribution of this study relates to its application of the human capital theory to examine the drivers of radical product innovations by small firms in a developing economy. The finding that prior entrepreneurial experience and having parents in business as key drivers of radical product innovations is an indicator of the relevance of the theory in explaining entrepreneurial processes. Another theoretical significance of this study relates to the ability of this study to link human capital theory and the concept of entrepreneurial orientation empirically. This linkage suggests that the possession of appropriate human capital and the organization and strategic processes of firms are important in the attainment of entrepreneurial outcomes. This finding gives credence to the observation by Wiklund and Shepherd (2003) that in addition to the resources themselves, the organizational and strategic processes of firms are important because they facilitate the manipulation of resources into value-creating strategies. However, it is yet to be established on whether human capital influences radical product innovations directly or indirectly through entrepreneurial orientation. This means that more refined contingent explanations of the drivers of radical product innovations in small firms are needed. Overall, the results of this study offer support for entrepreneurial-push as an important driver of innovative behaviour.

Policy makers interested in enhancing the development of radical product innovations in small firms can benefit from this study. Policy makers should consider the role of entrepreneurial experience and entrepreneurial orientation on radical product innovations. The study findings suggest that policy makers should focus on developing the entrepreneurial and strategic competencies of small firms if they wish to enhance the

development of radical product innovations. Thus, building a fertile entrepreneurial environment will accelerate radical product innovations in small firms.

The findings of this study can also help to qualify policies for the development of small enterprises particularly in Kenya. This analysis offers empirical support for the strategy to develop the entrepreneurial competencies of small enterprises as spelled out in Sessional Paper Number 2 of 2005 on *Development of Micro and Small Enterprises for Wealth and Employment Creation for Poverty Reduction* (GoK 2005). The findings of this study further suggest that the strategies for enhancing the technology capabilities of small enterprises as contained in the above mentioned policy document can benefit from incorporating measures that cultivate a culture of entrepreneurship. Provision of entrepreneurial experience and sharpening the entrepreneurial orientation of owners of small scale carpentry workshops are two strategic options that policy makers can consider if they wish to encourage the generation of radical product innovations.

A limitation of this study is that it is a cross sectional study and therefore the causal direction between human capital, entrepreneurial orientation and innovation can be called into question. While there are conceptual arguments in favor of both human capital and entrepreneurial orientation affecting radical innovation, the other causal direction is also possible. The development of radical innovations may enhance the human capital stock and also force enterprises to adopt an entrepreneurial orientation. A suitable approach would be to conduct a panel study where data are repeatedly gathered from a cohort of new ventures as this would allow cross-lagged regression analysis, which could help tease out the causal relationship between human capital, entrepreneurial orientation and radical product innovations.

Conclusion

In conclusion, this study contributes to one of the most important questions facing entrepreneurship research today, namely, why some people, and not others, recognize opportunities, and with what effect (Shane & Venkataraman 2000). The study responded directly to this fundamental, yet unresolved, question. The findings underscore the importance of specific human capital and the strategic processes that firms utilize to develop radical innovations. It also demonstrates that the organizational and strategic

processes of firms are important because they facilitate the manipulation of resources into attaining innovation outcomes.

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