ABSTRACT

**Topic** – This paper looks at the theory of firm growth. In particular, it attempts to identify models and determinants of firm growth which are relevant to small enterprises.

**Research Questions** – The following questions are addressed in the paper: (i) How is firm growth viewed in the literature? (ii) What are the models of firm growth most relevant to small enterprises (iii) What are the determinants of small firm growth?

**Methodology** – The paper surveys the literature about firm growth with a focus on small firms. It discusses evidence from empirical studies to shed lights on the determinants of small firm growth.

**Findings** – The review indicates that there has been a complete absence of a discussion of an appropriate measure of firm growth in the literature. Theorists have used different measures of growth ranging from employment to profits, value-added, turnover, and total assets. Most studies have been uni-dimensional, looking at individual indicators only. Three models of firm growth are identified to be most relevant to small enterprises. They include stochastic model, human capital model and learning model. Apart from firm size and firm age, which are commonly viewed as the determinants of growth, small firm growth is influenced by industry, location, gender, and human capital of the owner. Other important macro variables that have a direct effect on firm growth are the aggregate level of economic activity, policy, and constraints.

**Implications** – The paper shows the complexity of the issue of firm growth. When it comes to studying small firm growth, it is important to pay attention to the multi-dimensional nature of growth. Thus, it is useful to combine or modify existing models and theories of firm growth in studies about small firm growth.
INTRODUCTION

There have been numerous research examining firm performance in general and SMEs performance in particular in different context settings (David B Audretsch, 1991; David B. Audretsch & Mata, 1995; Baldwin & Rafiquzzaman, 1995; Becchetti & Trovato, 2002; Bevan, Estrin, & Schaffer, 1999; Bhaumik & Estrin, 2007; Biggs & Shah, 2006; Chow & Fung, 1997; Dollar, Hallward-Driemeier, & Mengistae, 2005; Glancey, 1998; Hallward-Driemeier, Wallsten, & Xu, 2006; Storey, 1990; Storey, Keasey, Watson, & Wynarczyk, 1987; Vivarelli, 2007b; Wang & Yao, 2002). Despite the wealth of literature on the topic, the concept of enterprise performance remains relatively fluid in the literature (Bevan et al., 1999). Indeed, performance is a complex and multi-dimensional construct (Carton and Hofer, 2005 and Dvir, Segev, and Shenhar, 1993 as cited in Wolff & Pett, 2006).

In financial and economic terms, different indicators of firm performance exist. According to Bevan et al. (1999), improvements in performance typically include growth in profitability, efficiency, and output. At various times firm performance may be reflected by financial outcomes such as sales growth or market growth, customer satisfaction, or establishing a foundation upon which future growth may take place. Other authors are interested in growth terms such as employment, assets and change in ownership of the firm (Bevan et al., 1999; Liedholm & Mead, 1999; Peres & Stumpo, 2000; Storey, 1990). In addition, firm performance could be proxied by exports and market share (Olsen, Lee, & Hodgkinson, 2008) or a change in customers (O'Farrell & Hitchens, 1988). The owner-manager characteristic of small firms implies that their performance could be assessed on the level of satisfaction in the part of the founder (O'Farrell & Hitchens, 1988; Vivarelli & Audretsch, 1998). Other authors considered societal contributions of small firms as an indicator of performance (Reynolds, 1987).
In many cases the discussion about firm performance immediately moves to a discussion about firm growth (Vivarelli & Audretsch, 1998). Nevertheless, there is no consistency in the dimensions of growth which theorists have used as the object of analysis. Some refer to employment; others to profits, value-added, turnover, and total assets (O’Farrell & Hitchens, 1988:1366). In fact, there has been a complete absence of any discussion of an appropriate measure of growth in the literature. Most studies have been uni-dimensional, looking at individual indicators; in some cases the parameters have not been defined at all (Birley & Westhead, 1990). In the small firm growth literature the problem is further complicated due to the fact that the literature is highly fragmented and there is little conversations between the different theoretical perspectives (Wiklund, Patzelt, & Shepherd, 2009). According to Wiklund (2009) reviews of studies of firm growth reveal that each study only covers a fraction of the variables considered important in other studies.

This paper reviews and identifies models of firm growth which are relevant to small firm growth and discusses the determinants of firm growth in the literature. The paper is structured as follows. The next section identifies three models of firm growth which are most relevant to small firm. They are: (i) Stochastic model; (ii) Human capital model; and (iii) Learning model. The section that follows focuses on determinants of small firm growth. Even though the traditional factors of firm size and firm age are discussed in details, factors relating to the internal and external environments of the firms are other determinants of small firm growth. The last section of the paper offers some concluding remarks about small firm growth research. It emphasized that the studies of small firms growth should be sensitive to the multi-dimensional nature of small firm growth.
FIRM GROWTH MODELS

Theories on the growth of firms have been discussed extensively in the literature (Coad, 2007; Paul A. Geroski, 2002; O'Farrell & Hitchens, 1988; Sutton, 1997; You, 1995). For example, Geroski (2002) discussed about the model of optimum firm size, the growth stage model, model with Penrose effects, and models of organizational capabilities. Meanwhile, O'Farrell and Hitchens (1988) identified four models of firm growth. The first model is the industrial economics approach in which firms will grow in a relatively unimpeded path with no limit to the absolute size. The second model suggests that firm growth is a stochastic process and is subjected to a cumulative random shock. The third model describes firm growth as a sequence of grow stages. The fourth model focuses on the strategic dimension of achieving sustained growth and the way in which the owner-manager responds to business and environmental indicators.

This section will discuss three models firm growth, as identified by Brock and Evans (1986) for small firms. They are the stochastic model, the human capital model and the learning-by-doing model. These three models capture the essential elements of other models. In addition, they are relatively simple and easy to understand. In order to provide a clearer theoretical framework about firm growth, this section presents three models of firm growth and an analysis of the determinants of firm growth commonly emphasised in the literature.

Stochastic Model

The most elementary fact about corporate growth based on econometric work on both large and small firms suggests that firm size, most often measured by employment, follows a random walk (Paul A. Geroski, 2002). The size distribution of firms at a given point in time is the product of a stochastic process resulting from cumulative random shocks over time (O'Farrell & Hitchens, 1988). In this stochastic model the probability of firm growth is based on pure chance and the size distribution of firms in an industry reflect these stochastic
processes. This model is closely associated with the Law of Proportionate Effects first proposed by Gibrat in 1931. In its simplest form Gibrat’s law suggests that the expected growth rate of a given firm is independent of its size at the beginning of the period examined (Gibrat, 1931). Simon and Bonini (1958) further showed that firm growth is unrelated either to size, its prior growth or its age.

The implications of Gilbrat’s law has been interpreted in a formal framework by different authors (Coad, 2007; Paul A. Geroski, 2002; O’Farrell & Hitchens, 1988). O’Farrell and Hitchens (1988) described the stochastic model of growth and explained that three elements make up the growth of a small firm. The first is a constant growth rate of the market which is common to all firms. Let \( X_t \) be firm size at time \( t \) and let \( \alpha \) be the constant growth rate of the firm. Then

\[
\frac{X_{t+1}}{X_t} = \alpha
\]

(1)

The second element is a systematic tendency for the growth of a firm to be related to its initial size

\[
\frac{X_{t+1}}{X_t} = \alpha X_t^{\beta-1}
\]

(2)

The effect of initial size on growth is determined by the value of \( \beta \). For \( \beta = 1 \), the exponent of \( X \) is zero and size has no effect on growth. For \( \beta > 1 \), large firms grow faster than small ones, and vice versa for \( \beta < 1 \).

The third element is a random growth term, \( \varepsilon_t \), which enters the equation multiplicatively:

\[
\frac{X_{t+1}}{X_t} = \alpha X_t^{\beta-1} \varepsilon_t
\]

(3)

or
\[ \log X_{t+1} = \log \alpha + \beta \log X_t + \log \epsilon_t \]  \hspace{1cm} (4)

There are two assumptions that Gibrat made: (i) \( \log \epsilon_t \) is normally distributed with zero means and variance \( \sigma^2 \), and it is independent of the initial size of the firm; and (ii) the mean proportionate growth of a group of firms of the same initial size is independent of that initial size, which means \( \beta = 1 \) in equations (2) and (3).

Nevertheless, many empirical studies have rejected Gibrat’s law and its assumptions based on the evidence that there is a negative relationship between firm size and growth (P. Dunne & Hughes, 1994; T. Dunne, Roberts, & Samuelson, 1989; Evans, 1987a; Liedholm, 2002; McPherson, 1996; Shiferaw, 2006; Storey et al., 1987). This will be discussed further in the next section. The stochastic model of firm growth suggests that many factors affect growth. For this reason O’Farrell and Hitchens (1988) conclude that there is no dominant theory in this stochastic model, and it does not provide us with a good framework to examine firm growth. Other authors believe that there is minimalistic theoretical background behind the testing of Gilbrat’s law in empirical work (Coad, 2007).

**Human Capital Model**

Lucas (1978) was the first researcher to put forward the human capital model (Storey, 1994; Vivarelli, 2007a). He assumed individual entrepreneurs have certain business or management ability which will influence their success in business. He further assumed that skill varies across workers. As a result, the size distribution of firms is based on the relative endowment of entrepreneurial talents and skills of employees.

The human capital model is related to firm growth effect model discussed by Penrose (1959) which contains two different arguments. One is the ‘resource push’ argument which sees firms as a bundle of resources bound together by set of administrative skills or capabilities which are used to deploy them as effectively as possible. The other is the
managerial limits to growth hypothesis (Paul A. Geroski, 2002). Penrose argues that at any time there are limits to the expansion that existing managers can achieve, and limits to the management capacity due to the constraint to the expansion of the number of managers (Penrose, 1959 as cited in O'Farrell & Hitchens, 1988).

Human capital is relevant to the internal environment of the firm as personal and leadership characteristics of the owner-manager are included in this environment (Gibb and Scott, 1985 as cited by O'Farrell & Hitchens, 1988). Factors such as the owner’s age, attitudes to growth, occupational background, personal objectives, management style, level of owner’s education and training, and personal values and attitudes have been emphasised in the literature as having an influence on firm growth (O'Farrell & Hitchens, 1988:1373).

**Learning Model**

The third model is the learning model introduced by Jovanovic (1982). This influential model has been discussed extensively in the literature about small firm growth (Liedholm & Mead, 1999; Storey, 1994; You, 1995). Jovanovic assumes that management ability varies between entrepreneurs. This information is unknown to the business owner when a new business is established. In addition, he assumes that firms have different efficiencies which are not directly observable. A firm’s true efficiency can only be learnt gradually after the firm enters into production. After learning about its true abilities, a firm will adjust its behaviour. Firms choose output levels to maximise expected profits on the basis of imperfect information on their efficiency levels in each period. They also update their expectations based on the efficiency level. Those who revise their ability upward will expand and those who revise them downward tend to contract or exit (Liedholm & Mead, 1999; Storey, 1994; You, 1995).

This model has important implications and indicates that both firm age and size are crucial for firm dynamics. It predicts that firm failure rates and growth rates will be inversely
related to the age and size of the firm (Liedholm & Mead, 1999). Thus, this learning model synthesizes the key elements of the human capital model and the stochastic model as discussed above.

Jovanovic’s model is found to be perfectly consistent with a world where founders are quite heterogeneous, entry mistakes can easily occur and early failures are quite common (Vivarelli, 2007a). However, Jovanovic’s model assumes that firms are endowed at birth with an unknown value of time-invariant characteristics. It does not take into account the evolution of a firm’s abilities. Thus, Pakes and Ericson (1987, 1998) called Jovanovic’s model a passive learning model. They then proposed an active learning model in which managerial ability is augmented through human capital formation. Thus, this is an extension of Jovanovic’s basic model (Liedholm & Mead, 1999). In the active learning model a firm is assumed to know its own characteristics and those of its competitors, along with the future distribution of the industry structure (Vivarelli, 2007a). Firms enter the industry at the sub-optimal scale in order to learn and expand if successful (You, 1995). In an empirical study of retail and manufacturing industries in Wisconsin, Pakes and Ericson ((1998:37) showed that the manufacturing sector is consistent with the active learning model while the retail sector is compatible with Jovanovic’s passive learning model.

The learning models could generate a rich set of testable hypotheses about the life cycle patterns of firm growth. Both active and passive learning models, however, do not indicate what the key determinants of managerial ability might be, or how other important variables might affect firm dynamics (Liedholm & Mead, 1999:11). The models also do not tell us a lot about the essential part of the dynamic process in which the capabilities of firms evolve overtime (You, 1995:458). Indeed, the ability to adapt and learn from the experience
of dealing with both the external environment and internal environment is the key factor in sustaining the growth of a business (O'Farrell & Hitchens, 1988).

The three models of firm growth presented above encapsulate different elements of growth of small firms. Random factors, human resources and learning ability all influence their growth. The following section will consider some major determinants of firm growth relating to the models above.

DETERMINANTS OF FIRM GROWTH

Firm Size and Growth

There is enough evidence to indicate that firm growth is significantly related to firm size and age (P. Dunne & Hughes, 1994; T. Dunne, 1988; T. Dunne et al., 1989; Evans, 1987a; Liedholm, 2002; Shiferaw, 2006). These studies have confirmed that firm growth decreases with firm size for firms of the same age, and decreases with firm age for firms of the same size. In addition, it was found that the variability of firm growth decreases with firm age for firms of the same size, and, to a weaker extent, with firm size for firms of the same age (Brock & Evans, 1989).

There is increasing empirical evidence to suggest that firm growth decreases with firm size for firms of the same age and decreases with firm age for firms of the same size. This contradicts Gibrat’s ‘Law of Proportionate Effects” in which a firm’s growth rate is independent of its size. However, this is increasingly questioned, with empirical works indicating that there is conflicting correlation in the size-growth relationship. It was Evans (1987a) who set out to test the extent to which the independence of firm growth and firm size applies in the small firm sector in the U.S. He concluded that Gibrat’s Law must be rejected for the small firm sector. He found that growth and size are negatively correlated, even allowing for the exiting of slow growth firms. The result is confirmed by Dunne et. al. (1989)
who found strong evidence that mean growth rates decline with size for both single-unit and multi-unit manufacturing plants in the U.S. Similarly, a study of small single plant independent manufacturing companies in the U.K. comes to the conclusion that size and growth are negatively correlated (Storey et al., 1987). In another study of UK firms, Dunne and Hughes (1994) suggest that the smallest companies grow faster than the larger ones. Using panel data of manufacturing firms in Ethiopia, Shiferaw (2006) found that small firms grow faster than large firms even after controlling for sample attrition. Liedholm (2002) came to the conclusion that small enterprise growth is inversely related with initial size in six developing countries of Africa. Therefore, the smaller SMEs at start-up added more job expansion per firm than did their larger scale counterparts (Liedholm & Mead, 1999:37). A similar result is also found in a study of micro enterprises in Southern African countries (McPherson, 1996).

Nevertheless, Dunne and Hughes (1994) observe from their study that there is a threshold effect. According to them the mean growth of firms in different size bands is fairly stable beyond this threshold. Empirical evidence from manufacturing industry in Ethiopia indicates that the growth rate does not depend on initial size among large firms (Shiferaw, 2006). In an empirical analysis of a large sample of 4,000 Italian firms it was found that firm growth is independent of initial size for large firms, but this is not the case for small and medium sized firms (Becchetti & Trovato, 2002). You (1995:454) thus notes that there is a clear negative relationship between size and growth among smaller firms, while Gibrat’s Law holds, if at all, only for large firms. In addition, there is a possibility that the size-growth relationship may have changed over time, with the advantage in growth terms moving from larger firms in the 1950s to smaller ones in the 1960s and 1970s (P. Dunne & Hughes, 1994). Johnson (2007) suggested that policy changes may have something to do with this shift. According to him there was much more emphasis on assisting larger firms in the 1950s,
whereas the policy focus switched to small firms in the 1970s and onwards, especially in the developed countries.

In studies about the size-growth relationship there is the possibility of sample bias. Most of the data sets used in the studies are made up of relatively larger firms, no matter how they are measured (Johnson, 2007). Moreover, there is the problem of sample attrition, since small, slow growing firms may be more likely to fail than large, slow growing firms. An analysis of growth that is concerned with survivors alone will be biased towards finding an inverse relationship between size and growth. The poor growth of large firms will simply involve them sliding down the size distribution for a considerable period before dying, whereas for small firms with a similar growth record they are more likely to be forced to exit. Thus, studies of the size-growth relationship may be biased toward finding that in the small size bands, growth of survivors is faster than in the larger size bands because the slow or negative growers have been weeded out by death (Johnson, 2007).

**Firm Age and Growth**

Age is an important variable to explain the growth of small firms. The average growth rate is found to have a negative relationship to the age of firms in the U.K and U.S (P. Dunne & Hughes, 1994; T. Dunne et al., 1989; Evans, 1987a). In fact, the model of firm life-cycle based on learning developed by Jovanovic in 1982, also predicted that younger firms grow faster. This influential model considers the learning process in which firm growth decreases with age. Yet, Pakes and Ericson (1998) found that Jovanovic’s passive learning model is not robust to more general specifications of the technology and learning process. They proposed an active learning model and found evidence that the size distribution of firms is stochastically increasing over time in manufacturing industry, but not in retail trade. The implications of the learning model is that the growth and survival prospects of new firms will
depend on their ability to learn about their environment, and to link changes in their strategy choices to the changing configuration of that environment. The slower is the process of learning and the more turbulent is the market environment, the more likely it is that firms will fail to cope (P. A. Geroski, 1995).

As discussed above, there is a clear indication that age is negatively related to the growth of small firms from empirical studies. Dunne et al. (1989) find that the mean growth rate for non-failing manufacturing plants in the U.S. declines with age for both plants owned by single and multi-plant firms. In the U.K., Dunne and Hughes (1994) observe that younger companies grew faster than older companies for a given size. Their analysis indicates that age is statistically significant and inversely related to growth for the whole sample, and in different size classes of the sample. According to Liedholm and Mead (1999), there are limited empirical studies examining the age-growth relationship in developing countries. These include countries such as India (Little, Mazumdar, & Page, 1987) and Colombia (Cortes, Berry, & Ishaq, 1987). All these studies found an inverse relationship between the age of the firm and its growth rate for each of the sub-sectors examined. Nevertheless, the negative age-growth relationship is not always clear. For example, Reid (1993) found that age was negative but insignificant to growth in his study of small firms in Scotland in the 1980s. Thus, it is suggested that there could be a positive effect of age in the early years, and then a negative effect in later years (Johnson, 2007).

In the analyses of the age-size-growth relationship there is strong evidence to suggest that the variability of firm growth decreases with firm age for firms of the same size, and, to a weaker extent, with firm size for firms of the same age (P. Dunne & Hughes, 1994; T. Dunne, 1988; T. Dunne et al., 1989; Evans, 1987a, 1987b). The variability of growth rates will be largest among young firms which are often smaller. This variance declines as the firm
becomes more mature. In Jovanovic’s learning model, younger firms are seen to have inexperienced management and thus make more mistakes (Jovanovic, 1982). In the smaller firm categories, there is a greater preponderance of younger, inexperienced management. Larger firms also tend to be more diversified and are thus able to spread their risk across sectors and projects (Johnson, 2007).

You (1995) observes that the life cycle models of firm growth based on learning, explain much about the age-size-growth-survival relationship. In these models, firms tend to enter small and grow large through learning. Owing to the greater uncertainty facing younger and smaller firms, they experience greater turbulence – a higher probability of death, a higher growth rate variance, and, in general, a higher average growth rate - than older and larger firms. However, he observes that existing life-cycle models rely on a much too simplistic conception of the nature of the uncertainty faced by firms. Thus, he claims that any dynamic analysis of firms should not disregard the fact that the capabilities of firms evolve over time instead of being given at some level. In fact, Brock and Evans (1989:102) mention that learning considerations are important in the examination of firm growth. In their opinion, individuals must learn about their general abilities as entrepreneurs, learn how to operate particular technologies or ways of doing things. They then predict that the relative importance of these various kinds of learning will vary over the life cycle of the firm and across different industries. Hence, they see that integrating these kinds of learning considerations with capital adjustment considerations will prove to be important.

Other Determinants of Growth

Besides age and size, there are other variables influencing the growth of firms. Audrestch (1995) used longitudinal US data and found that a higher level of minimum efficient scale (MSE) in an industry will encourage a young firm to grow rapidly in order to overcome its
cost disadvantage. In a technological regime with a lot of innovative activity, small firms will grow faster. He also observed that industry growth will have a positive effect on firm growth. In addition, a multi-plant firm will also grow faster than a single-unit plant. Liedholm and Mead (1999:20-21) list a number of other variables that influence small firm growth in addition to the key variables of age and size. According to them sector of operation, location, gender, and human capital of the owner can influence growth. In addition, important macro variables such as the aggregate level of economic activity, policy, and constraints can have a direct effect on firm growth.

A recent paper by Wiklund et. al. (2009) attempted to build an integrative model for business growth. They identified five perspectives as the basis of their model. These include entrepreneurial orientation, environment, strategic fit, resources and growth attitude. However, they note that these perspectives are not necessary independent of each other. For example, they view entrepreneurial orientation as the central construct mediating the impact of resources, environment, and attitude on growth. This has led them to focus on four groups of variables in their empirical study of over 400 small businesses (Table 1).

Table 1: Variables in the Integrative Model of Small Business Growth

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<tr>
<td>• Risk taking</td>
<td>• Dynamism</td>
<td>• Firm resources (capital, labour, management board, ownership, size)</td>
<td>• Goals (Creativity, Personal benefits, Stability, Power)</td>
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<tr>
<td>• Proactiveness</td>
<td>• Hostility</td>
<td>• Human capital (education, management education, experience, age, background)</td>
<td>• Favoured work tasks (Strategy, Marketing, Operations, Accounting)</td>
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<tr>
<td>• Innovativeness</td>
<td>• Heterogeneity</td>
<td>• Network resources</td>
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<td>Source: Adapted from Wiklund et. al. (2009)</td>
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CONCLUSION

This paper has reviewed and discussed models of small firm growth and the determinants of small firm growth. It recognised that there is no consistency in the definition for firm growth in empirical studies. In addition, the literature in this area is often fragmented with each study focuses only on certain perspective. Hence, there is a lack of an inclusive model of small firm growth. The paper identified three models that are relevant to small firm growth. The first model emphasises the stochastic nature of firm growth. In this model firm growth is the result of cumulative random shocks over time and firm growth is based on pure chance. The second model relies on human capital as the source of growth for small firm. The focus of this model is, therefore, the internal resource of the firm with its owner-manager as the decisive factor for growth. The third model is the learning model in which a firm learn about its ability after entering into operation and adjust its behaviour. Firms can improve their human capital over time through active learning.

When it comes to the discussion about the determinants of growth, firm size and firm age have always been dominant. It is generally accepted that that firm growth decreases with firm size for firms of the same age and decreases with firm age for firms of the same size. Thus Gibrat’s Law of Proportionate Effect is rejected for small firms. However, there are number of other variables that influence firm growth. These variables can be classified into the external environment, the resources of the firm, the entrepreneurial orientation and strategic fit, and the growth attitude of the owner/manager of small firms. Recently, there have been some attempts to include these variables in the examination of small firm growth to reflect the multi-dimensional nature of growth of small firm. However, there are some challenges in this type of model. For example, variables in different groups are not independent and it is not always possible to obtain the necessary data at the detailed level required. This can potentially limit the ability of researcher to examine small firm growth.
REFERENCES


