

The Life Cycle of Growth Path among Micro Firms: Swedish Data

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Abstract

The main purpose of this study is to empirically examine whether the implications of the life cycle model hold on the growth path of a sample of Swedish micro firms. The study is based on a sample containing 22001 Swedish micro firms across six industries for the year 2007. Several methods are used to analyse the impact of the life stage and two control variables, size and industry, to analyse the impact on firm growth. The empirical results of the study confirm a clear pattern of the growth life-cycle process among Swedish micro firms. Young micro firms, generally, grow on average more than their older counterparts and as they age and develop, their growth rate decreases. Additionally, firm growth among firms of different sizes and in various industries still follows the general pattern of the total sample. Thus, it appears from the results that the growth rate of Swedish micro firms included in the sample follows a systematic and predictable pattern associated mainly with the life stage.

Keywords: growth path, life cycle model, micro firm, life stage

1. Introduction

The dynamic processes of the life cycle of the firm generally play a fundamental role in the development of a given economy. The market entry of young firms and their development life cycle are important, not only for the creation of jobs and the contribution to firms' growth but also for the process of creative destruction underlying economic development. Theoretically, the concept of the growth life cycle has been one of the important questions in business literature (Aghion, Fally, & Scarpetta, 2007; Anthony & Ramesh, 1992). One explanation could be that growth is a significant pre-condition for a firm's survival, innovation, and technological change (Aghion et al., 2007; Pagano & Schivardi, 2003). The life cycle model has been implemented to investigate several variables related to firms. For example, while Fitzsimmons, Steffens, and Douglas (2005) and Klepper (1996) examine the applicability of the model to firm growth, others (Black, 1998; Nissim & Penman, 2001; Dickinson, 2011) use the model to analyse firm profitability and cash flow patterns. The model has also been used to analyse the development of the firm capital structure (Berger & Udell, 1998; Cabral & Mata, 2003; Fama & French, 2000; Gregory, Rutherford, Oswald, & Gardiner, 2005). Practically, various stakeholders, such as investors, managers, lenders, and creditors, can employ the model to analyse and assess the financial position, performance, and long-range planning of a firm (Scott & Bruce, 1987).

The purpose of this study is to empirically examine whether the implications of the life cycle model hold with respect to the growth path for a sample of Swedish micro firms.

The main contribution of this study is the provision of evidence relating to the applicability of the growth life cycle among micro firms in Sweden, where there has previously been no evidence relating to this question. However, as far as the authors know, no study has examined the life cycle model and its implications for firm growth in Sweden.

Sweden provides an interesting context for this study owing first to its position as an economy in transition and because it joined the position of the more industrial European countries during the period under study. Second, it adopted new policies for support to small and micro firms, because these firms employ more than 50% of the Swedish labour force, and new policies for greater dependence on industry, moving towards increased globalization and international competition. Hence, an innovative feature of this study is that the evolution of growth is determined during a country's transition. Third, it also permits growth model estimates to become more or less similar over time with respect to changes in the quantity of sales, industrial affliction, and the

number of employees. Accordingly, this study provides useful insights, at the cross-country level, into change in a major activity within each economy.

The study is organized as follows. Section 2 presents the key conceptual framework and summarizes the previous empirical studies. Section 3 gives an overview of the variables, their theoretical justification, the research hypotheses and data used in the study. The empirical results are presented in Section 4, and the final section draws together the main conclusions.

2. Theoretical Framework and Previous Empirical Studies

2.1 Theoretical Framework

Growth has been regarded as one of the pre-conditions for firm survival, innovation, and technological change (Aghion et al., 2007; Pagano & Schivardi, 2003). However, as a result of increasing competition, improved efficiency, and pricing pressure, firms are facing great difficulties in achieving sustainable growth. Thus, the question of which determinants explain growth is one of high priority for firm stakeholders. Theoretically, according to stochastic approaches, such as Gibrat's law, firms grow randomly and independently of variables such as age and size. Contradictorily, the deterministic approaches, such as the life cycle model, suppose that firm-specific characteristics, for example the firm life stage and size, explain firm growth (Audretsch, Santarelli, & Vivarelli, 1999; Dunne & Hughes, 1994; Yasuda, 2005). Specifically, from the perspective of the life cycle model, a firm or any organization – like any biological organism – develops through the stages of a life cycle consisting of a set of life stages that begins at birth and ends in death (Olsen, Tse, & West, 1992). However, the number of life stages has been the subject of controversy. Previous literature suggests that the number of development stages can vary between three and ten (Adizes, 2004; Lester, Parnell, & Carraher, 2003). For example, a number of researchers, such as Smith, Mitchell, and Summer (1985), suggest a three-stage life cycle model. However, Quinn and Cameron (1983) implement a four-stage life cycle model. On the other hand, Miller and Friesen (1984), and Scott and Bruce (1987) establish a five-stage model. Furthermore, Flamholtz (1986) adapts a seven-stage model and Adizes (1989) uses a model made up of ten life cycle stages. Despite all the controversy, there is a common feature among these interpretations: firms' performance in terms of growth, profitability, and productivity over time follows an inverted U-shape, increasing initially and declining with age. This process can be explained, for example, by the change in firms' characteristics, owners' preferences, and industry characteristics related to different types of challenges and opportunities.

2.2 Previous Empirical Studies

According to previous research, young SMEs (small and medium-sized enterprises) are likely to be less diversified (Campa & Kedia, 2002) and associated with high risk (Berger & Udell, 1998), high and volatile profitability (Peel & Wilson, 1996), and finally high growth (Mead & Liedholm, 1998). The relationship between age and performance in terms of profitability and growth rates has been explained by the risk–return approach. Accordingly, over the life stages, the risks associated with small firms, for example bankruptcy risk, reduce as the firm becomes older and the rates of return decrease (Berger & Udell, 1998). On the other hand, based on the entrepreneurial activities approach, as firms become older, they are more likely to lose the entrepreneurial capability to meet the continuous challenges related to changing market requirements and exploit profit opportunities (Sorensen & Stuart, 2000). Likewise, in line with the organization perspective, age is likely to influence performance and lead to organizational inertia, suggesting an inverted U-shaped association between age and performance (Leonard-Barton, 1992).

3. Selection of Variables, the Research Hypotheses and Data

3.1 Selection of Variables

Based on the purpose of the study and the relevant literature, the firm growth rate has been chosen as the dependent variable and the age category, as a proxy for the life cycle, as the main independent variable. Furthermore, since the association between the firm life cycle and its growth possibly overlaps with size and industry affiliation, the relationship between these and growth have also been investigated.

3.1.1 Dependent Variable

The dependent variable in this study, growth, can be defined in various ways, for example, in terms of an absolute change in the number of employees, market share, turnover, value-added, and sales (McMahon, 2000). However, most previous studies have used the percentage change in sales as a proxy for growth (Beck, Demircug-Kunt, & Maksimovic, 2005). It is expected that the firm growth rate will differ between life cycle stages and decrease as firms become older. This measure has been used in previous research by McMahon (2000).

3.1.2 Independent Variable

The main independent variable in this study is the life cycle stage. The micro firms in the sample are grouped into six age categories as a proxy for the life cycle stages. Firm age has generally been considered as one of the key explanatory variables of growth (Autio, 2005; Storey, 1994). However, the relationship between firm age and growth is ambiguous and complex (Jovanovic, 1982). The controversy among the previous literature regarding the relationship between age and growth can be explained partly by the fact that firm growth is a multi-dimensional and complex phenomenon. For instance, whereas some previous empirical studies have found a positive impact of firm age on growth (Elston, 1993), others have reported that firm age negatively effects growth (Almeida & Campello, 2007; Hobdari, Derek, & Mygind, 2009). In agreement with a number of previous studies, for example that of Tam, Lee, and Chung (2001), the current study is based on a six-stage life cycle development assumption. In addition, the age of the firm is measured as the number of years of the firm's life at the time of the research. Accordingly, the firms included in the sample are grouped in the following age subsamples:

First stage, age category 1: ≤ 5 years

Second stage, age category 2: 6–10 years

Third stage, age category 3: 11–15 years

Fourth stage, age category 4: 16–20 years

Fifth stage, age category 5: 21–25 years

Sixth stage, age category 6: > 25 years

Given the life cycle model, as firms become older, theoretically, it is likely that their growth rate will decrease.

3.2 Control Variables

3.2.1 Size

Firm size has been regarded as an important variable in measuring a firm's life cycle and it plays a significant role in the growth pattern and process (Beck et al., 2005; Storey, 1994; Ou & Haynes, 2006; Vos, Jia-Yuh Yeh, Carter & Tagg, 2007). However, the pattern of the relationship between firm size and growth has been subject to controversy (Storey, 1994). A number of previous studies propose that smaller firms face various obstacles, such as financial constraints, that negatively affect firm growth (Oliveira & Fortunato, 2006; Yasuda, 2005). Conflictingly, other research streams suggest a positive relationship between size and growth (Wiklund, 1998). Accordingly, smaller, newborn firms grow faster than larger firms (Almeida & Campello, 2007; Wiklund, 1998). Sales, assets, and the number of employees have been used as proxies in the previous literature (Rajan & Zingales, 1995). The fact that the number of employees has been regarded as a proxy for size is based on the microeconomic theory hypothesis of diminishing returns. The theory explains that, as a firm uses additional amounts of a changeable factor of production (employees) with the same quantity of the fixed factor of production (the marginal return), the variable factor eventually diminishes. The natural logarithm of the number of firm employees has been used as a proxy for size in this study.

3.2.2 Industry Affiliation

According to the previous literature, a firm's growth can partly be explained by its industry affiliation (Gilbert, McDougall, & Audretsch, 2006). This is due to the fact that firms in a particular industry are not isolated islands and there are links among firms in any given industry. Thus, the growth of that sector is likely to have a pulling effect on member firms (Gilbert et al., 2006). The development stage of the industry has also been regarded as another variable that affects firm growth (Gilbert et al., 2006). Furthermore, due to the fact that networking enables firms to access resources, the network position of firms, which is linked to the industry, also influences their growth (Zaheer & Bell, 2005). Thus, unlike many previous studies, and to highlight the cross-sectional variations in growth rate, the current study includes six industries in the sample.

3.3 The Research Hypotheses

Based on the theoretical framework and previous studies, the following hypotheses are developed. According to the life cycle perspective, a firm's growth level is high during the start-up stage, and will gradually decrease as the firm ages. Hence, the study addresses the main research question:

1. Do the growth rates of the sample firms relate to their life cycles?

Two additional and related questions to the two control variables are formulated as follows:

2. Does the size of the sample firms relate to their growth rates?
3. Does the industry affiliation of the sample firms relate to their growth rates?

In line with the questions, three hypotheses are formulated as follows:

Hypothesis 1: There is a negative association between life stages and growth among sample firms.

Hypothesis 2: There is a positive relationship between the life stages and size among sample firms.

Hypothesis 3: Industry affiliations are negatively associated with growth among sample firms.

3.4 Data

To test the hypotheses formulated previously, comprehensive data sets were obtained from the database AffarsData, a commercial databank, covering all the firms in six industries for the year 2007. Panel data based on financial statements generally suffer from possible problems, such as outliers or missing data. To overcome this problem, all the firms with any zeros, negative values, or outlier observations were excluded from the initial database. Subsequently, a total of 22001 firms in six industries, metal, health care, retail trade, consulting, construction, and restaurants, were included in the final sample and estimations (firms classified with a one-digit Standard Industrial Classification code). The following section provides a summary of the descriptive statistics of the sample.

4. Empirical Results

4.1 Descriptive Statistics

Table 1 shows a summary of the descriptive statistics of the sampled firms. Nearly half of the firms operate in the wholesale or retail trades, but there is also significant representation in several manufacturing sectors, transportation, and a variety of service segments. All the firms included in the sample fall into the 'micro' firm sector, with fewer than ten employees and an average of three employees per firm. Moreover, the firms in the sample are characterized by an average age of around 19 years. As confirmed by the descriptive statistics, the sample is characterized by homogeneity among the sectors with regard to age and size. However, the growth rate varies considerably among sectors, averaging approximately 10%, with a standard deviation of 7%.

Table 1. Descriptive statistics of the sample firms (means, standard deviations of variables)

	Metal	Health care	Retail trade	Consulting	Construction	Restaurants	Total
No. of firms	2211	3721	7039	4605	2470	1955	22001
% firms	0.100495	0.169128	0.31994	0.209309	0.112268	0.08886	1.0000
Employees: mean	3.825871	3.013975	3.606478	2.007166	2.754656	3.97289	3.130494
Employees: std deviation	2.444678	2.156465	2.194828	1.523546	2.059201	2.311863	2.197854
Employees: Levene test	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Employees: Welch test	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Age: mean	20.32422	18.21088	20.98735	16.90076	17.69089	13.69503	18.57769
Age: std deviation	12.24139	10.75961	14.26374	11.2205	11.31444	9.971826	12.41952
Age: Levene test	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Age: Welch test	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Growth: mean	0.132395	0.028227	0.057711	0.164151	0.198472	0.136955	0.105353
Growth: std deviation	1.312716	0.295461	0.586744	0.670611	0.824797	0.583477	0.708726
Growth: Levene test	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Growth: Welch test	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Growth among industries	ANOVA			Levene statistic	Welch t. statistic		
Sig.	0.00			0.000	0.000		
F	31.683						

Note: * Levene test: test of homogeneity of variances at 0.01, ** Welch t-tests of equality of mean at 0.01.

4.2 The Results of ANOVA

The descriptive results shown in Table 2 indicate that very young firms (age < 5 years) grow on average more than any other firms included in other age categories. The growth rate is around 28% for the youngest age category, and it decreases over the life cycle to around 4% for the oldest. Table 2 also provides the results of the ANOVA, which show significant differences in growth across the different life cycle stages at the 1% level ($F = 112.218$; $p = 0.000$). In other words, the findings confirm that as the firms in the sample become older, their

growth rates systemically follow a life cycle decline. Moreover, a negative and significant correlation ($CC = -0.084$; $p = 0.000$) between a firm's life stage and its growth is observed, confirming again that the older firms are characterized by lower levels of growth. However, the relationship between life stage and size is positive ($CC = 0.086$; $p = 0.000$); indicating that firm size appears to increase with the life stage. These findings are consistent with the first and second hypotheses.

As shown in table 1, the results of ANOVA of growth across six different industry sectors, reveal that this variation is statistically significant ($F = 31.683$; $p = 0.000$).

To examine the validity of the results, a number of robustness tests, including the J-B test (Jarque–Bera test), are performed to test the homogeneity of variances and the equality of the population means, supporting the reliability of the descriptive statistics and the ANOVA analysis. These ANOVA results also show that firm size ($F = 56.194$; $p = 0.000$) and industry ($F = 71.499$; $p = 0.000$) influence the growth rate.

Table 2. ANOVA of the growth ratio through the firm life cycle

Life stage(age category)	Average growth	St. deviation	N	% firms in sample	J-B p	Welch statistic	Levene statistic
<= 5 years, first stage	0.284193	0.749544	2294	0.104268	0.000	0.000	0.000
6–10 years, second stage	0.144752	1.218941	4005	0.182037	0.000	0.000	0.000
11–15 years, third stage	0.097239	0.609907	3314	0.15063	0.000	0.000	0.000
16–20 years, fourth stage	0.069223	0.460982	4975	0.226126	0.000	0.000	0.000
21–25 years, fifth stage	0.064386	0.464769	3436	0.156175	0.000	0.000	0.000
> 25 years, sixth stage	0.049873	0.412726	3977	0.180765	0.000	0.000	0.000
Total	0.105353	0.708726	22001	1.00	0.000	0.000	0.000
Validity tests		Wilks' lambda	Lawley-Hotelli ng trace	Pillai's trace	Roy's largest root	F	Sig
Life cycle stage		0.000	0.000	0.000	0.000	112.21	0.000
Size		0.000	0.000	0.000	0.000	56.194	0.000
Industry		0.000	0.000	0.000	0.000	71.499	0.000
Correlation coefficient (CC) between life cycle and growth $P=0,000$	-0.084**						
Correlation coefficient (CC) between life cycle and size $P=0,000$	0.086**						
Test of homogeneity of variances							
Levene statistic		3.965					
Sig.		0.00					
Robust tests of equality of means							
Welch t. statistic		93.156					
Sig.		0.00					

Note: All tests use significance levels of all variables 0.01. J-B p-values are reported for the Jarque–Bera normality test; H_0 = normality. ** Correlation between coefficient (Significant at the 0.01 level, $P=0.000$).

Additional diagnostic analyses of the results, including the F-test, Wilks' lambda, Pillai's trace, Hotelling Lawley, and Roy's greatest root, reject the null hypothesis that there is no significant difference in growth across the life stages. Hence, it can be concluded that there is significant impact on firms' growth of the life stage.

4.3 Results of MANOVA (Multiple Analyses of Variance)

As the next step in the empirical study, a MANOVA model without interactions, is performed using the independent variable, life stage, and two control variables, size, and industry affiliation, to estimate how the dependent variable, growth, is associated separately with them it was expected that, consistent with the third hypothesis, the independent variables would significantly influence growth. The results of one-way, two-way, and three-way MANOVAs for each independent variable and the impact of the three variables and their interactions altogether are presented in Table 3. The results indicate an overall significant finding ($F = 2.75$ and $P = 0.0000$) suggesting that both the independent variable and two control variables included in the model have a significant association with growth.

Table 3. Results of MANOVA

Source	Type III sum of squares	df	Mean square	F	Sig	Partial eta squared
Corrected model	434.656a	322	1.3498629	2.75650	0.0000	0.189
Intercept	130.4752	1	130.47516	266.43758	0.0000	0.217
Life stage	33.21551	5	6.6431003	13.56558	0.0000	0.116
Size	10.18841	8	1.2735509	2.60066	0.0077	0.074
Industry	31.04026	5	6.2080513	12.67719	0.0000	0.109
Life stage * Size	21.93343	40	0.5483358	1.11973	0.2780	0.2780
Life stage * Indus.	22.61179	25	0.9044716	1.12846	0.1623	0.118
Size * Indus.	33.34903	40	0.8337256	1.70251	0.0037	0.117
Life stage * Size * Indus.	139.5374	199	0.7011928	1.43187	0.13241	0.456
Error	10615.77	21678	0.4897025			
Total	11294.62	22001				
Corrected total	11050.43	22000				

Note: All tests have significance levels of all variables 0.01.

Additional analysis was conducted to investigate which individual variables are separately and significantly related to growth. The analysis shows that life stage, size in terms of employees, and industry affiliation achieve significant levels, explaining growth at the 0.01 level. The results also imply that the variable life stage ($F = 13.56$; $p = 0.000$, $\eta^2 = 0.116$) has the strongest association with growth compared to the control variables, size and industry affiliation. The next most important variable related to firm growth is industry affiliation ($F = 12.67$; $p = 0.000$, $\eta^2 = 0.106$), followed by size ($F = 2.60$; $p = 0.007$, $\eta^2 = 0.074$). Furthermore, to investigate the interaction among the variables, a two-way and a three-way MANOVA were conducted. The results of the two-way and three-way MANOVAs confirm that each variable, life stage, and the control variables, size and industry affiliation, are related to growth separately, supporting the second and third hypotheses. The diagnostic validity tests including the partial eta squared (η^2) of the independent variables of the model, intercept, show that each variable is relatively high, supporting the robustness of the findings. However, for the combinations of variables, eta squared (η^2) illustrates low effect sizes. Eta squared (η^2) measures the relative explanatory power of each variable and it is the proportion of the total variability of the dependent variable explained by the variation of the independent variable.

5. Conclusions

Since the growth of micro firms is an important pre-condition for job creation, wealth creation, and dynamic economic and sector development, the question of the relationship between the life cycle stage and growth has been a prioritized issue for both researchers and policy makers. Although the life cycle approach has been applied to explain several aspects related to the firm, empirical studies regarding its applicability to growth are limited. Based on the life cycle model, three hypotheses were developed and empirically examined in this study. Consistent with the hypotheses, the empirical results show a clear pattern of the growth life cycle process among micro firms included in this study. The results support the hypothesis that the growth rate of young micro firms is, on average, considerably higher than that of their older counterparts and as they develop and become older, the growth rate decreases. Thus, firm growth in this study follows a systematic and predictable pattern that can be explained mainly by the life stage. Moreover, firm growth is found to increase with firm size. This implies that larger and younger firms are more likely to achieve higher growth. Furthermore, industry affiliation plays a certain role in explaining firm growth as the results indicate that despite the growth rate varying across different industry sectors somehow, the growth path of all the individual industries follows the common life cycle of the entire sample.

References

- Adizes, I. (1989). *Corporate life cycles: How and why corporations grow and die and what to do about it*. Englewood-Cliffs, NJ: Prentice Hall.
- Adizes, I. (2004). *Adizes – Resources for Sustainable Exceptional Performance*. [online] Available at: www.adizes.com (Accessed 16 November 2004).
- Aghion, P., Fally, T., & Scarpetta, S. (2007). Credit constraints as a barrier to the entry and post-entry growth of firms. *Economic Policy*, 22(52), 731-790. <http://dx.doi.org/10.1111/j.1468-0327.2007.00190.x>

- Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. *Review of Financial Studies*, 20(5), 1429-1460. <http://dx.doi.org/10.1093/rfs/hhm019>
- Anthony, J., & Ramesh, K. (1992). Association between accounting performance measures and stock prices: A test of the life cycle hypothesis. *Journal of Accounting & Economics*, 15(2-3), 203-227. [http://dx.doi.org/10.1016/0165-4101\(92\)90018-W](http://dx.doi.org/10.1016/0165-4101(92)90018-W)
- Audretsch, D., Santarelli, E., & Vivarelli, M. (1999). Start-up size and industrial dynamics: Some evidence from Italian manufacturing. *International Journal of Industrial Organization*, 17(7), 965-983. [http://dx.doi.org/10.1016/S0167-7187\(98\)00002-2](http://dx.doi.org/10.1016/S0167-7187(98)00002-2)
- Autio, E. (2005). Creative tension: The significance of Ben Oviatt's and Patricia McDougall's article "Toward a theory of international new ventures". *Journal of International Business Studies*, 36(1), 9-19. <http://dx.doi.org/10.1057/palgrave.jibs.8400117>
- Beck, T., Demircuc-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to growth: Does firm size matter? *Journal of Finance*, 60(1), 137-177. <http://dx.doi.org/10.1111/j.1540-6261.2005.00727.x>
- Berger, A., & Udell, G. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking and Finance*, 22(6-8), 613-673. [http://dx.doi.org/10.1016/S0378-4266\(98\)00038-7](http://dx.doi.org/10.1016/S0378-4266(98)00038-7)
- Black, L. E. (1998). Life-cycle impacts on the incremental value-relevance of earnings and cash flow measures. *Journal of Financial Statement Analysis*, 4(1), 40-56.
- Cabral, L. M. B., & Mata, J. (2003). On the evolution of the firm size distribution: Facts and theory. *American Economic Review*, 93(4), 1075-1090. <http://dx.doi.org/10.1257/000282803769206205>
- Campa, J. M., & Kedia, S. (2002). Explaining the diversification discount. *Journal of Finance*, 57(4), 1731-1762. <http://dx.doi.org/10.1111/1540-6261.00476>
- Dickinson, V. (2011). Cash flow patterns as a proxy for firm life cycle. *The Accounting Review*, 86(6), 1969-1994. <http://dx.doi.org/10.2308/accr-10130>
- Dunne, P., & Hughes, A. (1994). Age, size, growth and survival: UK companies in the late 1980s. *Journal of Industrial Economics*, 42(2), 115-140. <http://dx.doi.org/10.2307/2950485>
- Elston, J. A. (1993). Firm ownership structure and investment theory and evidence from German panel data. Wissenschaftszentrum Berlin (WZB), *Discussion paper* no. FS IV 93.
- Fama, E. F., & French, K. R. (2000). Forecasting profitability and earnings. *Journal of Business*, 73(1), 161-175. <http://dx.doi.org/10.1086/209638>
- Fitzsimmons, J. R., Steffens, P. R., & Douglas, E. J. (2005). Growth and profitability in small and medium sized Australian firms. *AGSE Entrepreneurship Exchange*, AGSE Swinburne University of Technology, pp. 164-178.
- Flamholtz, E. (1986). *Managing the Transition from an Entrepreneurship to a Professionally Managed Firm*. San Francisco: Jossey-Bass.
- Gilbert, B. A., McDougall, P. P., & Audretsch, D. B. (2006). New venture growth: A review and extension. *Journal of Management*, 32(6), 926-950. <http://dx.doi.org/10.1177/0149206306293860>
- Gregory, B. T., Rutherford, M. W., Oswald, S., & Gardiner, L. (2005). An empirical investigation of the growth cycle of small firm financing. *Journal of Small Business Management*, 43(4), 382-393. <http://dx.doi.org/10.1111/j.1540-627X.2005.00143.x>
- Hobdari, B., Derek, C. J., & Mygind, N. (2009). Capital investment and determinants of financial constraints in Estonia. *Economic Systems*, 33(4), 344-359. <http://dx.doi.org/10.1016/j.ecosys.2009.05.004>
- Jovanovic, B. (1982). Selection and evolution of industry. *Econometrica*, 50(3), 649-670. <http://dx.doi.org/10.2307/1912606>
- Klepper, S. (1996). Entry, exit, growth, and innovation over the product life cycle. *American Economic Review*, 86(3), 562-583.
- Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, 13(1), 111-125. <http://dx.doi.org/10.1002/smj.4250131009>

- Lester, D. L., Parnell, J. A., & Carraher, S. (2003). Organization life cycle: A five-stage empirical scale. *International Journal of Organizational Analysis*, 11(4), 339-354. <http://dx.doi.org/10.1108/eb028979>
- McMahon, R. G. P. (2000). Seeking an empirical development taxonomy for manufacturing SMEs using data from Australia's business longitudinal survey. Paper presented at the *45th World Conference of the International Council for Small Business*, 7–10 June, Brisbane, Queensland.
- Mead, D. C., & Liedholm, C. (1998). The dynamics of micro and small enterprises in developing countries. *World Development*, 26(1), 61-74. [http://dx.doi.org/10.1016/S0305-750X\(97\)10010-9](http://dx.doi.org/10.1016/S0305-750X(97)10010-9)
- Miller, D., & Friesen, P. H. (1984). A longitudinal study of the corporate life cycle. *Management Science*, 30(10), 1161-1183. <http://dx.doi.org/10.1287/mnsc.30.10.1161>
- Nissim, D., & Penman, S. (2001). Ratio analysis and equity valuation: From research to practice. *Review of Accounting Studies*, 6(1), 109-154. <http://dx.doi.org/10.1023/A:1011338221623>
- Oliveira, B., & Fortunato, A. (2006). Firm growth and liquidity constraints: A dynamic analysis. *Small Business Economics*, 27(1), 139-56. <http://dx.doi.org/10.1007/s11187-006-0006-y>
- Olsen, M., Tse, E. C., & West, J. J. (1992). *Strategic management in the hospitality industry*. NY: Van Nostrand Reinhold.
- Ou, C., & Haynes, G. (2006). Acquisition of additional equity capital by small firms – findings from the National Survey of Small Business Finances. *Small Business Economics*, 27(2/3), 157-168. <http://dx.doi.org/10.1007/s11187-006-0009-8>
- Pagano, P., & Schivardi, F. (2003). Firm size distribution and growth. *Scandinavian Journal of Economics*, 105(2), 255-274. <http://dx.doi.org/10.1111/1467-9442.t01-1-00008>
- Peel, M. J., & Wilson, N. (1996). Working capital and financial management practices in the small firm sector. *International Small Business Journal*, 14(2), 52-67. <http://dx.doi.org/10.1177/0266242696142004>
- Quinn, R. E., & Cameron, K. (1983). Organizational life cycles and shifting criteria of effectiveness: Some preliminary evidence. *Management Science*, 29(1), 33-51. <http://dx.doi.org/10.1287/mnsc.29.1.33>
- Rajan, R., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *Journal of Finance*, 50(5), 1421-1460. <http://dx.doi.org/10.1111/j.1540-6261.1995.tb05184.x>
- Scott, M., & Bruce, R. (1987). Five stages of growth in small business. *Long Range Planning*, 20(3), 45-52. [http://dx.doi.org/10.1016/0024-6301\(87\)90071-9](http://dx.doi.org/10.1016/0024-6301(87)90071-9)
- Smith, K., Mitchell, T., & Summer, C. (1985). Top level management priorities in different stages of the organizational life cycle. *Academy of Management Journal*, 28(4), 799-820. <http://dx.doi.org/10.2307/256238>
- Sorensen, J. B., & Stuart, T. E. (2000) Aging, obsolescence, and organizational innovation. *Administrative Science Quarterly*, 45(1), 81-112. <http://dx.doi.org/10.2307/2666980>
- Storey, D. J. (1994) *Understanding the small business sector*. London, New York: Routledge.
- Tam, S., Lee, W. B., & Chung, W. W. C. (2001). Growth of a small manufacturing enterprise and critical factors for success. *International Journal of Manufacturing Technology and Management*, 3(4/5), 444-454. <http://dx.doi.org/10.1504/IJMTM.2001.001422>
- Vos, Ed, Jia-Yuh Yeh, A., Carter, S., & Tagg, S. (2007). The happy story of mall business financing. *Journal of Banking and Finance*, 31(9), 2648-2672. <http://dx.doi.org/10.1016/j.jbankfin.2006.09.011>
- Wiklund, J. (1998). Small Firm Growth and Performance: Entrepreneurship and Beyond. (Ph.D. dissertation). Jönköping International Business School, Jönköping, Sweden.
- Yasuda, T. (2005). Firm growth, size, age and behavior in Japanese manufacturing. *Small Business Economics*, 24(1), 1-15. <http://dx.doi.org/10.1007/s11187-005-7568-y>
- Zaheer, A., & Bell, G. G. (2005). Benefiting from network position: Firm capabilities, structural holes, and performance. *Strategic Management Journal*, 26(8), 809-825. <http://dx.doi.org/10.1002/smj.482>