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Life cycle and performance among SMEs: Swedish empirical evidence

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Abstract

Purpose – This study aims to empirically examine the applicability of the life cycle model of firm performance to growth and profitability among Swedish small- and medium-sized enterprises (SMEs).

Design/methodology/approach – Using analysis of variance, multiple analysis of variance and three-stage least square modelling, this study analyses a longitudinal data set covering 26,721 Swedish SMEs in six industries from 2008 to 2011.

Findings – The empirical results indicate a clear life cycle performance pattern among the sampled SMEs, and that a six-stage life cycle model is applicable in predicting the performance pattern in terms of growth and profitability. On average, younger SMEs tend to display better performance in terms of growth and profitability than do their older and larger counterparts; moreover, larger SMEs tend to achieve better performance than do smaller ones.

Practical implications – The findings help SME managers understand how their decision-making style, strategy and structure can be related to various life cycle stages. Such an understanding may help them improve firm performance over time. Policymakers may find the results useful in coordinating SME support in line with various life cycle stages.

Originality/value – To the authors' knowledge, this study is one of only a few using two performance variables to test the applicability of the life cycle model in a longitudinal and cross-industrial sample.

Keywords Sweden, SMEs, Life cycle stages, Performance path

Paper type Research paper

1. Introduction

The firm life cycle model has attracted considerable attention in recent decades as a conceptual framework for understanding and analysing various aspects of firm development in the management literature (Aghion *et al.*, 2007). By applying the model, empirical research has explored various topics, including financial performance (Anthony and Ramesh, 1992), growth (Klepper, 1996; Fitzsimmons *et al.*, 2005), profitability and cash flow (Dickinson, 2011), firm financing (Berger and Udell, 1998; Fama and French, 2000), entrepreneurship (Quinn and Cameron, 1983) and strategy (Lester *et al.*, 2003, 2006). The model has provided a useful theoretical framework for researchers and practitioners. From the managerial perspective, the putative power of the life cycle model can help managers predict potential problems and opportunities in various life stages. However, since firms may operate in multiple industries and produce different types of products and services, a firm's life cycle stages are difficult to identify precisely. This may explain why empirical research into the relationship between firm performance and life cycle stage is rather rare.

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The purpose of this study is to empirically examine the applicability of the life cycle model to the firm performance path in a sample of Swedish SMEs across six industries from 2008 to 2011. The main contribution is the provision of evidence regarding the applicability of the life cycle model to SME performance in Sweden. To the author's knowledge, this is one of only a few studies to consider the relationship between life cycle stage and performance in SMEs using two proxy variables for performance: growth and profitability. Given that the performance life cycle concept is important in SME strategic planning, these practical contributions might help managers and policymakers aiming to improve SME performance.

The remainder of this paper is organized as follows. Section 2 treats the theoretical framework and literature related to the topic. Section 3 outlines the variables, sample, data and statistical techniques used, while the empirical results are reported in Section 4. Section 5 concludes the paper.

2. Theoretical framework, previous studies, and hypotheses

According to the life cycle model, a firm – like any living organism – develops through various stages. Consequently, the life cycle of a firm typically consists of a set of stages that starts with birth and ends in death. A life cycle stage can be described as a phase of firm organizational operations and structures. According to Hanks *et al.* (1993), a life cycle stage is a "unique configuration of variables related to organization, context and structure". Common contextual dimensions include age, size, growth and profitability rate. The advantage of applying a life cycle approach is that it emphasizes that activity and structure change over time. The number, nature, length and breadth of life cycle stages have been interpreted and implemented in various ways. While Quinn and Cameron (1983) and Kazanjian and Drazin (1989) identified four stages in the business life cycle process, Scott and Bruce (1987) and Hanks *et al.* (1993) identified a five-stage model. Furthermore, Tam *et al.* (2001) recommend a six-stage and Adizes (1989) a ten-stage model.

The basic assumption of all these interpretations is that every stage of a firm's life cycle is associated with particular challenges and opportunities. Theoretically, certain aspects of firms, including performance in terms of growth and profitability, are associated with these stages, following an inverted U-shape over time: increasing initially and declining with age. Accordingly, as firms progress through the life cycle, they tend to change or adapt their management styles, organization structures, communication and decision-making processes, reward systems and strategies. This change, or adaptation, is a vital requirement for efficient resource use and for survival.

As demonstrated above, there is no consensus regarding the number of firm life cycle stages: most models have up to five stages, while the remaining models have six to ten. Moreover, the applicability of life cycle models has, like other theoretical models, been criticized for various reasons, some more fundamental than others. The criticisms can be classified into five categories: empirical applicability and validation (Levie and Lichtenstein, 2010); the nature of life cycle models, i.e. focusing on symptoms and not explanations; life cycle models chart one-way development, regression being ignored (O'Farrell and Hitchens, 1988); the models describe a linear pathway (Lester *et al.*, 2003); and the models usually measure firm size in terms of sales or number of employees, usually ignoring other measures of achievement or performance such as value added (O'Farrell and Hitchens, 1988).

According to previous research, young SMEs tend to experience high growth (Evans, 1987; Mead and Liedholm, 1998, Lester *et al.*, 2006; Barba Navaretti *et al.*, 2014), high and volatile profitability (Dunlop, 1992) and high risk (James and Wier, 1990; Berger and Udell, 1998). They are also likely less diversified than older firms (Campa and Kedia, 2002). Various theoretical frameworks have been developed to explain the relationship between life cycle stage and performance. James and Wier (1990) and Berger and Udell (1998) implement risk/return approaches, suggesting that as a firm ages, bankruptcy risk declines over life stages, so the required rates of return decrease.

Based on the entrepreneurial activity approach, markets undergo continuous change, creating profit opportunities for firms that are able and ready to act (Kirzner, 1997). As firms age they likely lose their entrepreneurial ability to meet changing market requirements and thereby to exploit growth and profit opportunities (Sorensen and Stuart, 2000). Likewise, in line with the organizational approach, age can influence performance by inducing organizational inertia, suggesting an inverted U-shaped relationship between firm age and performance (Leonard-Barton, 1992). However, previous empirical research disagrees as to the relationship between firm age and performance. Several previous studies have suggested a negative relationship (Leonard-Barton, 1992; Fairfield *et al.*, 1996; Fama and French, 2000; Nissim and Penman, 2001; Geroski and Gugler, 2004; Lotti *et al.*, 2009; Barba Navaretti *et al.*, 2014). However, Das (1995) and Shanmugam and Bhaduri (2002) found a positive relationship between age and performance in terms of growth. Maçãs Nunes *et al.* (2012) proposed a positive relationship between age and performance in terms of profitability among young SMEs, and a negative and significant such relationship among old SMEs. Majumdar (1997) found evidence indicating that older Indian firms tend to be more productive but less profitable than young ones, while Fariñas and Moreno (2000) suggested no significant relationship between age and growth. The ambiguous relationship between firm life cycle and performance suggested by Jovanovic (1982) is supported by studies from Belgium (Maes *et al.*, 2005), Portugal (Serrasquiero *et al.*, 2010) and Spain (Coad *et al.*, 2013).

According to the life cycle perspective, a firm's performance is high during the start-up stage and gradually decreases as the firm ages. Hence, the fundamental assumption of this study is that, given the life cycle model, as firms age, it is theoretically likely that their performance will decline. The expectation is that firm performance differs between life cycle stages, declining as firms age (Fama and French, 2000; Almeida and Campello, 2007; Hobdari *et al.*, 2009). In line with this theoretical framework and previous studies, the following hypothesis is formulated:

H1. Life cycle stage and performance are negatively related in terms of growth and profitability.

In addition, firms tend to be small in the start-up stage, when they are simply organized with few employees and limited market shares. As they develop through the life cycle stages, firms increase in size (Galbraith and Nathanson, 1979; Lester *et al.*, 2006; Serrasquiero *et al.*, 2010; Coad *et al.*, 2013). An additional hypothesis is formulated to test size as a control variable, as follows:

H2. Life cycle stage and firm size are positively related in terms of sales.

Firm size is assumed to be a determinant of performance (Storey, 1994; Beck *et al.*, 2005), but the nature of the relationship between firm size and performance has been the subject of disagreement. Gschwandtner (2005), Almeida and Campello (2007) and Asimakopoulos *et al.* (2009) have found that smaller firms are more likely to display high performance than are larger firms. However, several previous studies suggest that smaller firms face various challenges, such as financial constraints, that negatively affect their performance (Yasuda, 2005; Oliveira and Fortunato, 2006), indicating a positive relationship between firm size and performance (Goddard *et al.*, 2005; Reichstein *et al.*, 2010; Stierwald, 2010).

Due to the lack of consensus as to whether firm size has a general effect on performance, the second additional hypothesis, which entails testing size as a control variable, is based on the hypothesised relationship between life cycle stage and firm size. The third hypothesis is formulated as follows:

H3. Firm size and performance are negatively related in terms of growth and profitability.

3. Selection of variables, data collection and data analyses

3.1 Selection of variables

The dependent variable in this study is performance, which can be defined and measured in various ways, for example, in terms of number of employees, market share, turnover, value-added, sales and profitability (Rajan and Zingales, 1995). Unlike most previous studies, the present study uses two measures, growth and profitability, as proxies for firm performance. This choice may improve the robustness of the study, and thereby increase the validity of the results.

In line with previous studies (Hart, 2000; Beck *et al.*, 2005; Fitzsimmons *et al.*, 2005), firm growth was measured as the percentage change in sales over a year. Profitability was defined as the book value of net profit after tax divided by total assets, i.e. return on assets (Jovanovic, 1982; Fairfield *et al.*, 1996; Fama and French, 2000).

Based on the argument presented by Tam *et al.* (2001), the present study examines the applicability of the six-stage life cycle model. The SMEs in the sample were classified by age into six categories in five-year intervals ranging from 1 to 25 years, with a single category for firms older than 25 years. Accordingly, the age category was used as a proxy for life cycle. Firm age has generally been regarded as a proxy for life cycle stage, and as one of the most important independent variables affecting firm performance (Storey, 1994). Since this study focuses on two dependent variables, growth and profitability, which are both related to firm sales, the natural logarithm of firm sales has been used as a proxy for firm size.

3.2 Sample, data collection and data analyses

To test the hypotheses, comprehensive data sets were obtained from Affärsdata, a commercial database that provides detailed accounting data covering all registered limited liability companies in Sweden. The sample includes all Swedish SMEs in six industries from 2008 to 2011. According to Statistics Sweden (2011), SMEs are defined as firms with fewer than 200 employees. Panel data based on financial statements usually suffer from outliers or missing data. To solve this problem, all SMEs for which there were any negative values or outliers were excluded from the data. To minimize the risk of sample selection bias, firms involved in a bankruptcy process, with annual

operating revenue less than SEK 120,000 (EUR 13,400) or total assets less than SEK 100,000 (EUR 11,200), and without employees were excluded from the data set. Subsequently, a total of 26,721 SMEs in six industries (i.e. the metal, transport, retail trade, consulting, restaurant and construction industries) were included in the final sample (firms were classified using a one-digit standard industrial classification code). The following section summarizes the descriptive statistics for the sample.

Several statistical techniques, i.e. analysis of variance (ANOVA), multiple analysis of variance (MANOVA) and three-stage least square (3SLS) modelling, were used to test the hypotheses. Since the main independent variable, life cycle stage, is a categorical variable, ANOVA was employed to assess whether firm performance and size differed significantly over the life cycle stages of the sampled firms. MANOVA was used to construct a multiple comparison of multivariate data. A combination of the variables life cycle stage, growth, profitability and size was therefore included in the MANOVA model. To evaluate the results of ANOVA and MANOVA, and to avoid potential endogeneity, additional tests were performed using the 3SLS model. This model combines two-stage least squares regression and multivariate seemingly unrelated regression estimation to deal with the covariances across equation disturbances (Zellner and Theil, 1962). The underlying equation in the 3SLS model is as follows:

$$Y_1 = \alpha_0 + \beta_1(X_1) + \beta_2(X_2) + \varepsilon$$

$$Y_2 = \alpha_0 + \beta_1(X_1) + \beta_2(X_2) + \varepsilon$$

where

Y_1 = growth.
Y_2 = profitability.
α_0 = constant
X_1 = life cycle stage.
X_2 = size.
ε = an error term.

4. Empirical results

4.1 Descriptive statistics

Table I summarizes the descriptive statistics. Over 40 per cent of the firms operate in the consulting industry, though the retail trade industry is also significantly represented. The firms in the sample, on average, have seven employees each and are 17 years old. As indicated by the descriptive statistics, the sample is characterized by homogeneity among the industries in terms of number of employees, age and size (measured as the natural logarithm of sales). However, the rates of both performance proxies, growth and profitability, vary considerably among industries, averaging approximately 9 per cent (standard deviation, 41 per cent) and 15 per cent (standard deviation, 19 per cent), respectively. The consulting industry has the highest performance rates in terms of both growth (13 per cent) and profitability (21 per cent), while the transport, retail trade and construction industries have relatively low performance rates for growth as well as

Table I.
Descriptive statistics of sample firms (means and standard deviations of variables, and total)

Variables	Metal	Transport	Retail trade	Consulting	Restaurant	Construction	Total
No. of firms	2,893	1,443	8,790	11,099	1,203	1,293	26,721
(%) firms	11	5	33	42	5	5	100
Employees: mean	8.25	9.50	6.96	0.32	7.88	5.91	6.54
Employees: standard deviations	14.37	15.92	12.25	12.10	11.34	12.03	12.67
Age: mean	18.53	21.86	19.65	14.02	14.19	20.13	17.09
Age: standard deviations	12.12	11.88	14.84	11.65	10.73	11.42	13.12
Size: mean	3.741	3.793	3.779	3.451	3.611	3.591	3.623
Size: standard deviations	0.533	0.481	0.0.606	0.559	0.472	0.515	0.583
Growth: mean (%)	8	5	4	13	7	6	9
Growth: standard deviations (%)	34	23	32	51	31	32	41
Profitability: mean (%)	11	8	11	22	13	9	15
Profitability: standard deviations (%)	14	10	16	21	20	13	19

profitability. The high standard deviations indicate considerable variation in firm performance within all six industries investigated.

4.2 Correlation analysis

The correlation matrix of the dependent and independent variables is presented in Table II. We examined the direction and significance of the relationships among the variables included in the model and the possible degree of collinearity among them. A negative and significant correlation is observed between life cycle stage and performance in terms of growth and profitability, implying that younger firms on average tend to be characterized by better performance. Growth and profitability are significantly and positively related to each other ($r = 0.255$, $p = 0.000$). Table II further shows that there is a positive and significant relationship between life cycle stage and size, indicating that firm size increases with age. Moreover, significantly positive correlations are observed between firm size, on one hand, and growth and profitability, respectively, on the other. As can be observed, the correlation coefficients are not large enough to cause collinearity problems in the regressions, and are statistically significant at the usual levels of significance.

4.3 Results of ANOVA

4.3.1 Growth. The descriptive results presented in Table II indicate that the firms are relatively evenly distributed between life cycle stages. Table III further indicates that very young firms (age ≤5 years) grow on average more than do firms in the other age categories. The growth rate is 21 per cent for the youngest age category firms, decreasing gradually over the life cycle to 4 per cent for the oldest age category firms. The results of the ANOVA indicate significant differences in growth across different life cycle stages at the 5 per cent level ($F = 358.02$, $p = 0.000$). Consistent with *H1*, the findings confirm that, as firms age, their growth rates systematically decline through the life cycle. Moreover, as reported in Table II, a negative and significant correlation ($r = -0.110$, $p = 0.000$) is observed between a firm's life cycle stage and its growth, reconfirming that older firms are characterized by lower growth.

To examine the validity of the results, several tests, including Welch's ($p = 0.000$) and Levene's ($p = 0.000$) *t*-statistics, Wilks' lambda ($p = 0.000$), Lawley-Hotelling trace

Variables	Life cycle stage	Growth	Profitability	Size
Life cycle stage	1	−0.110**	−0.196**	0.165**
		0.000	0.000	0.000
Growth	−0.110**	1	0.255**	0.054**
	0.000		0.000	0.000
Profitability	−0.196**	0.255**	1	0.022**
	0.000	0.000		0
Size	0.165**	0.054**	0.022**	1
	0.000	0.000	0.000	
n (firms)	26,721	26,721	26,721	26,721
n observations (four years)	106,884	106,884	106,884	106,884

Notes: **, *Correlations are significant at the 0.01 and 0.05 levels, respectively (two-tailed)

Table II.
Results of the correlation analysis of the variables included in the study

Table III.
ANOVA of the growth rate through the firm's life cycle stages

Life cycle stage (age category)	Average growth rate (%)	SD	*n*	(%) firms in sample	J-B *p*	Welch statistic	Levene statistic
First stage (≤ 5 years)	21	0.566	14,578	14	0.000	0.000*	0.000**
Second stage (6-10 years)	10	0.428	21,805	20	0.000	0.000*	0.000**
Third stage (11-15 years)	7	0.369	14,942	14	0.000	0.000*	0.000**
Fourth stage (16-20 years)	6	0.374	17,534	16	0.000	0.000*	0.000**
Fifth stage (21-25 years)	5	0.356	18,564	17	0.000	0.000*	0.000**
Sixth stage (> 25 years)	4	0.333	19,461	18	0.000	0.000*	0.000**
Average of the total	9	0.410	26,721	100	0.000	0.000*	0.000**
Validity tests		Wilks' lambda	Lawley-Hotelling trace	Pillai's trace	Roy's largest root	ANOVA F	Sig.
		0.000	0.000	0.000	0.000	358.02	0.000**

Notes: ANOVA at 0.05 significance level; *Welch *t*-tests of equality of mean at 0.05; **Levene test of homogeneity of variance at 0.05

Table IV. ANOVA of the profitability rate through the firm's life cycle stages

Life cycle stage (age category)	Average profitability rate (%)	SD	n	(%) firms in sample	J-B p	Welch statistic	Levene statistic
First stage (≤ 5 years)	23	0.226	14,578	14	0.000	0.000*	0.000**
Second stage (6-10 years)	18	0.196	21,805	20	0.000	0.000*	0.000**
Third stage (11-15 years)	15	0.181	14,942	14	0.000	0.000*	0.000**
Fourth stage (16-20 years)	13	0.175	17,534	16	0.000	0.000*	0.000**
Fifth stage (21-25 years)	13	0.170	18,564	17	0.000	0.000*	0.000**
Sixth stage (> 25 years)	11	0.156	19,461	18	0.000	0.000*	0.000**
Average of the total	15	0.188	106,884	100	0.000	0.000*	0.000**
Validity tests		Wilks' lambda	Lawley-Hotelling trace	Pillai's trace	Roy's largest root	ANOVA F	Sig.
		0.000	0.000	0.000	0.000	957.08	0.000

Notes: ANOVA at 0.05 significance level; *Welch t-tests of equality of mean at 0.05; **Levene test of homogeneity of variance at 0.05

($p = 0.000$), Pillai's trace ($p = 0.000$) and Roy's largest root ($p = 0.000$) were performed. All these tests demonstrate the robustness of the results.

4.3.2 Profitability. As shown in Table IV, the mean profitability is high in the first stage of the firm's life cycle (23 per cent), decreasing gradually to 11 per cent in the sixth stage. Thus, in agreement with *H1*, the results provide evidence that profitability rates vary significantly at the 5 per cent level across all life cycle stages ($F = 957.08$, $p = 0.000$), supporting the existence of a life cycle effect on profitability. The correlation sign in Table II ($r = -0.196$, $p = 0.000$) also indicates a significant and inverse relationship between life cycle stage and profitability.

Several diagnostic tests, including Welch's ($p = 0.000$) and Levene's ($p = 0.000$) *t*-statistics, which examine variable equality and the homogeneity of variance of the population, were conducted, confirming the reliability of the results. Moreover, the corresponding values of Wilks' lambda, Lawley-Hotelling trace, Pillai's trace and Roy's largest root indicated the robustness of the results, meaning that life cycle stage indeed influences profitability.

4.3.3 Size. To investigate the relationship between size and life cycle stage, an ANOVA was conducted. Table V shows that the mean firm size is relatively small in the first stage of the firm's life cycle, increasing steadily through the various stages. The sign of the correlation coefficient in Table II ($r = 0.165$, $p = 0.000$) also confirms a positive and significant relationship between firm size and life cycle stage, indicating that firm size increases gradually with life cycle stage. Hence, *H2*, which states that a firm's size is positively related to its life cycle stage, is supported.

Welch's ($p = 0.000$) and Levene's ($p = 0.000$) *t*-statistics confirm the reliability of the results. Additional diagnostic analyses of the results, including Wilks' lambda, Lawley-Hotelling trace, Pillai's trace and Roy's greatest root, confirm the validity of the results.

4.4 Results of MANOVA

A MANOVA model without interactions was constructed to assess how performance in terms of growth and profitability is influenced jointly by life cycle stage and size. Table VI presents the MANOVA results for the impact of life cycle stage and size on performance. Both life cycle stage and size are found to exert a significant effect on growth ($F = 1{,}576.937$, $p = 0.000$; $F = 4{,}549.646$, $p = 0.000$) and on profitability ($F = 582.455$, $p = 0.000$; $F = 336.390$, $p = 0.000$). Accordingly, younger and larger SMEs are more likely to have better performance than are older and smaller firms. Furthermore, additional diagnostic analyses confirm that life cycle stage and the control variable size are related to performance separately. These findings support *H1*. However, in Table II, the signs of the correlations between size and growth ($r = 0.054$, $p = 0.000$) and between size and profitability ($r = 0.022$, $p = 0.000$) confirm a positive relationship between firm size and performance, which is in contrast to *H3*.

The results of the 3SLS model reported in Table VII further confirm that life cycle stage and size are significantly related to growth and profitability. The relationships between life cycle stage and the two performance proxies are negative, while positive relationships are observed between size and the performance proxies. The results of 3SLS model analyses support the findings of the ANOVA and MANOVA tests presented previously.

Table V. ANOVA of firm size through the firm's life cycle stages

Life cycle stage (age category)	Average size	SD	n	(%) firms in sample	J-B p	Welch statistic	Levene statistic
First stage (≤ 5 years)	3.4067	0.47955	14,578	14	0.000	0.000*	0.000**
Second stage (6-10 years)	3.5860	0.54475	21,805	20	0.000	0.000*	0.000**
Third stage (11-15 years)	3.5882	0.59061	14,942	14	0.000	0.000*	0.000**
Fourth stage (16-20 years)	3.6086	0.58098	17,534	16	0.000	0.000*	0.000**
Fifth stage (21-25 years)	3.6163	0.57944	18,564	17	0.000	0.000*	0.000**
Sixth stage (> 25 years)	3.8112	0.63184	19,461	18	0.000	0.000*	0.000**
Average of the total	3.6231	0.58350	106,884	100	0.000	0.000*	0.000**
Validity tests		Wilks' lambda	Lawley-Hotelling trace	Pillai's trace	Roy's largest root	ANOVA F	Significance
		0.000	0.000	0.000	0.000	878.728	0.000

Notes: ANOVA at 0.05 significance level; *Welch t-tests of equality of mean at 0.05; **Levene test of homogeneity of variance at 0.05.

Overall, the results indicate that the sampled firms can be grouped into life cycle stages based on performance level measured by growth and profitability rates. Consistent with *H1*, the results provide evidence that younger firms have higher average performance in terms of growth and profitability. The present results thereby extend previous research into the life cycle model (Fairfield *et al.*, 1996; Fama and French, 2000; Nissim and Penman, 2001; Almeida and Campello, 2007; Hobdari *et al.*, 2009; Lotti *et al.*, 2009; Serrasquiero *et al.*, 2010; Barba Navaretti *et al.*, 2014). The positive relationship between life cycle stage and firm size is in line with *H2* and supported by the findings of previous research (Serrasquiero *et al.*, 2010; Coad *et al.*, 2013). Larger SMEs are more likely to be high-performance firms than are their smaller counterparts, which is in contrast to *H3* but in agreement with several previous studies (Goddard *et al.*, 2005; Yasuda, 2005; Oliveira and Fortunato, 2006; Reichstein *et al.*, 2010; Stierwald, 2010).

5. Concluding discussion

The high performance of SMEs is a precondition for their survival and thereby job creation. Although the life cycle approach has been applied to explain several aspects of the firm (Berger and Udell, 1998; Lester *et al.*, 2003; Fitzsimmons *et al.*, 2005; Aghion *et al.*, 2007; Dickinson, 2011), empirical studies of its applicability to reliable performance measures are limited. In line with the life cycle model, the present study examined the impact of life cycle on performance among Swedish SMEs in six industries using a large panel data set covering 26,721 firms from 2008 to 2011. The empirical results indicate a clear life cycle performance pattern among the studied SMEs. The results indicate that performance in terms of growth and profitability is, on average, considerably higher in young SMEs than in their older counterparts. Thus, firm performance follows a pattern explainable by firm life cycle stage (Fama and French, 2000; Hobdari *et al.*, 2009 Lotti *et al.*, 2009; Serrasquiero *et al.*, 2010). The present study contributes to the literature by drawing a more detailed picture of the relationship between life cycle stages and the performance path by measuring performance in terms of both growth and profitability.

The pattern of the relationship between firm life cycle stage and performance should be a priority for owners, managers and policymakers. Firms develop through several life cycle stages, each entailing certain problems and opportunities. Effective resource use and firm survival require that owners and managers adapt appropriate strategies and management styles to each life cycle stage. For example, growth is a primary goal of many firms in the early life cycle stages (Lester *et al.*, 2006), when such a focus is preferably accompanied by a focus on profitability. For less profitable firms in later life

Table VI.
Results of MANOVA of the relationship between life cycle stage, firm size, and performance in terms of growth and profitability

Source	Sum of squares	df	Mean square	*F*	Significance
Life cycle stage					
Growth	260.6055	1	260.6055	1576.937	0.000*
Profitability	154.382	1	154.382	4549.646	0.000*
Size					
Growth	96.2569	1	96.2569	582.455	0.000*
Profitability	11.41465	1	11.41465	336.390	0.000*

Note: *Significance level of 0.05.

Growth	Coefficient	Standard error	z	$p > z$	95 per cent confidence interval	
Life cycle stage	−0.0293519*	0.0007391	−39.71	0.000	−0.0308006	−0.0279032
Size	0.0521486*	0.0021608	24.13	0.000	0.0479136	0.0563836
Cons.	0.001995*	0.0079363	0.25	0.802	−0.0135599	0.01755
Equation	Observation	Parms	RMSE	R^2	χ^2	p
	106,883	2	0.4065167	0.0174	1894.28	0.0000
Profitability	Coefficient	Standard error	z	$p > z$	95 per cent confidence interval	
Life cycle stage	−0.0225914	0.0003349	−67.45	0.000	−0.0232478	−0.0219349
Size	0.017958	0.0009791	18.34	0.000	0.016039	0.019877
Constant	0.1703594	0.0035962	47.37	0.000	0.1633109	0.1774078
Equation	Observation	Parms	RMSE	R^2	χ^2	p
	106,883	2	0.1842059	0.0413	4602.88	0.0000

Note: *Significance level of 0.05.

Table VII. Summary of 3SLS model of the relationship between life cycle stage and size, and growth and profitability, respectively

cycle stages, Lester *et al.* (2006) suggest a focus on innovative activities and customer-perceived values rather than on low costs. In addition, by moving into new markets and/or developing new products for existing customers, older SMEs can renew themselves and possibly initiate a new life cycle. For larger firms, outsourcing can be an alternative for inducing viability-enhancing change. For smaller firms struggling to be profitable in their usual businesses, mergers can be an alternative.

While researchers may find the life cycle model a useful analytical tool, policymakers can use the results to coordinate support to SMEs that display dynamic opportunities for business success. This suggestion is in line with that of Maçãs Nunes *et al.* (2012), who proposed governmental support for young SMEs through the creation of special long-term lines of credit. Such initiatives may allow young SMEs to take advantage of good investment opportunities in the early life cycle stages without creating stress in managing financial resources.

This study is, admittedly, subject to limitations. The applicability of the life cycle model to performance is based on the comparison of means, providing average performance across six age categories. Such modelling provides a picture of reality neglecting the dissimilarity in life cycle stages of development across industries and within age categories. In addition, the model application is based on the assumption that performance develops constantly and linearly across age categories; however, actual SME performance tends to be stochastic.

The limitations lead to several recommendations for future research. It would be useful to test the life cycle–performance nexus using a time-series sample. In addition, examining various proxy variables of performance over several periods may lead to interesting findings. More and deeper empirical research into each life cycle stage for different industries could also be productive. Further attention could also be paid to explanations of the negative relationship between life cycle and firm performance in terms of growth and profitability, particularly to the somewhat contrasting finding of the present study that firm life cycle stage (firm age) and firm size affect performance in different ways, even though firm life cycle stage and firm size are positively related to each other. In addition, the present findings were obtained for just six industries, and the industry composition of the panel does not replicate the whole Swedish SME sector, nor the variety of SMEs in other countries. More attempts should therefore be made to investigate and compare various countries and industries. Future studies could investigate whether the relationships found here are linked to specific firm characteristics or to the Swedish context.

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