A TAXONOMIC DEVELOPMENT OF LIFE-CYCLE STAGES: AN APPROACH OF THE FIRM ACQUISITION CAPITAL

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ABSTRACT

Over the years much has been written about the firm life cycle, yet there has been remarkably little attention given to the underlying construct of a life-cycle stage. It is proposed in this study as main objective to develop a taxonomic study of SMEs' life-cycle stages, and compare this methodology of stages classification with those that admit a priori the existence of life-cycle stages (auto-categorisation). The data obtained through questionnaires were submitted to different statistical analyses. Cluster analysis is used to derive a taxonomy of growth stage configurations in a sample of SME of several sectors of economy. The results suggest a sequence of five development stages. From two utilised methodologies (taxonomy and auto-categorisation) have resulted different configurations. It is also a concern of this study to focus on the identification of firm's financial objectives and capital sources in the different life cycle stages.

KEY WORDS: taxonomy; life-cycle stages; SMEs' capital sources

1. INTRODUCTION

The life-cycle paradigm is well established in the literature. Several investigators (Greiner, 1972; Lynden, 1975; Lavoie and Colbert, 1978; Kimberly, 1979; Adzes, 1991) have been suggesting that life-cycle models can help to understand the complexity of the growth phenomenon and the effects that this provokes in firms (Glues, 1980; Quinn and Cameron, 1983). The works of Greiner (1972), Lynden (1975), and Adzes (1991), indicate that changes, which occur in the organisations, follow a predictable pattern that can be characterised by development stages. These ones follow several strategies, activities and organisational structures (Lavoie and Colbert, 1978; Quinn and Cameron, 1983). Although numerous models and theories have been proposed, in an attempt to explain the life-cycle process, few have been the efforts for validating it empirically (Quinn and Cameron, 1983; Miller and Friesen, 1984). Some empirical research (Miller and Friesen, 1984; Smith et al., 1985; Kazanjian, 1988) focuses mainly on the differences that characterise the firms in the several stages assuming, consequently, a priori the existence of development stages.

It is intended, in this paper, to verify empirically the existence or not of firms' patterns (or stages) of development. Concretely, it is intended to test to what extent the identification of life-cycle stages is possible through the construction of a taxonomy of life cycle stages for SME (Small and Medium-sized Enterprises) and to understand the acquisition of capital in each one of the found stages.

It could be that stage configuration appears changed when different variables are used in the construction of life-cycle stages? The life cycle models will be dependent on the type of used variables? The description of each of one life-cycle stages previously proposed by other conceptual models it will be changed? These questions are the main challenges of this investigation.

2. THE NEED FOR A TAXONOMIC STUDY OF THE FIRM LIFE–CYCLE

In spite of a diversity of models based on growth stages of organisation, proposed along of the years, it has been little attention given to variables of construction life-cycle stages (Hanks et al., 1994). Most of the investigations on life-cycle models are conceptual assuming, a priori, the existence of development stages. The strength of taxonomies lies in the fact that they are derived empirically, through multivariate analysis, based upon common patterns or relationships identified in the data. Although taxonomic methods have not been frequently used. Smith et al. (1985), Hanks et al. (1994), Ferreira (1997), and McMahon (2000) are an exception. They tested empirically the existence of life-cycle stages models. Smith et al. (1985) explored the use of a taxonomic classification methodology to operationalise life-cycle stages. This study showed some evidence in that sense, but it was limited to a small sample size (n = 27 firms) and a three-cluster solution. Hanks et al. (1994) developed an empirical taxonomy of life-cycle stages, testing the possibility of development stages existence. They stressed, for future investigations, the need to construct taxonomy of life-cycle stages using new samples. More recently, Ferreira (1997) developed a life-cycle taxonomy using the same variables proposed by Hanks et al. (1994) applicable to Portuguese SME, in a more extensive sample. The results evidenced the existence of different groups (clusters) of firms and it was identified 5 development stages. To use more analyses and different variables in the construction of the life -cycle stages configurations, then broad changes could appear at each life-cycle stage and, in that way, to supply more evidences in the nature and number of life-cycle stages.

In this context, a new challenge arises: Will the use of new variables, in the construction of life-cycle stages, change the model configuration? The use of different variables will lead to a different model? These and other issues lead to a need to build new life-cycle taxonomies for a major knowledge about the construction of life-cycle models.

For a taxonomy construction of life-cycle stages, three important questions will be addressed: (1) what is a life-cycle stage? (2) how many stages exist in a life-cycle model?; and (3) what are the characteristics of each stage? It will be tried to find an answer to each one of these questions in the following sections.

2.1 What Is a Life-Cycle Stage?

In the review of the life-cycle literature, we have not found any explicit definition. Lacking an explicit definition, we have explored stage descriptions in an effort to derive a definition. At the presentation of their models, some investigators explicitly talked over life-cycle stages (Quinn and Cameron, 1983; Miller and Friesen, 1984; Smith et al., 1985; Adizes, 1991), while others used terms such as growth stages (Galbraith, 1982; Scott and Bruce, 1987; Kazanjian, 1988) or development stages (Galbraith, 1982; Churchill and Lewis, 1983; Quinn and Cameron, 1983). We have not found any effort to distinguish between these terms in the literature. Indeed, several researchers used these interchangeably as it is done in this study.

Ferreira (1997), based on the research study of Hanks et al. (1994), made a comparison of investigators' statements regarding the nature of literature cycle stages and the specific dimensions utilised to describe stages and to differentiate between various stages of development. Nine life-cycle models were reviewed (Greiner, 1972; Galbraith, 1982; Churchill and Lewis, 1983; Quinn and Cameron, 1983; Miller and Friesen, 1984; Smith et al., 1985; Scott and Bruce, 1987; Kazanjian, 1988; Adizes, 1991) and it was evidenced, in each one of them, the dimensions used in the definition and construction of the models. Based upon our assessment of these data we make the following observations. First, the life-cycle stage construct appears to be a multidimensional phenomenon. In each of the reviewed life cycle models researchers described stages in multidimensional terms. Second, although considerable variability exists among the models, all included some dimensions related to

organisation context and organisation structure. Common contextual dimensions included organisation age, size, growth rate, and focal tasks or challenges faced by the firms. Common structural dimensions included structural form, formalisation, centralisation, vertical differentiation, and the number of organisation levels.

Although numerous models exist with multiple stages, which use a diversity of characteristics to explain the phenomenon of development organisational, the consensus is that changes in an organisation follow a predictable pattern, which is characterised by different development stages. Stages are defined as: a sequence of events that describe the changes along of the time (Dodge et al., 1994); a hierarchical progression that is not easily reversible (Greiner, 1972); and a set of a great number of structures and organisational activities (Quinn and Cameron, 1983). Lavoie and Culbert (1978) share same definition when arguing that stages are sequential by nature, also occurring in a hierarchical progression that it is not easily reversible, and involve wide internal activities and organisational structures. Although several indications of definition of life-cycle stage defended and proposed by several investigators, the definition of life-cycle stages stays, still, so much generic (Hanks et al., 1994; Ferreira, 1997). In this context, we have chosen to define a life-cycle stage as a unique configuration of variables related to organisation context and structure. This notion is further supported by Galbraith (1982), and by Hanks et al. (1994) who used the term reconfiguration for characterising the transition from one stage to the next.

2.2 How Many Life-Cycle Stages Exist In a Model?

Although all reviewed models suggest a reasonable compatibility of organisation growth patterns, there is a fairly broad range in the number of stages specified in reviewed literature. Smith et al. (1985) suggested a three-stage model. Four-stage models are proposed by Quinn and Cameron (1983), and Kazanjian (1988). Five stages are theorised by Greiner (1972), Galbraith (1982), Miller and Friesen (1984) and Scott and Bruce (1987). Finally, Adizes

(1991) proposed the most complex model, suggesting 10 life-cycle stages. Only some of these investigators (Smith et al., 1985; Kazanjian, 1988; Adizes, 1991) included the decline stage in their life-cycle model. Exclusion of decline stage in the majority of models may likely be attributed to two characteristics of organisation decline (Hanks et al., 1994). First, the impact of decline on organisation structure and systems is far less predictable than changes associated with growth. Second, the onset of organisation decline may actually occur at any stage of the life-cycle (Miller and Friesen, 1984).

What Are the Characteristics of Each Stage?

To describe the changes of organisations characteristics at different stages, several basic variables have been proposed. These changes vary in function of cognitive orientations from organisations' members, organisational structures, and from environmental relationships. This study demonstrated as the organisations grow through several life-cycle stages, they increase in age and in size. Organisational structure is going from simple, functional to divisional. Organisation becomes increasingly more formal and specialised, and the decision-making becomes less centralised, as organisation grows. This characterisation is also shared by Hanks et al. (1994).

Kazanjian (1988) argues that typical progression of change occurring in a life-cycle model it is a unitary sequence (it follows a singular stages sequences), cumulative (acquired characteristics in the first stages are retained at the last stages) and conjunctive (stages are derived from a common underlying process). Each development stage is seen, still, as a necessary precursor of the following stage (Quinn and Cameron, 1983).

According to Greiner (1972) organisational life cycle stages reflect a typical pattern of development based on size and age growing of the organisations. However, considerable evidence exists to quest these observations (Quinn and Cameron, 1983). It seems more

probable that size can be more than a determinant of certain strategic changes. By consequence, Quinn and Cameron (1983) prefer to argue that changes of the internal and external contexts in an organisation create more the pulses to enter in a new stage rather than a threat to current practices or creation of opportunities for growth.

In sum, there are these arguments, in themselves contradictory that partly creates the need of more studies for a broadly knowledge about firm behaviour and its characterisation along the several life-cycle stages.

3. ACQUISITION OF CAPITAL AND FIRM GROWTH

Empirical evidence from previous investigations shows strong support to the proposition that, as SME progress through several life-cycle stages, the financial dimensions of their operations tend to be more problematic (Hutchinson and Ray, 1983a; Hanks and Chandler, 1984; Vozikis, 1984; Hunsdiek, 1985; Ray and Hutchinson, 1985; Kazanjian, 1988; Kazanjian and Drazin, 1989; Kazanjian and Drazin, 1990; Dodge and Robbins, 1992; Terpstra and Olson, 1993; Dodge et al., 1994).

Ang (1991) and Berger and Udell (1998) argue that for each life cycle stage there are appropriate capital sources to finance firms. In that way, it makes sense to draw a financial life cycle for SME. This means that the firm's financing needs and the capital sources available to firms change along the several life cycle stages. As small firms grow the problems of asymmetric information between them and creditors are attenuated, thereby SME are less constrained in the access to debt sources. At later life cycle stages, SME may choose an initial public offering. Then external investors become better informed about firm's future prospects and at the same time small firms may issue signals to the market. For these SME the acquisition of capital is easier, and likely with more favourable costs and conditions (Berger and Udell, 1998).

For Davies and Gibb (1990), the life cycle models assume that the owners´ personal goals, and their role in the firm's management change through the several life cycle stages. However, not all SME follow the life cycle stages according to the models, since the owners' personal goals are not feasible with firm' s growth. This happen when small firms' owners put restrictions on the capital sources they are willing to use as well as when small business owners are averse to firm's growth (Clark et al., 2002; Howorth, 2002)

4 –LIFE-CYCLE MODEL ADOPTED IN THE INVESTIGATION

4.1 – Importance and Justification of the Adopted Model

Several studies (Walker and Petty, 1978; Peterson and Shulman, 1987; Walker, 1989; Hutchinson and Ray, 1983b; Ang, 1992; Forlong and Vos, 1996; Berger and Udell, 1998) have defined a SME financial life cycle in which financial needs and the availability of capital sources change as the business grows. The principal differences between the several models are found regarding the number of stages pointed out. In terms of usefulness to the present review, the model developed by Walker (1989) stands out in the literature concerning the SMEs´ financial life cycle, since it is an attempt to ground stages of the firm life-cycle based upon variables related to organisation context, and structure. The contextual variables include financial dimensions such as internal and external capital sources. The Walker (1989) model was empirically tested by Walker (1991). In this study, it is concluded that the linkages between debt sources and equity sources established in the Walker (1989) model had been verified in practice by SME.

Serrasqueiro (2000), and Ferreira et al. (2000) adopted the Walker (1989) model to explain the financing patterns followed by Portuguese SME over their life cycle. In these studies, it was used an auto-categorisation of firms' life cycle stage [(1)] and it was concluded that Portuguese SMEs' growth patterns are according to the life cycle stages model adopted.

The research question is: does the use of a taxonomic approach of the life cycle stages imply different configurations of the life cycle stages? In other words, does the acceptance a priori of the life cycle stages (through auto-categorisation) imply different configurations than those ones obtained through the adoption of a taxonomic approach to identifying and specifying stages in a firm life-cycle model? In that way, the research objective of this paper is to investigate the differences between the configurations of the life cycle stages caused by the use of different methodologies (taxonomic construction and auto-categorisation) for classifying the SMEs' life cycle stages.

4.2 Walker Model Characterisation

Walker (1989) presents a model for SMEs' stages of financial development that reflects the changes in firm's form of legal organization, financial objectives, and capital sources as small firms move from start-up stage to maturity stage of its life cycle. Characteristics of the model formulated by Walker (*ibid.*) are presented in Table 1.

Table 1: Small firms' financial stages growth

Stage	Start-up	Development	Expansion	Maturity
Maturity	New firm	Developing small firm	Established small firm	Mature firm
Form of legal organisation	Sole Proprietorship	Sole Proprietorship, Few partners S corporation	Numerous partners of small corporation, S corporation	Many partners, Corporation

Goal	Survival	Maximize profits Moderate growth	Maximize profits Return on equity >= Target rate of return	Maximize growth
Equity	Owner's capital Retained earnings	Owner's capital Retained earnings Informal investment	Owner's capital Retained earnings Informal investment Venture capital	Owner's capital Retained earnings Informal investment Venture capital Traditional markets
Debt	Accrued expenses Trade credit Bank credit Mortgage credit	Accrued expenses Trade credit Bank credit Mortgage credit	Accrued expenses Trade credit Bank credit Mortgage credit Secured or guaranteed notes payable, mortgage payable Line of credit	Accrued expenses Trade credit Bank credit Mortgage credit Secured or guaranteed notes payable, mortgage payable, Line of credit Unsecured notes payable

Source: Small Business Economics, Walker, 1989, p. 294

In present study, it makes sense, to use the Walker (1989) model, since the objective is to derive and characterise empirically-based development taxonomy for SME and compare the configurations of the life cycle stages with those ones obtained by Ferreira et al. (2000). The primary interest of Ferreira et al. (2000) and of the present study it is to investigate the availability of adequate financial resources. These are crucial during start-up as well as at later stages of accelerated growth.

5. RESEARCH METHODOLOGY

5.1 Research Objectives

There are several similarities between organisational life cycle models. However, one may point out some differences between them. For example, several models point out a different number of life cycle stages that vary amongst 3 to 10.

The inexistence of homogeneity of variables used to define the life cycle stages has been pointed out to justify the differences between the several models (Kazanjian, 1989; Hanks et al., 1994; Ferreira, 1997; Ferreira et al., 2000). In that way, there is a need, to substitute the use of only descriptive, categorical, and generic dimensions to defining a life cycle stage by a higher level of dimensions achieved by taxonomic analyses that will allow a greater specification of the life cycle stages.

In the empirical literature (Peterson and Shulman, 1987; Forlong and Vos, 1996; Berger and Udell, 1998; Zinger et al., 2001), it has been identified patterns of financial problems experienced by SME over their life cycle stages. However, several authors (Hutchinson and Ray, 1983b; Ang, 1992; Berger and Udell, 1998) argue that not all SME successively go through all life cycle stages. These last authors enhance the fear of SMEs´owners to lose the firm's control and independence, and consequently their reluctance to raise capital from external equity sources. Consequently, the insufficient internal capital and the absence of external capital sources may constrain the firm's growth, and consequently avoiding that SME pass successfully each life cycle stage. Small firms' acquisition of capital is frequently based on personal financial security and autonomy as well as financial goals (Barton and Mathews, 1989; Kuratko et al., 1997; Van Auken, 2001). One of the implications of this is that small firms owners' unwilling to use external equity may refrain the firm's growth. The level to which this situation affects the firm's growth and development will depend on the profitability of the firm, and the owners' personal wealth, since these capital sources substitute the external equity sources (Howorth, 2002).

Ferreira et al. (2000) concluded that Portuguese SME don't show the same financial patterns defined by Walker (1989) model. These firms don't raise capital from external equity sources (the retained earnings are the most important capital source) in later life cycle stages (development and maturity stages) conversely to Walker (1989) model.

Ferreira et al. (2000) employed an auto-categorisation methodology to classify the life cycle stages, which may have influenced the results obtained. Thereby, the present research intends to derive and characterise an empirically-based development taxonomy for SME. Concretely, the objective is to find the existence or not of changes in the configurations of life cycle stages when different variables are used on the taxonomic construction to formulate the stages

model as well as their possible differences when different methodologies are used in the configurations stages. What differences we can expect, when we use the auto-categorisation or taxonomy in the stages model construction? There are significant differences between them? The answers to these questions are a main concern of this study.

5.2 – Research Sample, Research Variables and Data Analysis

At 1998 a questionnaire was mailed to 600 Portuguese SME. All questions were pretested with 8 members SME pilot group. The research sample was obtained from a database of the Statistics Department of the Portuguese Ministry of Employment. This database provided information on Portuguese SME (firms with fewer than 500 employees, according to the "SME" definition adopted) reported to 1997, namely, the number of employees, the annual amount of sales, and the business sector. The sample of 600 firms includes: 150 firms with 0-9 employees, 150 firms with 10-99 employees, and finally 300 firms with 100-499 employees. The two later groups are over-represented in the sample in relation to the whole population of Portuguese SME, with the objective to get a significant number of responses for the analysis.

The data was obtained from a questionnaire mailed to the firms in January 1998. The response rate was 22%, hence the data yielded 132 usable responses. The response rate is almost equal between different dimensions of firms, as it can be seen in the Table 2.

Table 2: Demographics of the sample

	Frequency	%
Number of employees (*)		
0-9	24	18.2
10-49	38	28.8
50-99	34	25.8
100-499	34	25.8
Type of business (*)		
Manufacturing	67	60.8
Construction	6	4.8
Wholesale and retail trade	36	27.8
Transport and communication	3	2.3
Business Service	18	12.1

Annual sales (*)		
< 997 595 €	25	18.9
997 596 € - 4 987 978 €	51	38.6
4 987 979 € - 11 971 150€	32	24.2
> 11 971 150 €	15	11.4

(*) May not add 100% due to missing responses

Two sets of variables were used in this research study. One of them, designated by clustering variables, includes 11 contextual and structural dimensions regarding to firm that were used to construct the taxonomic stages of life cycle model:

- Firm age: as measured by difference between 1997 and firm's foundation year.

- Firm size: as measured by total employment at 1997.

- Firm financial objectives: as measured by the importance (on basis of use of a Likert scale from 1 = not important to 5 = very important) that firms give to the following financial objectives: maximisation of long-term profit, maximisation of short-term profit, maximisation of firm's value, growth of firm's assets, and increase of market share.

- Firm centralisation/decentralisation of the decision-making at the financial management level: as measured by a dummy variable representative of the responsible by financial management function (1= owners; 0 = external managers).

- Firm centralisation/decentralisation of the decision-making at the top management level: as measured by a dummy variable representative of the responsible by top management function (1= owners; 0 = external managers).

- Firm growth rate: as measured by annual employment growth. It was used the following formula:

Firm growth = (1997 employment –1996 employment)/ 1997 employment.

Each of these dimensions (related to the firm's structure and contextual dimensions) was identified in the literature as a variable to describe the life cycle stages (see the section 2.3).

The second set of research variables includes 3 kinds of descriptive variables (form of legal organisation, ownership, and capital sources). These variables were employed to facilitate the interpretation of the configurations derived from life cycle model taxonomy. The one-way analysis of variance - Anova and the Kruskal-Wallis tests were used to test the statistical significance of results.

6. RESEARCH RESULTS

6.1 Cluster Analysis

The principal analytical procedure used in this research is exploratory cluster analysis. This multivariate statistical technique was used to derive a taxonomic life-cycle model, since the aim of this study is objectively to classify cases into a small number of mutually exclusive groups on basis of similarities amongst values for certain clustering variables. It was employed the agglomerative hierarchical cluster analysis, and the Ward's method to optimise the variance inside of groups. A 6 group's solution included 1 cluster with only 2 elements and with little additional information compared with that one provided by 5 clusters. These factors implied a choice of a 5-cluster solution. The characterisation of the 5 clusters on basis of 9 of the 11 clustering variables is presented in Table 3.

Table 3: Cluster analysis and one-way analysis of variance (Anova)

Cluster variables	Cluster 1 (N = 42)		Cluster 2 (N=36)		Cluster3 (N=15)		Cluster 4 (N= 13)		Cluster 5 (N=16)		Anova	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	Val. F	?(*)
Enterprise size (n. of employees)	114,8	78,6	76,2	62,7	9,7	78	35,4	50,4	86	89,4	14,2	0,000
Enterprise age	28,4	14,65	16,64	11,7	6,9	2,8	16,6	12,5	19,1	10,6	16,8	0,000
Enterprise growth rate (employment growth)	0,0475	0,2	0,02	0,07	0,033	0,2	0,005	0,37	0,03	0,18	0,18	0,95
Principal financial objectives:												
- Maximization of long-term profit	4,2	0,9	4,6	0,6	3,9	1,1	2,8	1,2	4,6	0,5	12,0	0,000
- Maximization of short-term profit	2,7	0,9	4,2	0,6	3,0	1,0	3,5	1,5	2,8	1,2	12,7	0,000
- Maximization of	3,1	1,2	3,7	0,9	2,9	1,0	2,0	1,2	3,5	1,4	6,2	0,000

firm selling value												
- To achieve a satisfactory profit	4,0	0,9	4,3	0,7	4,8	0,4	3,7	1,4	3,8	1,2	3,6	0,008
- Expansion of net assets	3,7	0,9	4,3	0,7	3,2	0,9	2,3	1,2	4,3	0,9	15,1	0,000
- Expansion of market share	4,2	0,7	4,6	0,6	4,8	0,6	1,9	0,9	4,4	0,8	43,7	0,000

Number of firms in the sample: 132; (*) ?= level of statistical significance; (a) Mean; (b) Standard deviation

The Anova significance figures in Table 3 suggest that all clustering variables do differ between clusters in the solution. Concerning the variable of the firm size, it is verified that cluster 3 is formed by small-sized firms, concretely by micro-firms (with 0-9 employees). The clusters 1 and 5 are formed by medium-sized firms with a total employment mean of 115 and 86, respectively. Related to firm age, it is observed that the firms of cluster 3 are the youngest ones (with mean age of 7 years) and the firms of cluster 1 are the oldest ones, since the mean age is about 28 years.

According to Anova significance figures (see Table 3), all clustering variables other than employment growth rate do differ between the 5 clusters in the solution. However, the employment growth rate variable was retained in the cluster analysis to facilitate classification of clusters. The firms of cluster 1 have the greatest employment growth rate (0, 0475). Conversely, cluster 4 is composed by firms with the smallest employment growth rate (0,005). Considering the financial objectives pursued by firms, it is verified that the firms of clusters 2 and 5 give more importance to the growth's firm net assets suggesting that these firms pursue financial objectives related to firm's growth. The firms of cluster 1 have the highest employment growth rate and they pursue financial objectives related to the maximisation of long-term profit and the expansion of market share. Firms that pursue with more importance the achievement of a satisfactory profit as well as the expansion of market share form the cluster 3. These results suggest that the firms of cluster 3 develop efforts for assuring the firm's survival/development. For the firms of cluster 4, the most important

financial objectives are the achievement of a satisfactory profit, and the maximisation of short-term profit in detriment of objectives related to firm's growth/development.

The significance of Kruskal-Wallis figures (see Table 4) suggests that clustering variables (representatives of the responsible by financial management function and by top management function) do differ between the 5 clusters in the solution.

Table 4: Cluster analysis and the Kruskal-Wallis test

Centralization of decision-making	Cluster 1 (N = 42)	Cluster 2 (N=36)	Cluster 3 (N=15)	Cluster 4 (N= 13)	Cluster 5 (N=16)	Kruskal-Wallis test	
						F	? (*)
Top management function						71,6	0,000
• Firm´s owners	100% (a) (42) (b)	97,2% (35)	100% (15)	100% (13)	0 % (0)		
• External managers	0% (0)	2,8% (1)	0% (0)	0% (0)	100% (16)		
Financial management function						30,35	0,000
• Firm´s owners	64,3% (27)	52,8% (19)	86,7% (13)	84,6% (11)	0 % (0)		
• External managers	35,7% (15)	47,2% (17)	13,3% (2)	15,4% (2)	100% (16)		

% by column; (b) number of enterprises; ? = level of statistical significance ; number of enterprises of the sample: 132

Firms' principal managers in cluster 5 are external managers. In counterpart, firms' principal managers of remaining clusters are their owners. In the same way, firms' owners in clusters other than cluster 5 are their financial managers. External managers are responsible by this management function in the firms of cluster 5.

6.2 Clusters Typology

On basis of the results of cluster analysis (clustering variables are presented in Tables 3 and 4), it is possible to classify the 5 clusters (groups of firms) obtained over the several life cycle stages:

Cluster 1 (N=42): Maturity Stage

Cluster 2 (N= 36): Development Stage

Cluster 3 (N=15): Start-Up Stage

Cluster 4 (N=13): Stage of ?

Cluster 5 (N=16): Expansion Stage

Taking into account this typology, it is possible to describe each stage of the life cycle model:

- Start-up Stage (Cluster 3): this cluster is formed by the youngest firms (mean age = 6, 9 years) and by the smallest firms (mean number of employees = 9, 7 persons) in comparison with firms of other clusters. Employment growth rate is not the smallest one (0,033), but doesn't have higher values than other clusters.

- Development Stage (Cluster 2): this group have a mean age similar to that one presented by firms of cluster 4 (mean age = 16, 64 years). However, the firms of cluster 2 have a higher size (mean number of employees = 76, 2 persons). Besides the firm size, the cluster 2 is formed by young firms that have an employment growth rate similar to that one verified by clusters 3 and 5. However, firms of cluster 2 have an employment growth rate inferior to that one exhibited by firms of cluster 1, but superior to that one presented by cluster 4.

- Expansion Stage (Cluster 5): this cluster is composed by the oldest (mean age of 28, 4 years) and largest firms (mean number of employees is 114, 8 persons). This cluster has the highest employment growth rate (0, 05).

- Stage of ? (Cluster 4): Walker (1989) model is not supported by firms of cluster 4, since they have the same age (mean age = 16, 6 years) as firms of cluster 2 (Development stage), but firms of cluster 4 are small-sized firms (mean number of employees = 35, 4 persons). This means that firm age of cluster 4 is not according to its size and these firms verified the smallest employment growth rate (0,005). These results suggest that firms of cluster 4 have

disengaged from the growth process after establishing their viability at relatively small size following start-up.

For a better profile of the clusters firms, in following section of this research, it will be made a characterisation of the clusters based on ownership, form of legal organisation, and firm's capital sources.

6.3 Ownership and Form of Legal Organisation Dimensions

Table 5 shows the results for the clusters profile concerning the ownership and the form of legal organisation variables. The results show that the majority of firms (85, 7%) of cluster 3 have between 1 and 4 partners, suggesting some concentration of the ownership. This level of concentration of ownership is smaller in the firms of cluster 3 than in the other clusters, since these last ones have between 5 and 8 partners.

Table 5: Clusters profile for ownership and form of legal organization dimensions

Variables	Cluster 1 (N = 42) Maturity Stage.	Cluster 2 (N=36) Development Stage.	Cluster 3 (N=15) Start-up Stage	Cluster 4 (N= 13) ? Stage	Cluster 5 (N=16) Expansion Stage
Ownership					
1-4 partners	53,8% (a) (21) (b)	60% (21)	85,7% (12)	66,7% (11)	60,0% (9)
5-8 partners	28,2% (11)	31,4% (11)	7,1% (1)	33,3% (11)	33,3% (5)
8-12 partners	5,1% (2)	2,9% (1)	-		
> 12 partners	12,8% (5)	5,7% (2)	7,1% (1)		6,7% (1)
Form of legal organization					
Sole partnerships	2,4% (1)	2,9% (1)	6,7% (1)	23,1% (3)	-
S corporation	61,9% (26)	67,6% (23)	93,3% (14)	69,2% (9)	62,5% (10)
Corporation	35,7% (15)	29,4% (10)	-	7,7% (1)	37,5% (6)

(a) % by column ; (b) Number of the firms

Several authors (Keasey and Storey, 1987; Crutchley and Hansen, 1989; Jensen et al., 1992) argue that a high level of concentration of ownership is associated to a high concentration of the management functions in firm's owners. This is verified by the firms in the present study, however it can be seen that the firms of cluster 1 (maturity stage) and of cluster 5 (expansion stage) verified a major dilution of the ownership and a greater decentralization of financial decision making, since the financial management function is assumed by external managers without participation in the capital of the firm. Regarding the form of legal organisation of firms, the results in Table 5 evidence that the Corporate form is more adopted by firms of clusters 1 and 5 than the firms of the other clusters.

6.4 Firms' Capital Sources

In Table 6 it is presented the mean values of importance of equity and debt sources for each cluster. The retained earnings are the main equity source for all clusters. The firms of clusters 1, 2 and 5 verify some diversification of equity sources. However, the firms of cluster 3 (start-up stage) don't share the same diversification of equity sources and they depend basically on the credit from banks and trade-credit. Furthermore, the cluster 4 (Stage of ?) is composed by firms that don't almost get capital from external capital sources, with the exception of banks, besides their weak importance for firms' financing. The firms of this cluster pursued with importance the financial objective related to the achievement of a firm's satisfactory profit. This financial objective suggests the existence of non-financial factors in the firm's objective function (McMahon et al., 1996).

Table 6: Importance of the capital sources for clusters firms financing

Capital sources	Cluster 1 (N = 42) Maturity Stage		Cluster 2 (N=36) Development Stage		Cluster 3 (N=15) Start-up Stage		Cluster 4 (N= 13) Stage of ?		Cluster 5 (N=16) Expansion Stage	
Equity sources	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Retained profits	4,5	0,97	4,4	1,1	4,1	1,5	4,2	1,3	4,3	1,2
Owners' personal savings	2,3	14	1,6	0,9	2,4	1,5	3,2	1,5	2,1	1,2
Owners' loans (Quasi equity)	2,6	1,5	1,5	0,9	1,0	0,0	1,4	0,8	1,0	0,0
Friends and/or family	1,2	0,6	1,0	0,0	1,0	0,0	1,0	0,0	1,3	1,0
Venture capital	1,1	0,7	1,0	0,0	1,0	0,0	1,0	0,0	1,3	1,0
Public subsidies	1,8	1,3	1,5	1,0	1,0	0,0	1,4	0,8	1,0	0,0
Stock issues	1,0	0,0	1,0	0,0	1,0	0,0	1,0	0,0	1,2	0,8
Debt sources										
Banks	3,7	1,3	3,7	1,1	3,6	1,2	3,3	1,5	4,0	2,6

Trade credit	2,7	1,3	2,7	1,4	2,9	1,6	1,7	1,2	3,0	1,5
Leasing	2,3	1,2	2,6	1,5	2,6	1,2	1,9	1,1	2,6	1,1
Friends and/or family	1,2	0,6	1,0	0,2	1,2	0,6	1,2	0,8	1,0	0,3
Factoring	1,2	0,7	1,8	1,3	1,3	0,7	1,0	0,0	1,8	1,2
Public Subsidies	2,0	1,4	1,7	1,2	1,1	0,3	1,0	0,0	1,4	0,8
Bonds issues	1,0	0,0	1,11	0,7	1,0	0,0	1,0	0,0	1,0	0,0

(a) .Mean (b) Standard deviation

6.5 Auto-Categorisation versus Taxonomic Approaches

This paper intends to confront the two methodologies most pursued by researchers to classifying life cycle stage models. This implies the identification of the differences in the number, profile, and life cycle configurations stages between classifications derived from auto-categorisation and taxonomic approaches. To achieve this objective, the groups of firms identified by cluster analysis (taxonomic approach) were compared with the auto-categorisation approach. This has resulted from the classification made by the respondent firms with respect to a multiple-choice questionnaire that was formulated for identifying the firms' stages of life cycle. The results of that comparison are presented in Table 7.

Table 7: Auto-categorization approach versus taxonomic approach

Auto-categorization / Taxonomic approach	Start-up Stage (N = 7)	Development Stage (N= 35)	Expansion Stage (N = 56)	Maturity Stage (N = 24)	Total
Cluster 1 (N = 42) (Maturity Stage)	7,1%	11,9%	50%	31%	100%
Cluster 2 (N = 36) (Development Stage)	2,8%	27,8%	55,6%	13,9%	100%
Cluster 3 (N = 15) (Start-up Stage)	0%	66,7%	33,3%	0%	100%
Cluster 4 (N = 13) (Stage of ?)	23,1%	69,2%	7,7%	0%	100%
Cluster 5 (N = 16) (Expansion Stage)	5,7%	28,7%	45,9%	37,5%	100%

On basis of the results in Table 7, the comparison of the two criteria for classifying the life cycle stages originate different configurations about which one may point out:

- Only cluster 5, classified by the taxonomic analysis as the Expansion Stage, is the group in which almost the majority (45,9%) of firms had classified themselves in the Expansion Stage. This means that only for this group there aren't differences between the two different approaches employed in the classification of life cycle stages. The auto-categorisation approach has classified all the other clusters in different life cycle stages comparing with the classification resultant from the taxonomic approach.

- The cluster 1 it was classified as the Expansion Stage by firms (50%), but according to the taxonomic approach the firms are in the Maturity Stage.

- The cluster 2 (Development Stage) is not according to the classification resultant of the taxonomic approach, but it was classified as the Expansion Stage by firms (55,6%) in the auto-categorisation.

- The cluster 3 (Start-up Stage) is not considered by any firm in the auto-categorisation approach.

- The cluster 4 (Stage of ?) is not according to the classification resultant of the taxonomic approach, but it was classified as the Development Stage by firms (69,2%) in the auto-categorisation.

According to the anterior results it isn't possible to argue that the methodology used to classify the life cycle stages doesn't matter. In this way, it is suggested to use auto-categorisation and taxonomic approaches to understanding the life cycle stages configurations.

The taxonomic approach is a rigid criterion for selecting and classifying the firms in the life cycle stages. This may exclude some groups (clusters) from the model, as happen concerning the exclusion of cluster 4 in this study.

The study does not consider variables related to small firms owners' independence and control objectives. This avoids the possibility to capture small business owners' rejection of firm's growth as well as their restrictions on the capital sources they are willing to use that could constrain the ability of SME to grow.

However, the level that small business owners' preferences by capital sources constrain the firm's growth depends on the profitability of the firm, and personal wealth of the firm's owners and/or managers. Consequently, as it may happen in this study, SME with high levels of profitability and/or owners/managers' personal wealth invested in the firm may be in the later life cycle stages (Expansion and Maturity Stages) without diversified capital sources. Also, the small business owners' wish to preserve the control and independence of the firms avoids the delegation of the decision-making to external managers even for SME in the later life cycle stages. These aspects are not according to the previsions of Walker (1989) model.

7. CONCLUSIONS

In this research paper, several variables were used to construct a taxonomy of life cycle stages. One of the research objectives it was to test the existence of differences between life cycle stages configurations originated by the use of different approaches: auto-categorisation (that means to accept a priori the existence of life cycle stages), and the taxonomic approach (to construct the life cycle stages on basis of empirical analysis).

The results allow to identify several life cycle stages that are according to configurations pointed out by the conceptual life cycle models. This means that the use of different variables isn't the justification of the change of the life cycle stages configurations observed in the present study. The results show that the Walker (1989) model may empirically be tested, without significant changes. However, in the present study the capital sources (control

variable) used by SME are different of those ones established by the Walker (1989) model. It seems that Portuguese SME don't diversify their capital sources as they pass successfully the several life cycle stages. This is more evident with the analysis of cluster 4 (Stage of ?), which interpretation requires additional variables for knowing the need of SME to diversify capital sources caused by the firm's growth. In that way, SME with high levels of profitability and/or owners/managers' personal wealth invested in the firm may successively pass over life cycle stages without diversified capital sources. That kind of variables not included in this paper should be included in future researches.

As limitations of this study, one may point out the cross-sectional approach taken as well as the relatively small research sample. Longitudinal data in future research studies may provide important insights into patterns of growth and development of SME over time. In this context, one may suggest for future researches to consider different approaches to classify a life cycle stage model.

8. ENDNOTES

(1) In this study, a multiple-choice questionnaire was formulated for identifying the firms' stages of life cycle according to the characteristics presented in Walker's (1989) model.

9. REFERENCES

Adizes, Ichak (1991) *Les Cycles de Vie de L´Entreprise,* Les Editions d´Organisation, Paris.

Ang, S., James (1991) 'Small Business Uniqueness and the Theory of Financial Management", The Journal of Small Business Finance, Vol.1, Nº. 1, pp. 1-13.

Ang, S., James (1992) 'On the Theory of Finance for Privately Held Firms', *The Journal of Small Business Finance*, 1(3), pp.185-203.

Barton, S.L. and Matthews, C.H. (1989) 'Small Firm Financing: Implications from a Strategic Management Perspective', *Journal of Small Business Management*, Vol.27, Nº. 1, pp. 1-7.

Berger, A.N. and Udell, G.F., (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), pp.613-668.

Churchill, N. C. (1983) 'Entrepreneurs and their Firms: A Stage Model', in J.ª Hornaday, J. A. Timmons and K. H. Vesper, (eds) *Frontiers of Entrepreneurship Research*, Babson College, Wellesley, Massachusetts, pp. 1-22

Churchill, N., and Lewis, V.L. (1983) 'The Five Stages of Small Business Growth', *Harvard Business Review*, 61(3), pp. 30-50.

Clark, D., Berkeley, N. and Steuer, N. (2002) 'Attitudes to growth among owners of Small and Medium-sized Enterprises and the implications for business advice: some evidence from the clothing industry in Coventry', *International Small Business Journal*, 19, 3, pp. 72-77.

Crutchley, C. E. and Hansen, R.S. (1989) 'A test of the agency theory of managerial ownership, corporate leverage, and corporate dividends', *Financial Management*, Winter, pp. 36-46.

Davies, L. e Gibb, A. (1990) 'In Pursuit of Frameworks for the Development of Growth Models of the Small Business", *International Small Business Journal*, Vol.9, Nº.1, pp.15-31.

Dodge, H. R. and Robbins, J. E. (1992) 'An Empirical Investigation of the Organisational Life Cycle Model for Small Business Development and Survival', *Journal of Small Business Management*, 30, 1, pp. 27-37.

Dodge, H. R., Fullerton, S. and Robbins, J. E. (1994) 'Stage of Organisational Life Cycle and Competition as Mediators of Problem Perception in Small Business', *Strategic Management Journal*, 15, 2, pp. 121-134.

Ferreira, João (1997) *Estudo e Desenvolvimento de Uma Taxonomia Aplicável às Pequenas e Médias Empresas Da Região da Beira Interior*, Dissertação de Mestrado, Universidade da Beira Interior, Covilhã, Portugal.

Ferreira, J., Raposo, M., and Serrasqueiro, Z. (2000) 'Obstacles Faced by Portuguese SME: a Perspective of Life-Cycle, Conference Proceedings, 23rd ISBA National Small Firms Policy & Research Conference Small Firms: Adding the Spark, Aberdeen, UK, 17th November.

Forlong, C. e Vos, E. (1996) 'The Agency Advantage of Debt over the Life Cycle of the Firm', *Journal of Entrepreneurial and Small Business Finance*, Vol.5, Nº. 3, pp.193-211.

Galbraith, Jay (1982) 'The Stages of Growth', *Journal of Business Strategy*, 3 (1), 70-79.

Glueck, William F. (1980) *Business Policy and Strategic Management,* Third Edition, MacGraw-Hill.

Greiner, Larry E. (1972) 'Evolution and Revolution as Organisations Grow', *Harvard Business Review*, July/August.

Hanks, S. H. and Chandler, G. (1984) 'Patterns of Functional Specialization in Emerging High Tech Firms', *Journal of Small Business Management*, 32, 2, pp. 23-36.

Hanks, Steven H., Watson, C. J., Jansen, E. and Chandler, G. N. (1994) 'Tightening the Life-Cycle Construct: A Taxonomic Study of Growth Stage Configurations in High-Technology Organisations', *Entrepreneurship Theory and Practice,* 18 (2).

Helms, M.M: and Renfrow, T.W. (1994) 'Expansionary Processes of the Small Business: a Life Cycle Profile', *Management Decision*, 32, 9, pp. 43-45.

Howorth, C.A. (2002) 'Small Firms' Demand for Finance: A Research Note', *International Small Business Journal'*, Vol. 19, Nº.4, pp. 78-86.

Hunsdiek, D. (1985) 'Financing of Start-Up an Growth of New Technology-based Firms in West Germany', *International Small Business Journal*, 4, 2, pp. 10-24.

Hutchinson, P.J. and Ray, G.H. (1983a) 'The Financial Control of Rapid Growth Firms Up to Flotation', *Accounting and Business Research*, 5, 1, pp. 145-157

Hutchinson, P.J. and Ray, G.H. (1983b) *The Financing and Financial Control of Small Firm Development*, Gower Publishing Company Limited, Aldershot, England.

Jensen, G.R., Solberg, D.P. and Zorn, T.S. (1992) 'Simultaneous Determination of Insider Ownership, Debt and Dividend Policies', *Journal of Financial and Quantitative Analysis*, Vol.27, Nº. 2, pp.247-263.

Kazanjian, Robert K. (1988) 'Relation of Dominant Problems to Stages of Growth in Technology-Based New Ventures', *Academy of Management Journal*, 31 (2), 257-279.

Kazanjian, R. K. and Drazin, R. (1989) 'An empirical test of stage growth progression model', *Management Decision*, 35, 12, pp.1489-1503.

Kazanjian, R. K. and Drazin, R. (1990) 'A Stage-Contingent Model of Design and Growth for Technology Based Ventures', *Journal of Business Venturing*, 5, 3, pp. 137-150

Keasey, K. and Storey, D. (1987) 'The Performance of Small Firms', Watson, R. e Wynarczyk, P (eds.). *The Small Firm*, Croom Helm, New York.

Kimberly, J. and Miles, Robert (1980) *The Organisational Life Cycle*, Jossey-Bass Inc., Publishers, California.

Kimberly, John R. (1979) 'Issues in the Creation of Organisations: Initiation, Innovation and Institutionalisation', *Academy of Management Journal*, 22 (39), pp. 437-457.

Kuratko, D.F., Hornshy, J.S. e Naffziger, D.W. (1997) 'An Examination of Owner's Goals in Sustaining Entrepreneurship' , *Journal of Small Business Management*, January, pp. 24-32.

Lavoie, Dina and Culbert, Samuel A. (1978) 'Stages of Organisation and Development', *Human Relations*, 31(5), 417-438.

Lyden, Fremont J. (1975) 'Using Parson´s Functional Analysis in the Study of Public Organisations', *Administrative Science Quarterly*, 20, March, pp. 59-70.

McMahon, R.G.P., LeCornu, Mark R., Forsaith, David M. and Stanger, Anthony, M.J. (1996) 'The Small Enterprise Financial Objective Function', *Journal of Small Business Management*, July, pp.1-14.

McMahon, R.G.P. (2000) 'Seeking an Empirical Development Taxonomy for Manufacturing SMEs Using Data From Australia´s Business Longitudinal Survey', School of Commerce Research Paper Series:00-1, ISSN: 1441-3906, School of Commerce, The Flinders University of South Australia.

Miller, Danny and Friesen, Peter H. (1984) 'A Longitudinal Study of the Corporate Life Cycle', *Management Science*, 30 (10), pp. 1161-118.

Mintzberg, Henry (1984) 'Strategy Making in Three Modes'; *California Management Review*, 16(2), pp. 44-53.

Norusis, Marija J. (1993) *SPSS for Windows, Professional Statistics*, SPSS inc., Chicago.

Peterson, Rein e Shulman, Joel, (1987) 'Capital Structure of Growing Small Firms: a 12-Country Study on Becoming Bankable', *International Small Business Journal*, Vol.5, Nº. 4, pp.10-22.

Quinn, R. E., and Cameron, K. (1983) 'Organisational Life Cycles and Shifting Criteria of Effectiveness: Some Preliminary Evidence', *Management Science*, 29, January, pp. 33-51.

Ray, G. and Hutchinson, P. J. (1985) 'The Entrepreneur, Accounting Information and Financial Control', *Management Forum,* 11, 4, pp. 223-233.

Serrasqueiro, Z. (2000) *Financiamento das Pequenas e Médias Empresas Portuguesas: Fontes de Capital Externas na Perspectiva do Lado da Procura*, Tese de Doutoramento. Departamento de Gestão e Economia. Universidade da Beira Interior, Covilhã, Portugal.

Scott, Mel and Bruce, Richard (1987) 'Five Stages of Growth in Small Business', *Long Range Planning,* 20 (3), pp. 45-52.

Smith, Ken G., Mitchell, Terence R. and Summer, Charles E. (1985) 'Top Level Management Priorities in Different Stages of the Organisational Life Cycle', *Academy of Management Journal*, 28 (4), pp.799-820.

Terpstra, D. E. and Olson, P. D. (1993) 'Entrepreneurial Start-Up and Growth: A Classification of problems', *Entrepreneurship Theory and Practice*, 17, 3, pp.5-20.

Van Auken, H.E: (2001) 'Financing Small Technology-Based Companies: The Relationship between Familiarity with Capital and Ability to Price and Negotiate Investment', *Journal of Small Business Management*, Vol. 39, Nº. 3, pp. 240-258.

Vozikis, G. S. (1984) 'A Strategic Disadvantage Profile of the Stages of Development of Small business: An Empirical Investigation', *Review of Business and Economic Research*, 20, 1, pp. 86-110.

Zinger, J. T., LeBrasseur, R. and Zanibbi, L.R. (2001) 'Factors influencing early stage performance in Canadian microenterprises', *Journal of Developmental Entrepreneurship*, 6, 2, pp. 129-134.

Walker, E. e Petty, J.W. (1978) 'Financial Differences between Large and Small Firms', *Financial Management*, Vol.7, Nº. 4, pp.61-68.

Walker, A.D. (1989) 'Financing the small firm, *Small Business Economics'*, 1, 285-296.

Walker, A. D. (1991) 'An Empirical Analysis of Financing the Small Firm', in Yazdipour, Z. (ed) *Advances in Small Business Finance,* Kluwer Academic Publishers, pp.47-61.