



EARLY STAGES OF TECHNOLOGY-INTENSIVE COMPANIES IN SOUTHERN CALIFORNIA

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ABSTRACT

Purpose: Numerous stage models have attempted to clarify management priorities during the early stages of companies. However, a need for more focused and context-specific studies exists. This study seeks to clarify the early stages of technology-intensive companies in Southern California. To summarise the research questions, the authors ask: What early stages do technology-intensive companies face based on empirically based stage literature? How do the experiences of managers in early-stage technology-intensive companies relate to assumptions of such stage framework? What viewpoints should be considered when using stage framework in context of Southern California?

Design/methodology/approach: To answer these questions, this retrospective multiple case study devises a four-stage framework describing early stages of technology-intensive companies and reflects it through nine case studies. The study utilises sequential incident technique (SIT) and semi-structured interviews in data collection. Three perspectives were analysed in each case company for triangulation purposes – one from company management, one from operations management, and one from marketing management.

Findings: The applicability of the framework will be clarified in this study; moreover, an analysis of context-specific viewpoints will be provided. It is necessary to recognise these viewpoints when using this framework in Southern California.

Research limitations/implications: The research focus of this study is limited to the context studied. This limits the applicability of the explorative and descriptive results to other contexts.

Practical implications: The results of the study may be effectively used in intermediary organisations and companies as framework for predicting the early-stages of technology intensive companies.

Originality/value: The context specific viewpoints and their affect to the early stages of company have not been broadly studied - this study takes the context into account and provides new insights into growth-management of technology-intensive companies in the studied context.

Category: Research paper

Keywords: stages of growth; growth process; Southern California; sequential incident technique; technology-intensive companies;

INTRODUCTION

Firm growth and development have been studied extensively in the last decades, and the literature in this area includes many perspectives, such as the static equilibrium theories (see e.g., Coase 1937), stochastic models (see e.g., Gibrat 1931), transaction cost theories (see e.g., Williamson 1975), economics of growth theories (see e.g., Penrose 1959), resource-based theories (see e.g., Penrose 1959), evolutionary theories (see e.g., Nelson & Winter 1982), organisational ecology theories (see e.g., Hannan & Freeman 1977), strategic adaptation theories (see e.g., Sandberg & Hofer 1982), motivational theories (see e.g., McClelland 1961), and configuration theories (see e.g., Greiner 1972), among others. Most of the perspectives presented above are concerned with the factors leading to growth. However configurations (or company life-cycle or stages of growth) (see e.g., Muhos *et al.* 2010, Muhos 2011) perspective have instead attempted to clarify managerial challenges and priorities in the early stages of companies (see e.g., Churchill & Lewis 1983, Greiner 1972). This perspective relates to what growth brings to a company and how to manage a growing company (see Davidsson & Wiklund 2006, Wiklund 1998). Growth configuration literature reveals diverse managerial problem configurations specific to the different growth stages.

The main findings of the fourteen recent empirically based stage models focusing on technology-intensive companies have been synthesised to a self-evaluation framework (Muhos 2011). To test the findings, empirical cases in different cultural business contexts needs to be studied. Doing so will allow analysis of gaps between the reality and the stage models and will highlight potential paths for further development of these models. This study aims to describe the early development stages of technology-intensive companies in the Southern Californian business context.

The research problem is condensed into the following research questions: What do early-stage technology-intensive companies face based on recent empirical literature? How do the experiences of managers in early-stage technology-intensive companies relate to assumptions of such stage framework? What viewpoints should be considered when using stage framework in Southern Californian context?

This is a retrospective multiple case study with holistic research strategy – the study utilises Sequential Incident Technique (SIT), a specific form of Critical Incident Technique (CIT) (Edvardsson & Roos 2001, Fisher & Oulton 1999, Flanagan 1954). The following definitions figure prominently in this analysis. We define an early-stage technology-intensive firm in three parts: first, a technology intensive firm is an independently owned research- and product development-intensive company whose continuous aspiration to valuable, rare and inimitable knowledge in technology leads to new or enhanced products and services (see Salonen 1995, Tesfaye 1997). Second, the term early refers to the newness of the firm; according to Storey & Tether (1998) a new firm is not more than 25 years old. Third, the term stage corresponds to a unique configuration of variables, e.g., strategies, problems and priorities that growing firms will likely face (see e.g., Coad 2007, Hanks *et al.* 1991, Miller &

Friesen 1984). The term configuration applies to the clusters or frameworks of common variables used for analysis of stages.

This study addresses scholars interested in the process perspective on company growth and development. The study may also function as a useful guide for those responsible for company growth and development policies, those considering investing in a defined group of companies and the owners and managers of growing companies. In the theoretical part of this study the current state of configurations literature is presented. In the empirical part of the study the nine case companies from the Southern California are described and their experiences of growth reflected through stages framework to identify parallel and context specific viewpoints. Finally, this study analyses the applicability of the framework to the cases of Southern California and describes the context specific issues.

EARLY STAGES OF GROWTH – THE SELF EVALUATION FRAMEWORK

Table 1. Early stages of technology-intensive companies – assumptions of the self-evaluation framework

Stage	Stage description/assumption codes
1. Conception and development:	Newly established firm is owner-dependent (1-A1). The objective is product and/or technology development (1-A2) and establishment of an early customer base (1-A3). The main activities relate to the business idea (1-A4), identification of a market (1-A5) and resource mobilisation (1-A6). Development of a working prototype is started (1-A7). The management is informal, flexible and creative (1-A8); communication is face-to-face (1-A9), and the owner makes the decisions (1-A10). Organisation functions as a product-development team (1-A11). Cash flow falls into the red due to lack of product at this point (1-A12).
2. Commercialisation	Stage begins with the early-reference customers (2-A1). Objective is creation of a business and commercialisation of the product (2-A2). Stage is characterised by early manufacturing (2-A3), marketing (2-A4) and initial technical challenges (2-A5). Company learns to make the product and to produce it (2-A6). Management style is participative (2-A7) and coordinative (2-A8). Owner and/or small number of partners dominate the nucleus of the administrative system (2-A9). Resource generation and survival are key issues (2-A10). Amount of negative cash flow decreases (2-A11).
3. Expansion	At this stage, manufacturing and technical feasibility and market acceptance lead to high growth (3-A1) and constant change (3-A2). Main objective: manage the company toward growth and increase market share by marketing and manufacturing the product efficiently and in high volume (3-A3). Company needs to produce, sell and distribute the product at an increasing volume (3-A4) while taking care of efficiency and effectiveness through structures and processes (3-A5). New customers and new market channels require constant attention (3-A6). Personnel problems result from high growth (3-A7). Owner and/or entrepreneurial team are central,

Stage	Stage description/assumption codes
	though a sense of hierarchy increases (3-A8). Budgets are moderately used for communication (3-A9). More specialised functions considered and added (3-A10). Positive cash flow increases rapidly (3-A11).
4. Stability/renewal	Company faces a slowing growth rate (4-A1) and intense competition in maturing product market (4-A2). Effort needed to launch a second generation of the product and for effectiveness and efficiency issues (4-A3). Identification of new markets is essential for company renewal (4-A4). However, cost control and productivity become main concerns (4-A5). Resulting product generation and profitability improvements maintain growth and reasonable market share (4-A6). Owner usually supported by or replaced by a professional manager or a management team and professional management systems are added (4-A7). Strategies, rules, regulations and procedures are standardised and formalised (4-A8). Employees become specialised, non-risk-takers (4-A9). Specialised functions are added (4-A10). The stage is characterised by a decreasing growth of cash flow (4-A11).

The above described framework functions as a reference framework for this study. The authors use this framework to reflect and analyse the experiences of managers during the stages of early growth.

THE METHOD

This present research takes the form of a retrospective multiple case study. According to Yin (1989, p.23), “a case study is an empirical inquiry that: investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used”.

The study analysed nine case companies located in Southern California using sequential incident technique (SIT) and semi-structured interviews implemented during autumn 2012. Three managerial viewpoints were opened in each case company for triangulation purposes – one from company management, one from operations management, and one from marketing management. The case study follows guidelines set by Yin (1989). In an overview of CIT methods, Gremler (2004) recognises several variants of CIT including SIT, created to take the sequential character of the process studied into account (see Stauss & Weinlich 1997). Case studies using SIT clarify the main sequences of the process under analysis prior to the collection of the data. This is advantageous if the process has already been defined empirically. In this study, the critical incidents are reflected in the sequential framework presented in the theoretical part. The case reports are based on ten separate case studies.

THE CASE STUDIES

The cases are summarised in the following table 2:

Table 2: The case companies

Case	Established	Technology	N. of employees	Sales (M\$)	Assets (M\$)
A	2009	Software	11	1,3	2,9
B	2010	Health care technology	16	2,0	20,0
C	2009	E-commerce solutions	18	2,0	6,0
D	2003	Intelligence software	15	0,5	0,4
E	2008	Investment software	16	0,7	3,0
F	2008	Recycling solution	65	12,0	250,0
G	1995	Diversified technology	30	5,7	2,5
H	2009	Biotech	7	0,3	4,5
I	2005	E-commerce solutions	24	18,9	1,6

Case1 - Case 9 descriptions (to be completed before submission of final paper...)

Summary of the parallel/ contradictory aspects related to the framework (to be completed before submission of final paper...)

DISCUSSION

The applicability of the framework will be clarified in this study; moreover, an analysis of context-specific viewpoints will be provided. It is necessary to recognise these viewpoints when using this framework in Southern California.

As an answer to *the first research question* the meta-analytical synthesis, four-stage stage self-evaluation framework for early-stage technology intensive companies is presented. The stages include: conception and development, commercialisation, expansion and stability/renewal. Table 1 presents these stages in detail. This study used the synthesis as a set of assumptions to test on ten case studies. Using the nine case studies, the authors answer *the second research question* using SIT. We analyse nine cases from Southern California to test how the experiences of the managers related to the assumptions of the framework. The results of the analysis will be presented in detail in the final paper. The results evaluate the applicability of the framework for context of Southern California by analysing the proportions and content of parallel aspects in relation to the assumptions of the framework. *The study's third research question* clarifies the contradictory (fresh), context-specific viewpoints of the stage framework from Southern Californian perspective. The fresh context specific viewpoints will be described to answer the third research question.

The research focus of this study is limited to the context studied. This limits the applicability of the explorative and descriptive results to other contexts.

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