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THE FINANCING OF EXPLORATIVE AND EXPLOITATIVE ACTIVITIES: A Comparative Study of the Finnish Post-IPO High-Tech Companies

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ABSTRACT

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Companies that engage in explorative activities face challenges of organizing the financing to balance time asymmetry between expenses and incomes. Investments in explorative activities may bind relatively significant amount of resources while earnings from these activities are uncertain. Exploitation, indeed, often has an opposite impacts. It often generates operating cash flows that form an independent source of finance. In addition, level of uncertainty in exploitative activities is lower.

This study is conducted by examining first the existing literature on exploration/exploitation, business models, and then financing models. Extant research points out the knowledge gap in the relationship between explorative/exploitative activities and financing models. This relationship is studied by conducting the comparative cross-case study. Case companies that provide the empirical data for this study have been selected from among the Finnish listed IT and biotech companies, containing BasWare Oyj, Biotie Therapies Oyj, Okmetic Oyj, SSH Communications Security Oyj, and Tekla Oyj.

This study begins by constructing an analytical framework to analyze how firms fund their explorative and exploitative activities. To construct the framework, business operations have been categorized into two dimensions: business model and product/technology. Both of these dimensions contain explorative and exploitative activities. The object of this study is to explore how firms fund different combinations of activities, in particular, in which situations they are likely to use existing or new equity, debt, and operating cash flow as sources of finance.

The findings of this study reveal that explorative activities on the business model dimension such as acquisitions are financed by existing and new equity. Operating cash flow mainly funds exploitative activities on this dimension. According to the findings, explorative activities on the product/technology dimension are often funded by operating cash flow if it is adequate and available. Exploitative activities on product/technology dimension seems to be mainly funded by operating cash flow but also debt funding has been used.

TIIVISTELMÄ

Tampereen Yliopisto	Johtamistieteiden laitos, yrityksen hallinto
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Useiden yritysten menestyminen perustuu kykyyn uudistaa liiketoimintaa ja tuotteita. Eksploratiiviset operaatiot aiheuttavat tällaisille yrityksille haasteen järjestää rahoitus siten, että tuotteiden ja liiketoiminnan kehittämisestä aiheutuvat kulut saadaan katetuksi tulojen ja kulujen ajallisen epäsymmetrisyyden vuoksi. Sijoitukset eksploratiivisiin toimintoihin sitovat resursseja mutta tulojen realisoituminen niistä on epävarmaa ja tapahtuu myöhemmin. Eksploitaatio, eli olemassa olevien toimintojen monistaminen tuottaa usein positiivisen kassavirran, muodostaen täten itsenäisen rahoituslähteen. Tämän lisäksi tulot operaatioista realisoituvat varmemmin kuin kehitysprojekteista.

Aikaisemmat tutkimukset eksploraatiosta, eksploitaatiosta sekä rahoitusmalleista osoittavat, että näiden toisistaan eroavien toimintojen suhdetta eri rahoitusmalleihin ei aikaisemmin ole tutkittu. Tässä tutkimuksessa tätä suhdetta tutkitaan vertailevan tapaustutkimuksen avulla. Empiirinen aineisto tutkimusta varten on kerätty viidestä suomalaisesta pörssiyhtiöstä. Tutkittavat yritykset ovat: BasWare Oyj, Biotie Therapies Oyj, Okmetic Oyj, SSH Communications Security Oyj, and Tekla Oyj.

Tutkimus alkaa aikaisempaan teoriaan pohjautuvan viitekehyksen rakentamisella, jonka avulla analysoidaan yritysten toimintoja sekä näiden rahoitusmalleja. Viitekehyksen rakentamiseksi yritysten toiminnot on luokiteltu kahden päädimension alle, jotka ovat *liiketoimintamalli* ja *tuote/teknologia*. Molemmilla dimensioilla esiintyy eksploratiivisia sekä eksploitatiivisia toimintoja. Tämän työn tavoitteena on tutkia, miten yritykset rahoittavat luonteeltaan erilaisia toimintoja eri dimensioilla.

Tutkimustulokset osoittavat, että liiketoimintamallin uudistamiseen liittyvät toiminnot, kuten yritysostot, on pääsääntöisesti rahoitettu olemassa olevalla tai uudella omalla pääomalla. Liiketoiminnan monistamiseen liittyvät investoinnit taas pääsääntöisesti on rahoitettu tulorahoituksella. Tulosten mukaan tuote/teknologia-dimensioon liittyvät eksploratiiviset investoinnit, kuten tutkimus ja tuotekehitys, rahoitetaan enimmäkseen tulorahoituksella. Mikäli tulorahoitus ei ole riittävä, yritykset käyttävät tämän toiminnan rahoittamiseen myös olemassa olevaa omaa pääomaa. Tuotteen tai teknologian monistamiseen kuuluvia investointeja rahoitetaan pääsääntöisesti tulorahoituksella, mutta myös vieraan pääoman ehtoista rahoitusta on käytetty.

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1 INTRODUCTION

1.1 Background and the aim of the study

The changing demands of customers and the growing competition have forced firms to increasingly pursuit exploration. That is, to learn, search and, in generally, to do new things such as entering into a new market or making investments in new and uncertain activities (March 1991). Indeed, creating and developing new products and ways of doing business are found to be in the center of long-term success, especially in fast-changing industries such as IT and biotechnology (e.g. Brown and Eisenhardt 1997). Exploration, however, becomes difficult or even impossible if firms cannot exploit the outcomes of explorative activities and, as a result, generate positive cash flow (Simerly and Li 2000). Accordingly, finding a correct balance between a firm's explorative and exploitative activities becomes a crucial task in order to ensure and improve the performance[1] of the firm (e.g. Benner and Tushman 2003; Gupta et al. 2006; March 1991; March and Levinthal 1993; Siggelkow and Rivkin 2006).

In earlier research this exploration/exploitation dilemma has been considered from various viewpoints related to, for example, the creation of new and/or remaining existing product lines, technologies, and business strategies (e.g. March 1991; Levinthal and March 1993; Brown and Eisenhardt 1997; Rosenkopf and Nerkar 2001; Siggelkow and Rivkin 2006). However, earlier research still lacks in depth considerations of how the explorative and exploitative activities of firms are financed and, in particular, how they should be financed. This topic can be seen important as already Jensen and Meckling (1976) as well as Barton and Gordon (1988) have shown that the strategy of the firm and its capital structure influence each other.

[1] Performance related notions such as success and survival within this study refer to firms' ability to generate profits or positive operating cash flow so that they are able to continue business and to avoid bankruptcy. The purpose of using these notions is not to bring this study into the field of performance discussion but describe firm-level operations in generally.

This study seeks to address this issue by considering how different kind of explorative and exploitative activities of firms (i.e. whether they are focused on business model dimension or product/technology dimension of business activities) are financed. The study also examines the potential performance implications resulting from the different combinations of explorative/exploitative activities in the business model and the product/technology dimensions. Studying these issues is important for at least two reasons: First, financing models and thus capital structure affect the return on equity (ROE) ratio. Understanding the natures of different activities and identifying their risk factors as well as understanding the effects of each financing model can lead to better financing decisions, and thus increase the ROE. Second, understanding the link between different activities and performance provide a base for organizing the activities so that financial performance can be improved. This may also affect an important source of finance and give opportunities to take more risks without the fear of bankruptcy. In addition, financing decisions define risk level, cost of capital, investment time horizon, corporate governance structure, and liquidity of a firm (De Miguel et al 2004; Simerly and Li 2000; Taggart 1997; Harris and Raviv 1991). When managers plan and choose strategic activities, they have to recognize the influences of decisions over business in general, especially in terms of changes in capital and governance structure, and how they affect future performance.

In this study, exploration and exploitation are categorized into cash flow generating (exploitation), and cost causing (exploration) activities. The nature of activity therefore affects firms' financial performance and also financing solutions. Exploration and exploitation are dealt with as activities that appear on two separate dimensions. First one is classified as business model dimension (BM) (e.g. Zott and Amit 2007), and another is product/technology dimension (PT) (e.g. Winter and Szulanski 2001).

1.2 Structure of the thesis

Before turning into the deeper theoretical discussion and the empirical analyses it is worth giving a reader some kind of picture how this study is organized. The composition of the thesis follows the following structure.

Chapter 2 reviews the literature and previous researches on the related themes of the study: exploration/exploitation and financing, namely financing models. The main purpose of this chapter is not only to review existing studies but also to point out the knowledge gap in earlier research and thus create the theoretical framework for the study. This knowledge gap also gives vise to the specific research question.

Chapter 3 deals with the methodological issues. I discuss why the comparative case study method was chosen for theory creation purposes. I also introduce empirical research setting and the research process, including the case selection, the data collection and the method of case analysis adopted in this study.

Chapters 4, 5, 6, 7 and 8 present the analyses of the five cases; BasWare Oyj, Biotie Therapies Oyj, Okmetic Oyj, Tekla Oyj, and SSH Communications Security Oyj. These chapters follow the same structure for the convenience of cross-case comparability. Each case begins with a short introduction of a company, namely historical development of operations and strategy. Thereafter the strategy and changes in it are presented in a more detailed form. This contains also statistical information about financial performance and general-level development of the business. To combine strategic issues with finance, I provide financing-related information and statistics of each company as well as illustrate capital structures in the form of Figures.

In chapter 9, building on cross-case comparisons, a set of propositions is developed. This chapter is divided into two parts: first it deals with the relationships between strategic activities and their financing models. After this discussion, the chapter focuses on relationship between financial performance and combinations of strategic activities.

Chapter 10 summarizes the study with general discussions on its theoretical contribution and its limitations. An important part of this chapter is found in managerial implications. I give some recommendations for managers who operate in the businesses where combining financing models with business activities are crucial. Also relationship between financial performance and business models are commented from managerial perspective. At the end of the final chapter I introduce ideas and thoughts for further research.

2 THEORETICAL DISCUSSION AND THE EMERGENT FRAMEWORK

In this chapter I first review literature and studies related to exploration and exploitation (Chapter 2.1), and then financing related issues such as capital structure and financing model discussions (Chapter 2.2). The third part ends by pointing out a knowledge gap between the relationship of explorative/exploitative activities and financing models, which form the main research problem of the thesis.

2.1 Strategy as exploration and exploitation

Exploration and exploitation are two very popular notions in strategic management literature referring to organizational learning (March 1991), and the nature of business activities (Levinthal and March 1993). As March (1991) expresses this in a simple and understandable way, organizations divide attention and other resources between two broad kinds of activities – exploration to ensure fitness and capabilities in the long run, and exploitation to yield more positive returns to survive in its environment in the near term by making immediate profits.

Dividing activities only into exploration and exploitation gives a too simple picture of business. Activities themselves differ from each other not only by the nature of the activity (exploration/exploitation), but also in functional terms. Based on the earlier studies done for example by Zott and Amit (2007), and Winter and Szulanski (2001), the business operations can be divided into two basic functional categories. These functional dimensions are defined here as "product/technology" (e.g. Aspara et al 2006; Winter and Szulanski 2001) and "business-model" (Zott and Amit 2007) -related operations. This discussion is shortly presented here because the notions exploration and exploitation relates closely to the business model and product/technology dimensions.

2.1.1 What are exploration and exploitation?

Before going further in theoretical discussion, it is reasonable to define first what exploration and exploitation are and why they are studied within this context. This chapter tries to answer on how they can be characterized and how they imply firm's behavior. As a multifilament issue, this topic requires a few simplifications to be used as a base for analyzing firms' strategies and activities. Therefore, I begin the construction of the research framework by defining the notions and reviewing the major existing studies of the branch.

Exploration

In the simplest form, exploration is often defined as learning of new things that the organization has not handled with earlier (March 1991) or as innovativeness, learning of new things, and transferring created knowledge into business (Gupta et al 2006). Exploration, as Levinthal and March (1993: 105) put it, is "the pursuit of new knowledge of things that might come to be known". Exploration can also be seen as an activity that implies behavior characterized by search, discovery, experimentation, risk taking, and innovation (He and Wong 2004). Amount of learning can be used as an indicator of exploration, which measures explorative activity (Gupta et al 2006). In addition, it is also essential to pay attention to the fact that exploration is guided not only by inventing new things but also by learning from others (Levin and Rosenkopf 2006; Huber 1991). This latter viewpoint, learning from others, is tightly bounded with the idea of absorptive capacity (Cohen and Levinthal 1990). Absorptive capacity approach recognizes also better the idea of dynamic capabilities (Winter 2003; Teece et al 1997) than another school of exploration that defines exploration-exploitation through presence or absence of learning (e.g. March 1991). If exploration is measured simply by presence of learning, then many exploitative activities in one company would be categorized as explorative ones in other companies (Gupta et al 2006). However, I pay respective attention to this orthogonal aspect of exploration but at the same time I do also point out that March's (1991) view of continuum fits well to the discussion how to understand firms' behavior through explorative activities. In this study I use March's (1991) definition of exploration as the base for classifying and comparing firm-level strategies.

Typical for all of these definitions of exploration is learning and transferring new knowledge. This could be described as development of new capabilities that a firm requires to implement its strategy (McNamara and Baden-Fuller 1999). In practice, however, explorative activities often lead to development of new products, technologies, and partnerships. Definitions of exploration contain the idea of innovativeness with no exception. Innovations are also mostly held as results of investments in exploration (O'Brian 2003). This kind of definition, as far as I know, ignores the nature of innovation, namely whether it is a business model (e.g. Zott and Amit 2007) or product related (Winter and Szulanski 2001) innovation.

Innovations, and thus exploration, require investments in uncertain activities without any guarantee of payback (Gupta et al 2006). Such investments are typical especially in biotechnology and information technology (IT) industries (Rothaermel and Deeds 2004). Companies in these industries are likely to engage in exploration for many reasons. Especially biotechnology is tightly bounded with academic specialists, who may be more interested in research and creating new applications than in making profitable business (Pisano 2004). IT industry is not as emergent industry as it was a few years ago, but for many companies, remaining competitive advantage still mean sustainable renewal and launching of new products, technologies, and applications (Maksimovic and Pichler 2001). The hi-tech industry is well-known from its product exploration achievements, but at the same time, many companies in this industry have been changing not only their own business models but also industry-level business logics.

Explorative activities create opportunities to adapt to dynamic environment and thus achieve success in the future (Sidhu et al 2004). This finding refers not only to the ability to create new products but also the ability to adapt new ways of doing business. Therefore, it is reasonable to argue that survival in the environment requires business model exploration. Although exploration on both dimensions creates possibilities to boost success in the future, it may cause a failure trap because of investments in uncertain activities (Gupta et al 2006; Siggelkow and Rivkin 2006; Lohivesi 2000). This reason makes it understandable why exploitation and short-term profits are often preferred rather than investments in uncertain explorative activities. To solve this problem, one way of producing more exploratory behavior is through ignorance and misperception of its

risks (McNamara and Baden-Fuller 1999; He and Wong 2004). This kind of behavior is, at least partially, needed in radical exploration, but as mentioned earlier, risks to get into failure traps increase. Risks of a failure trap force companies to seek solutions for sustaining exploration as well as willingness to benefit from outputs exploration activities have produced. Although exploration contains usually higher risks than exploitation, benefits from it are also considered to be bigger (He and Wong 2004; Kyriakopoulos and Moorman 2004).

As a conclusion, there seems to be one major reason that drives firms to engage in explorative activities such as developing new products, screening new markets, or creating new distribution strategies. This can be defined as an opportunity to achieve success, and especially, generate cash flow in the future (Sidhu et al 2004). It can also be seen as the need to fit with external environment, which means that a firm needs different capabilities in the future than it has now, and thus it has to explore new possibilities to survive (Rosenkopf and Nerkar 2001). As Rosenkopf and Nerkar (2001: 287) put it, "in high-technology industries, firm's success depends on the ability to innovate consistently".

Exploitation

In the simplest form, exploitation refers to using existing knowledge in different kinds of functions and activities (Gupta et al 2006). As I noted earlier, there are practical reasons for why exploitation is often preferred more than exploration. As Levinthal and March (1993: 105) put it, "exploitation generates clearer, earlier and closer feedback than exploration… and yields more positive returns in the near term". In other words, although exploitative activities also require investments, it generates quick cash flows with lower risks. The question is as one experienced businessman once said, "opportunities to have a positive cash flow are created through exploration, but earnings are generated through exploitation". In other words it generates the quick cash flow with lower risks for example by selling existing products to extant market/customers (Aspara et al 2006).

Accordingly, a basic reason why firms need to engage in exploitation is to sustain the viability of business in the short term (e.g. Lavie and Rosenkopf 2006; Aspara et al 2006; Benner and

Tushman 2003). Exploitation is essential for a firm because it generates (or at least it should generate) positive cash flow, which enables a firm to survive in short-term, and thus let it pursue its explorative activities to create an opportunity to generate cash flow also in the long run (O'Brien 2003). As exploration/exploitation has not been much linked with financing model theories, these assumptions and findings ignore several important financing related issues. Exploration, instead, can also be funded by external source of finance and thus profits generated from exploitation can be returned to investors.

Investments in exploitation do not contain as significant risks as investments in exploration because of lower level of uncertainty and faster pay back –period (cf. Brealey et al 2006). According to financial literature, investments are often valued by counting net present value for each investment (Brealey et al 2006). Despite the costs related to exploitation, present value of exploitative activities is often higher than in explorative activities due to lower risk and closer returns (Brealey et al 2006; Benner and Tushman 2003). Risk and time are the main factors that influence the net present value of the investment (see e.g. Copeland et al 2000; Brealey et al 2006; Horngren et al 2005) This approach can explain why exploitation is often preferred over exploration to satisfy creditors and shareholders.

Two different approaches to exploration and exploitation

There are two different approaches to explore exploitation and exploration: one is to define these two as two ends of a continuum (e.g. March 1991), and another way is to see them to be two different and orthogonal aspects of organizational behavior (e.g. Gupta et al 2006). As Gupta el al (2006: 694) put it, "the central ambiguity regarding the definition and implications of exploration and exploitation lies in whether the two are distinguished by differences in the type of learning or by the presence versus absence of learning". They suggest that this should be defined by amount of learning because otherwise many activities in firms would be exploration instead of exploitation. According to this definition, for example developing new technology is exploration only if an organization has to adapt new skills, and there is more learning than use of existing knowledge. Using existing knowledge and skills can be thus defined as exploitation (Siggelkow and Rivkin 2006). Revisiting dynamic capabilities again – exploration in one firm may be

exploitation in another (Winter 2003), which means that the nature of activities needs to be defined at the entity level (e.g. Teece et al, 1997; Winter 2003)

March (1991) and Lavie and Rosenkopf (2006) have a partially different approach to exploration. They argue that exploration and exploitation should be defined by presence or absence of learning. In this viewpoint, exploration and exploitation represent two ends of a continuum (Gupta et al 2006), which means that these two kinds of activities are mainly incompatible – both of them compete for scarce resources (March 1991; Benner and Tushman 2003). Investments in one activity are taken away from another. However, investment decisions between exploration and exploitation become strategic when a firm has to choose a balance between them. Strategy is, as Porter (1996) stated, choices about what to do, and especially what not to do. Therefore, I argue that it is justified to define nature of strategy in particular cases as exploration and exploitation by using a continuum definition of exploration/exploitation (e.g. March 1991).

2.1.2 Two functional dimensions of business operations

According to the extant studies, firms may engage in explorative or exploitative activities on two separate functional dimensions: business model (Zott and Amit 2007) and product/technology (Winter and Szulanski 2001). Functional dimensions of business operations are close to those dimensions that Ansoff (1957) uses in his "legendary" growth matrix: product and market. The business model dimension as well as product/technology dimension is divided here as March (1991) sees the nature of activities: both of these dimensions have explorative and exploitative activities. Therefore, it is reasonable to use terms business model and product/technology exploration/exploitation. Dividing functions into the dimensions and defining the content of dimensions by the nature of activities, it is thus possible to classify patterns of activities and then combine them to financing models.

The existing studies on exploration/exploitation have concentrated mainly on studying the determinants why firms engage in explorative and/or exploitative activities as well as in issues related to organizational learning. Many of these studies have the focus on anything else but the pure business context. Only a few studies have handled with the issue that exploration and

exploitation can be divided into two somewhat independent dimensions (e.g. Winter and Szulanski 2001; Benner and Tushman 2003).

Product/technology exploration often refers mainly to R&D. Business model exploration, instead, refers such things as changing business strategy or focus of customer segments, or creating new distribution channel solutions. However, business model exploration is a wider issue than product/technology exploration and it is more difficult to define exactly. Product/technology exploitation, in its simplest form, means that a company has existing products developed earlier and that are exploitable. Business model exploitation refers to non-changing way of doing business – basically sustaining the existing strategy. Exploitation on this dimension may also be seen as routines or accumulated experience to handle with customers or organize distribution. (cf. Winter and Szulanski 2001; Lavie and Rosenkopf 2006). Altogether based on the presented dimensions, there appear four possible patterns of activities in which the company may engage itself. These patterns of activities can be categorized as follow:

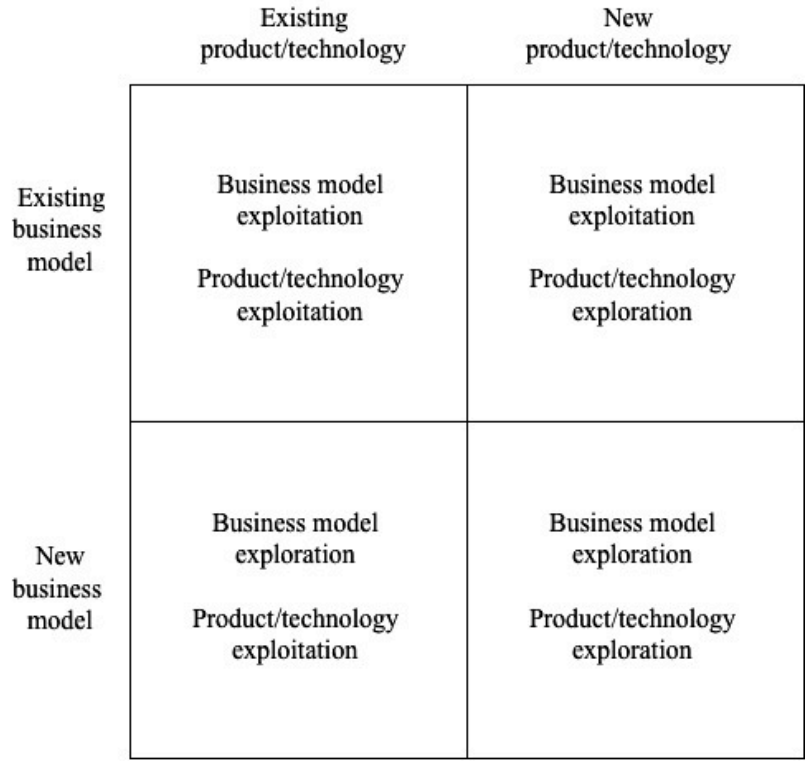

Figure 1. Dimensions of exploration and exploitation and patterns of activities

None of the patterns of activities introduced in Figure 1 represent a static situation in which a particular company could not change the balance of dimensions and shift from one pattern to another. In this study it is important to differ the static and dynamic perspective due to the relatively long observation period of the case companies. Companies are usually likely to move from one categorized pattern to another, shifting their focus from exploration to exploitation and vice versa, on one or on both dimensions. It is supported in the literature that a company may balance its exploration and exploitation not only by product-line planning and technology choices, which refers to product/technology exploration (Kyriakopoulos and Moorman 2004), but also by varying and changing strategic partnership alliances, thus referring to business-model exploration (Lavie and Rosenkopf 2006).

2.1.3 Balancing between explorative and exploitative activities

Structures, processes, capabilities, and cultures of a firm vary depending on which focus the firm's strategy implementation requires (He and Wong 2004) and therefore, firms have to balance their activities. Discussion has turned from whether exploration and exploitation are incompatible to how firms can achieve a balance by using both kinds of activities at the same time (Kyriakopoulos and Moorman 2004). For example, as Brown and Eisenhardt (1997) argue, exploration and exploitation do not require totally different organizational structures or cultures as previous researchers have shown. The main argument provided by Brown and Eisenhardt (1997) is, that organizations are able and they need to engage in both activities and find balance between them. Lewin and Volberda (1999: 523) noted that "these forms need not be contradictory processes – they can be complementary, and organizations must learn how to carry out both forms". Engaging in exploration on one dimension, for example product/technology, makes a company able to exploit its current business model. This thing has been mostly unexplored among the strategy researchers. Simultaneous execution of both dimensions is an essential success factor for many firms, as Smith and Tushman (2005: 522) argue that "sustained organizational performance depends on top management teams effectively exploring and exploiting". As these studies reveal, relationship between exploration/exploitation and performance has been studied, at least somehow, but relationship between the nature of activities and different kinds of financing models is fairly untouched.

Dividing short- and long-term success strongly from each other may be dangerous (Levinthal and March 1993). One has to notice that short-term survival is absolutely required if a firm wants to achieve long-term success. Therefore, I argue that short-term survival is as important as long-term success – or actually, I point out that survival in long run is not an independent variable; it is partially determined by sustained short-term performance. According to this viewpoint, too much exploration drives out efficiencies and prevents gaining economies of scale or learning by doing (e.g. He and Wong 2004). These arguments represent finance-oriented viewpoint and thus differs from mainstream strategic management discussion. Long-term success is usually seen within strategy context as a result of right strategic choices and therefore short-term survival is not held as a determinant of long-term success.

Companies implement their strategies by investing in tangible and intangible assets needed in firm's activities (Brealey et al. 2006; O'Brien 2003). Thus it is justified to state that strategy and its implementation can be analyzed by classifying investments in explorative and exploitative activities. Measuring strategy by investments also brings financial aspect into discussion, which makes possible to compare different kinds of financing decisions with firms' explorative and exploitative activities. By using investments as an indicator of exploration/exploitation activity, it is thus able to compare firms' strategies whether they are explorative or exploitative. Investments in both kinds of activities do not reveal the whole truth of strategy, and therefore other moves and operations that have not required investments are also analyzed and classified. Especially changes in business models do not always require financial investments but these changes have to be recognized. Paying attention to the nature of investments as well as other strategic moves provide a more holistic view of firm-level activities and gives more specific picture of strategy to be analyzed.

2.2 Linking strategy to financing models

Modigliani and Miller (1958) stated that firm's capital structure and financing decisions as well as its investment decisions are independent factors, which do not depend on each other. This finding, however, means that strategic decisions do not affect financing decisions and capital structure. Subsequently, numerous studies have shown opposite results (e.g. Jensen and Meckling

1976; Barton and Gordon 1988; Kochhar and Hitt 1998; O'Brien 2003). Nowadays it is widely agreed that strategy and financing decisions are interdependent factors that influence each other (Barton and Gordon 1988; Kochhar and Hitt 1998). These findings have been drawn from studies that have dealt with financing decisions within context of expanding business to related/unrelated operations.

Barton and Gordon (1988) were the early ones who brought the behavioral approach to financial studies following the research line that Jensen and Meckling (1976) had launched. They recognized that factors influencing financing decisions and decisions of capital structure have not been systematically studied or identified. Altogether, while some strategy scholars (e.g. Kochhar and Hitt 1998; O'Brien 2003) have addressed the relationship between strategy and finance there still remain many unknown issues. In particular, we do not have clear understanding how decisions between explorative/exploitative activities and functional dimensions affect financing models (Kochhar and Hitt 1998; O'Brien 2003).

2.2.1 Strategy and financing models

This chapter reviews the extant research on financing models, concentrating on capital structure and thus equity versus debt financing. First some general knowledge and existing research findings from this issue are provided. Thereafter, financing transactions that form the ground of capital structure are discussed. Altogether, the purpose of this chapter is to combine financing models to strategic moves within exploration/exploration context in order to explicate how firms may finance particular combinations of strategic activities.

Financing decisions demonstrate values and goals of managers (Barton and Gordon 1987; 1988). This viewpoint brings a co-evolutionary aspect into the discussion. Behavioral discussions within the field of financial studies plausibly argue that an access to financing sources affects managers' decision-making (Barton and Gordon 1988; Stiglitz 1988; Kochhar 1996; Hsu 2000). Although this study focuses on explaining impacts of different kinds of strategic activities on financing models, it seems plausible that there is also an opposite causality. According to extant studies, financing decisions do have impact on firm's strategic choices between different activities

(Barton and Gordon 1988; Berger et al 1997; Hellman and Puri 2000; Simerly and Li 2000), but total turnovers in firms' strategy caused by financing decisions are rare. The co-evolutionary perspective on the topic opens an interesting viewpoint over the issue, but it is not dealt with more specifically within this study.

2.2.2 Initial public offering, access to capital markets, and equity financing

Initial public offering (IPO) is one of the best-known financing transactions. An IPO provides an access to public capital markets, which allow a firm to use not only an opportunity to raise new equity, but also an opportunity to draw loan with lower interests than private firms (Shepherd and Zacharakis 2001). In the mainstream financing literature IPOs are held as a financing decision (Mello and Parson 2000), but researchers have also pointed out that IPOs can be seen as strategic moves (Brau and Fawcett 2006). An IPO can thus be seen as a double-folded issue. On the one hand, an IPO is a financing decision with its influences over capital structure, source of finance, and publicly valued share price (e.g. Ritter and Welch 2001). On the other hand, it is as a strategic move affecting corporate governance, decision-making, ownership structure, and access to the capital markets (Pagano et al 1998; Subrahmanyam and Titman 1999).

There are many reasons and explanations why firms choose to go public rather than to stay private. Gaining new equity to fund business activities is often held as the main reason (e.g. Fischer 2000). Other reasons are broadening the owner base, making the stock more liquid, or restructuring ownership structure (e.g. Pagano et al 1998). Most of these explorations are purely theoretical (e.g. Ritter and Welch 2002; Helvege and Liang 2004) with only a few empirical studies (Pagano et al 1998; Fischer 2000; Helwege and Packer 2003; Brau and Fawcett 2006). Yet, empirical studies have proved that theories of going-public are fairly well grounded (Brau and Fawcett 2006).

Maybe the answer to question why firms complete an IPO is the desire to raise equity for the firm to finance future investments (Ritter and Welch 2002; Subrahmanyam and Titman 1999). Ritter and Welch (2002: 1796) also point out that within this explanation there is an underlying purpose to "create a public market in which the founders and other shareholders can convert some of their wealth into cash at a future date". Indeed, the external equity gives an opportunity to fund

business activities without issuing a debt, but at the same time it brings new owners into decision-making (Harris and Raviv 1991). This may affect strategic decisions of firms such as choice between exploration and exploitation, which in that way have impacts on the financial performance. According to this point of view, causalities between financing models and financial performance are plausible. Financial performance, however, has also impacts on financing model, and thus the co-evolutionary causality between financing decisions and strategic activities gain supportive evidence due to this argument. New equity may be used to fund growth opportunities (Fischer 2000), but empirical evidences support also the claim that IPO is sometimes used to balance a firm's capital structure after large investments and fast growth (Pagano et al 1998). Brau and Fawcett (2006) argue that the primary motivation for going public is to facilitate acquisitions. This empirical finding does not ignore the importance of gaining new sources of finance, but it criticizes the traditional explanations about why firms do an IPO such as lowering the cost of capital and the pecking order of financing (Myers 1984; Myers and Majluf 1984).

After introducing reasons why firms choose to go public, it is relevant to go through some consequences that IPOs cause in companies. I do not go through all those financial and legal changes that the IPO causes, but I do concentrate on the factors that have strategic impacts on firm's activities and decision-making processes. One of the most important changes that a company faces when completing an IPO is changes in ownership structure, which may lead to changes in corporate governance (De Miguel et al 2004; Kochhar 1996). The fact that firm's ownership structure is one of the main corporate governance mechanisms influencing firm's strategic decision-making and also its agency costs is generally accepted by most strategy and finance scholars (Jensen and Meckling 1976; De Miguel et al 2004). The uncertainty of capital supplies enables the suppliers of finance to exert control over a firm (Stearns 1986). Kochhar (1996) noted that capital structure of a firm is affected by corporate governance mechanisms as well as results of managerial risk taking propensity (Barton and Gordon 1987; 1988). Owners have decision-making power in company mainly through corporate governance. When a company is going public, it has to recognize that when it is reaching a desired capital structure, it also influences the governance structure of the firm (Simerly and Li 2000). Creation of the ownership and governance structure can influence firm's ability to make strategic decisions (Jensen 1989). Thus, it is understandable that firm's ownership structure influences the value of a

corporation (Mello and Parsons 1998). Mello and Parsons (1998: 80) argue that "the IPO is particularly suited for the sale of dispersed shareholdings to small and passive investors but is not a good method for selling control". However, even though the main shareholdings are not sold through the IPO process but through private placements, the impacts on control and ownership base are the same in both cases.

Yet, an access to capital markets does not contain only an access to a particular stock exchange, but also to wider sources of debt (Brav 2004). Ability to fund activities by issuing a new offering or debt gives a company an opportunity to raise capital quickly, which may help a company making quick strategic moves. Public companies have better possibilities to use not only equity but also leverage funding. As Faulkender and Petersen (2006) pointed out in their empirical study, firms with an access to the public bond markets have significantly more debt. Access to the public bond markets require a debt rating, which is easier to get if a company has gone public (Brau and Fawcett 2006), although it is available for private companies too (Harris and Raviv 1991). Issuing new shares via stock exchanges is not possible for private companies, but they have to raise equity through earnings and/or private placements. Larger base of capital sources can be a strategic advantage for a company (e.g. Pagano et al 1998), but it is not any automatic way to success. Financial benefits of going public may be high depending on conditions, as Subrahmanyam and Titman (1999: 1045) noted that "the advantage of public financing is high if costly information is diverse and cheap to acquire, and investors receive valuable information without cost". Possibilities to use public financing with other sources of capital are important strategic factors, but quite less researched field in strategic management and also in finance literature. As previous studies have shown, access to capital markets is one of the main benefits that a firm gain when going public (e.g. Ritter and Welch 2002). However, as Kochhar (1996) argues, capital is a crucial resource for all firms, the supply of which is uncertain.

Most of the previous discussion can be attached as such to other forms of equity finance. The IPO makes a company capable of raising new equity via the public capital market also after the IPO (Brau and Fawcett 2006). These additional share issues play an important role in many cases when companies need to rise external funding. Because the share issues have same kinds of impacts as IPOs, I do not deal more with this topic. Instead of raising equity through the public

capital market such as stock exchanges, companies can raise new equity via private placements (PP).

2.2.3 Debt financing

Companies have several ways to draw debt. One possibility to draw debt is the direct loans provided by any financial institution or private person. This category contains e.g. bank loans. Direct loans represent pure debt funding, which has several impacts on firms' operations. Direct loans are the liabilities that are required to pay back within the limited time, which pressures a company to sustain its liquidity and the payback ability. This kind of debt funding forms the major threat of bankruptcy due to the rights that creditors have over the companies (Munro 1996). This thing makes the debt funding less attractive from managers' perspective, and therefore direct loans create one financing model that has its own characters and nature.

Another way how companies can benefit from debt funding is to issue public debts, called bonds. These debt issues may also have characters from mezzanine or equity-loan financing (e.g. Ericsson and Renault 2006). Bonds do not create as huge bankruptcy threat as direct private loans (Ericsson and Renault 2006), and therefore they represent more often used option to finance business by using debt funding. As Faulkender and Petersen (2006) noted in their empirical study, public companies usually have more debt than private companies. This is mainly due to the access to capital markets that makes bond issues available.

Debt often forms a very important source of finance for many companies providing capital for investments or better short-term liquidity. It may also increase the ROE, when invested capital generates more return than the interest of debt is (e.g. Brealey et al 2006). Often the cost of debt is lower than the cost of equity (Harris and Raviv 1991), and therefore companies tend to use debt financing even though they had enough equity to complete intended investments. However, it seems to be unclear under what kinds of conditions firms tend to use debt financing instead of existing or new equity (Kochhar and Hitt 1998). Classifying strategic operations into patterns of activities opens a possibility to explore this very unexplored issue.

2.3 Combining strategy, financing models and financial performance: Analytical framework and the research question

Theoretical discussion presented in the chapter 2.1 works as a basis for this study by creating the base of framework into which the financing models and financial performance can be integrated. The functional dimensions of operations that both have two broader kinds of activities, exploration and exploitation, thus form four kinds of patterns of activities. According to the extant research, these patterns have been somehow recognized (e.g. Ansoff 1957; March 1991; Winter and Szulanski 2001), but they have not been studied from this particular point of view.

The review of the financing literature shows that earlier studies have been focused on exploring financing decisions and capital structure, but the link between strategic choices, particularly exploration and exploitation, and financing models has not been much studied (e.g. Kochhar and Hitt 1998; O'Brien 2003). According to Kochhar and Hitt (1998), it seems to be unclear under what kinds of conditions firms tend to use debt financing instead of existing or new equity. Classifying strategic operations into patterns of activities opens a possibility to explore this issue. Therefore, it is relevant to explore how strategic choices between exploration and exploitation affect financing models and financial performance. This theoretical approach leads into the central problem of the study, and based on the extant knowledge and the gap between strategy and finance, I state the research questions as follow:

> **How do explorative and exploitative activities affect firms' financing models and financial performance?**

3 METHODOLOGY

The purpose of this chapter is to have an overview on the design of the research using case study as the main research strategy. This chapter also provides the arguments for case selection and data collection as well as introduces data analysis method.

3.1 Case study as a research strategy

As the theoretical discussion points out, there is no single, explicit theory from which to derive propositions dealing with the relationship between exploration/exploitation and financing models. Therefore, I decided to use case study strategy because of its ability to develop theory inductively (Eisenhardt and Graebner 2007). Inductive research is justified here because many researchers have pointed out that finance-oriented strategy research can offer significant benefits for business organizations, but this topic has mostly been ignored in existing literature (e.g. Barton and Gordon 1988, O'Brien 2003). Case study based theory development is, as Eisenhardt and Graebner (2007: 25) define it, "a research strategy that involves using one or more cases to create theoretical constructs, propositions and/or midrange theory from case-based, empirical evidence". Other researchers have also stated same kinds of arguments. Case study is often seen as a qualitative study method, but Yin (1981) noted that it is rather a research strategy, which does not exclude the use of quantitative methods. The main reason for using the case study method in this study is that cases can reveal "patterns of relationships among constructs within and across cases and their underlying logical arguments" (Eisenhardt and Graebner 2007: 25).

The choice to conduct this research by using the case study method follows naturally after reviewing the literature, identifying the research gap and need, and taking into consideration the availability of the possible empirical data sources. The research question that is based on the extant literature Figures out how different activities and their combinations affect firms' financing models and financial performance. Such 'how' research problem cannot be solved without studying some representative case companies (Yin 1993). The basic idea of this study is to develop theoretical knowledge that can later be tested by conducting a quantitative study.

Another important reason to choose case study method follows from the complexity of the research problem. Finding causalities between strategy and financing models as well as financial performance requires deep understanding of the phenomenon that can be derived only by describing and analyzing representative cases. Ragin (2000) calls this kind of issue as causal complexity, which required to be analyzed by using qualitative method. Conducting this kind of study by using a quantitative method could lead into wrong assumptions for example about how causes operate (Ragin 2000).

Case study method has many strengths, particularly its ability to provide knowledge from complex phenomena and add understanding of influencing factors. Despite of the strengths, this method has also many weaknesses. The most important ones that need to be recognized here come from its richness and overwhelming empirical evidences that might result in narrow and idiosyncratic theories and thus make parsimonious theory building a daunting task (Eisenhardt 1989).

3.2 The research process

3.2.1 Case selection and data collection

Case selection

After deciding the research issue, reviewing existing literature related to the topic, and choosing the method for the study, there was a challenge of selecting case companies to gather relevant and reasonable empirical data. Multiple cases were needed because generalizing propositions from comparable cases tend to provide more powerful explanations than one case could provide. According to Eisenhardt and Graebner (2007: 27), "multiple cases create more robust theory because the propositions are more deeply grounded in varied empirical evidence".

Some criteria were set for case selection. First, every case company is required to have very explorative activities so that studying exploration and exploitation is possible. Second, every company needs to be public. This requirement has two reasons. Only public companies have

access to all possible sources of finance, and they are required to inform publicly about their operations, financing transactions, and financial performance, thus making comparison possible. Third, launching an initial public offering around the same time to remain comparability of activities was required. In addition, when selecting cases, as Stake (1994: 244) noted, "balance and variety are important; opportunities to learn is of primary importance".

According to these requirements, I explored the Helsinki Stock Exchange list of companies. Hi-tech industry provided several potential case companies as well as a very explorative biotech sector (actually there are only two biotech firms listed). The year 2000 has been a significant time in the Finnish history. It was time of hi-tech hype and IPO boom. New companies entered into the stock exchange at the rate never seen before. This time, however, was actually the first period in Finland when new listing companies had opportunities to raise remarkable amount of new equity easier than ever. Many companies launching an IPO in 2000 succeeded to raise significant sums compared with firms that had listed before. For these reasons, I decided to select companies that had launched their IPOs in 2000 and fulfilled other requirements presented earlier. Thus, I found the following five firms that fulfilled the presented requirements: BasWare Oyj, Biotie Therapies Oyj, Okmetic Oyj, SSH Communications Security Oyj, and Tekla Oyj.

Data collection

The empirical data was collected mainly from public data sources. The primary data sources of the study were the IPO prospectuses, annual reports of each company from year 2000 to 2006, and other prospectuses related to share issues, mergers and other financing transactions. If other sources are not otherwise mentioned, the five cases are presented and analyzed based on the material presented with details in the Table 1:

	IPO prospectus	Annual reports	Other prospectus
BasWare	2000	2000-2006	2006
Biotie Therapies	2000, 2002	2000-2006	2002, 2003, 2005, 2006

Okmetic	2000	2000-2006	-
SSH	2000	2000-2006	2004
Tekla	2000	2000-2006	-

Table 1. Sources of empirical data

This material provides an adequate database for analyzing the cases for two primary reasons. First, public companies are required to inform investors about their operations and financial situation. The requirements of public information are highly standardized and contain detailed information. Therefore this data source provides a good ground to collect data needed for analyses. Second, public data has been documented year by year, and therefore reliability of the data does not depend on individuals. This ensures availability of exact and fairly detailed data and also good comparability of the cases.

Data collection also included two interviews. The purpose of these interviews was to gain general background information from industry specialists about finance-related issues and biotech industry. The first interview was done in June 26 by interviewing Jari Piiponniemi (partner at Deloitte Corporate Finance). This interview provided information particularly about IPOs. In the second interview conducted in August 13, Timo Veromaa (CEO, Biotie Therapies Oyj) provided information about biotech industry. Both interviews lasted about one hour and they were conducted as semi-organized interviews.

3.2.2 Case study data analysis

I use comparative cross case analysis as a data analysis method. This study, however, confronts the problem that lays almost in every qualitative study: there is no simple or single trick for drawing results from the collected data (Eisenhardt 1989). Therefore, interpretations that have been done based on the material are more or less interpretative results. The empirical data is consisted from two major categories: one category is numerical, financial data that contains financial statements, cash flow statements, and balance sheet, and another category is consisted from operation, transaction, and strategy descriptions. Numerical data is used for analyzing performance and financing models, as well as describing exploration level of each company

during the observation period. Each case description includes a Figure of firm specific capital structure and exploration ratio. The exploration ratio used in this study is calculated by using financial data. The detailed information of how the ratio is calculated and figures used to count it are provided in Appendix 1. The purpose of using a ratio to measure exploration level is only allusive. It gives an overview of nature of activities that are measurable by investments and expenses. Exploration and exploitation themselves cannot be absolutely measured, but some kind of generalization can be done by categorizing investments and activities and thus measure differences between them. Numerical data, in addition, is mainly used for analyzing development of capital structure and financial performance.

Another category, strategic activities and operations, is analyzed by choosing the relevant factors that can be picked up from each case. The purpose of choosing the activities is to create the ground for comparison between strategic activities and financial issues relating to each activity or pattern of activities. The activities mapped from every case year by year are presented in the following list:

- Acquisitions and divestments
- R&D expenses and projects
- Remarkable single investments
- International expansion
- Changes in distribution strategy
- Changes in product lines
- Changes in mission and/or customer segments

Acquisitions and divestments are analyzed because both of these types of activities represent significant opportunities to modify firm's business model –related activities or even business strategy, even at relatively short notice. R&D expenses and projects, however, reveal how much a single firm allocates resources in the product exploration. Remarkable single investments often have two major reasons: to strength existing activities or bring something new into the business. Investments are important to recognize because firm's strategy can be analyzed by classifying its investments. In other words, firms reveal their strategies through the investments (Myers and

Majluf 1984). International expansion and the distribution channel strategies relate closely to each other. They are analyzed because of their direct impacts on firms' business model –related activities. Changes in mission and customer segments also represent business model dimension and therefore these factors are identified and analyzed. Changes in product lines may refer to both dimensions and the product line -related decisions are the important drivers of the business strategy (e.g. Winter and Szulanski 2001).

4 FINDINGS FROM CASE 1: BASWARE OYJ

4.1 Case description and background of BasWare

BasWare Oyj is an international fast-growing software-company, established in Finland in 1985. BasWare got its actual organizational form in 1990 through the management buy-out operation in which the managers bought two thirds of BasWare share capital from Baltic Data Oy. In 1993, owners bought rest of the shares from Unic Oy, becoming thus the sole owners of the company.

BasWare concentrated on creating ready-to-install software-products. In 1992, BasWare launched its first financial controlling software version, called BasWare Sigma. This version was the very first Windows-based ready-to-install software-product on the local market. One year later, in 1993, BasWare extended its product-line bringing new budgeting software into the market, which was later developed to cover needs of financial reporting and analyzing. This product-line extension was an important move opening a new path toward e-commerce software-products. Continuous development and concentration on chosen product-lines created the first e-commerce software, BasWare E-Flow, which was launched in 1997. Strategy was based on two fields of business: e-commerce, and financial reporting / controlling software businesses.

Since 1995, BasWare concentrated on developing, marketing and selling only its own software-products. BasWare developed its two product-lines that both have been chosen at the early stage of the firm history. The original business idea of the company has remained the same - to develop, market and sell software-products that support financial controlling and e-commerce operations of customer firms. The main factors of strategy have been and still are:

- Organic growth with strategy-supporting external growth through acquisitions
- Internationalization
- Concentration on existing product lines and development of new software-products mostly on the basis of extant ones
- Concentration on chosen customer segments (revenue over EUR 100 million)

BasWare was one of those hi-tech companies that launched its IPO in the middle of hi-tech IPO boom in 2000. Compared with other hi-tech companies that were listed at the same time, BasWare is an exceptional firm measured by ability of making profit. The company has been able to grow quickly while keeping profitability at good level. The following table (Table 2) points out development of revenue and operating profit as well as growth of size measured by numbers of personnel.

	Revenue (€1.000)	Operating profit (€1.000)	Number of Personnel
1999	*4 536*	*1 645*	*65*
2000	7 455	1 551	101
2001	12 399	389	168
2002	20 263	1 370	244
2003	25 597	1 133	256
2004	32 640	4 663	280
2005	42 810	3 611	362
2006	59 954	8 078	514

Table 2. BasWare post-IPO performance

4.2 Nature of business

BasWare had two business lines when it launched its IPO in February 2000. E-commerce business was relatively new compared with financial controlling and reporting software business, but already in 2000 it brought 56 % from revenue while financial software business generated 36 %. Six years later, in 2006, the same Figures were written as follow: e-commerce 88 % and, financial software 12 %.

Reasons for growth of e-commerce business can be found from changes in environment. One of the most important factors has been the growing use of World Wide Web as a part of everyday business operations. BasWare has also allocated resources to service business, which has come more and more important line of business for the company including IT-consulting, and supportive services as software maintenance and updates. Dividing business activities in terms of products, services, and software maintenance, BasWare has thus three different kinds of business operations by their natures. In the year of IPO, BasWare generated 53 % of revenue from selling

software products, 31 % from consulting and, the rest of revenue, 16 %, from software maintenance. Counting consulting business and maintenance as services, they form together 47 % of total revenue. In 2006, the same Figures were as follow: 32 % from products, 37 % from services and, 31 % from software maintenance – service part totaling some 68 %.

The focus of business has changed little by little toward more service-oriented activities. Software maintenance brings a stable cash flow compared with selling new products and gaining new customers. Consulting business does not bound as much resources forehand as product development, which means that revenue can be generated immediately without risks of unsuccessful R&D processes. At the moment of the IPO, BasWare concentrated strongly on software development as well as commercializing outcomes of R&D. Even six years later, BasWare allocates significant part of resources into explorative activities such as R&D, but business extensions are targeted to exploitative activities. As stated in BasWare's IPO-prospectus, the company aims to develop its products as much as needed and then exploit outcomes at short notice thus collecting cash flow soon.

4.3 Business activities and operations between years 2000 and 2006

Internalization

Ensuring funding for internationalization was addressed as one of the main reasons for the IPO. Fast extension to European market begun during the year 2000 and it has continued until these days. Quick transfer to European markets, and later global markets has required big sums of capital. IPO-funding has mainly been used to finance internationalization process. The development path of international operations and activities are described in Figure 2.

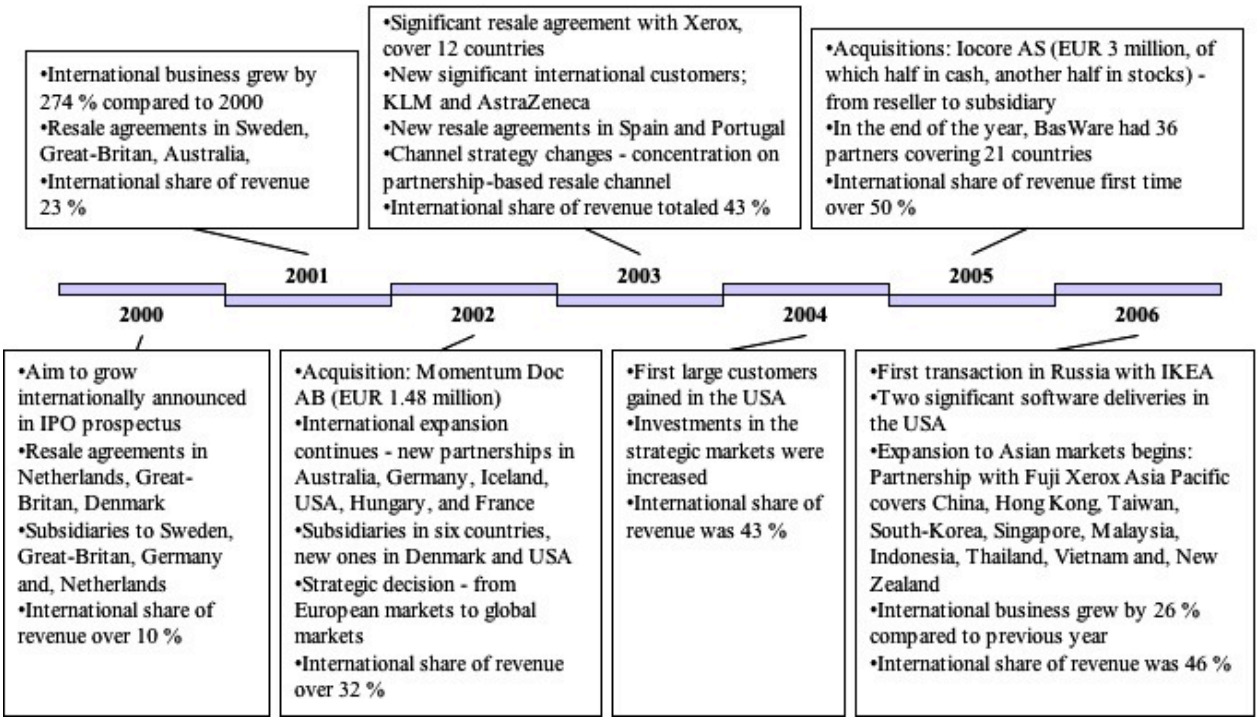

Figure 2. BasWare's internalization process 2000-2006

Other strategic operations and activities

Growth and profitability were set as major objects when BasWare launched its IPO in 2000. Internationalizing has been one way to implement strategy and achieve growth goals, but of course there has been very strong domestic growth during the past years. Almost all R&D projects have been done in Finland, and therefore, especially product and business development activities have been executed in the home country. In the following Figure 3 I have summarized all other but international strategic operations and activities completed during the seven years period after the IPO. The purpose of the Figure 3 is to form a ground for integrating strategic activities and financial events later in this chapter.

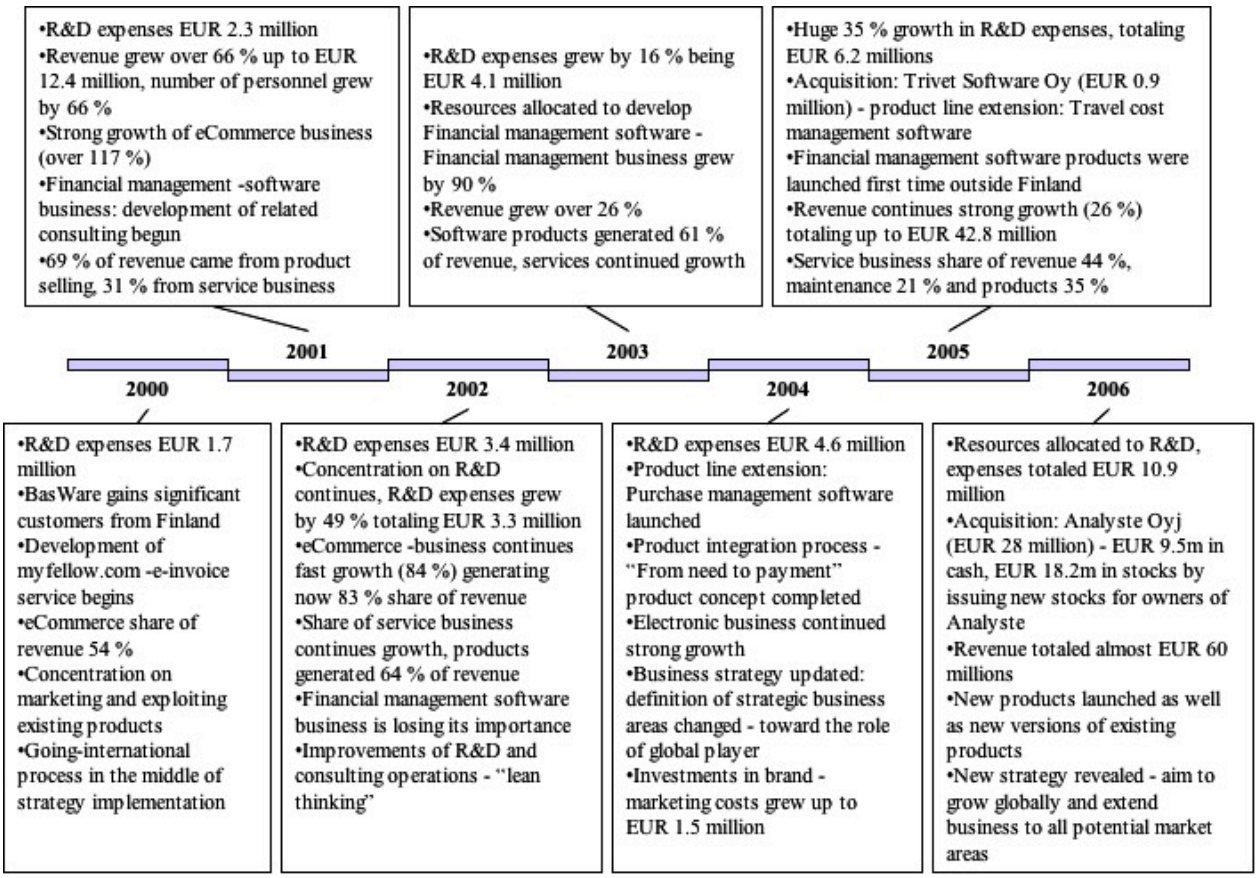

Figure 3. BasWare strategy path 2000-2006

There seems to be several factors that rise up when business activities are explored afterward. The first one is concentration on service business. Year after year services have brought bigger and bigger share of revenue, beating revenue generated from product selling a few years ago. Another significant factor has been the firm's ability to handle with R&D. Products have been integrated into the "product families" and development of new products has been linked with existing product lines, making outcomes of R&D quickly exploitative.

4.4 Financial development of BasWare

BasWare has had stable and good financial position, especially after the IPO. It succeeded to raise needed equity from the IPO and profitable business has provided continuous financing through positive cash flows. These factors have led BasWare into a position in which the company has been able to raise new equity or issue a debt when needed. Liquidity has remained

at high level, which has been one reason why BasWare has been able to execute its acquisition processes quickly and pay significant shares in cash. Table 3 introduces the financial development of the company in 1999-2006.

	Equity (€1000)	Liabilities (€1000)	External finance (€1000)	Financial events (€ 1 000 000)
1999	1 958	988	59	-
2000	10 342	1 695	8 414	IPO, institutional & personnel issues (EUR 8.24), long-term debt (EUR 0.18)
2001	9 337	2 807	6	-
2002	9 952	3 440	0	Acquisition (EUR -1.48)
2003	10 088	5 915	2 000	Debt (EUR 2) for funding increase in working capital
2004	12 172	8 607	305	Short-term debt (EUR 0.3)
2005	21 296	9 932	9 056	Private placement (PP) (EUR 6.9), two acquisitions (EUR 3.9)
2006	44 606	12 951	855	PP (EUR 0.76), acquisition (EUR 27.92)

Table 3. BasWare financial development and events

4.5 Conclusions from Case 1

Looking from strategic perspective, BasWare has three major changes in its strategy path – internationalization, increasing importance of service business, and renewed product lines. Two very remarkable factors in BasWare's business have also been successful R&D and strong growth. In addition to strategic perspective, I observe BasWare also from the financial aspect. The company has had two interesting financing operations during its history. The first one is, of course, the IPO itself and institutional and personnel issues related to the IPO. The second significant financial operation was executed in 2005, when the company raised EUR 6,9 millions new equity through the private placement. Otherwise the financial development has been based on income cash flow, which has helped BasWare to implement its strategy as well as keep investors satisfied by paying dividends. IPO funding (EUR 8,24 million) was intended to use for international and domestic growth as well as for R&D activities. The equity base the company gained in the IPO was relatively huge. As business had been profitable before listing and remained profitable after it, BasWare has had a good ground for explorative operations. It started quickly negotiating resale agreements with companies operating in Europe as well as creating own subsidiaries in the most important market areas.

Most operations during the observation period have begun with strong exploration, but as the executives of the company noted, it will focus quickly on exploitation so that projects and operations could be cashed out at short notice. BasWare has been able to balance its explorative and exploitative activities on both dimensions. It has succeeded especially in exploiting the outcomes of business model exploration, i.e. acquisitions. I have classified internationalization mostly as explorative activity because of the speed of capturing foreign markets. In 2000, the international share of revenue was only some 10 %, which makes approximately EUR 800.000. Seven years later, the share was 46 %, which is recorded EUR 27.6 million. R&D, of course, can also be classified as explorative activity. R&D expenses, however, have increased significantly from year to year while the business has growth. Figure 4 describes how inputs into explorative activities have been allocated compared with the capital structure.

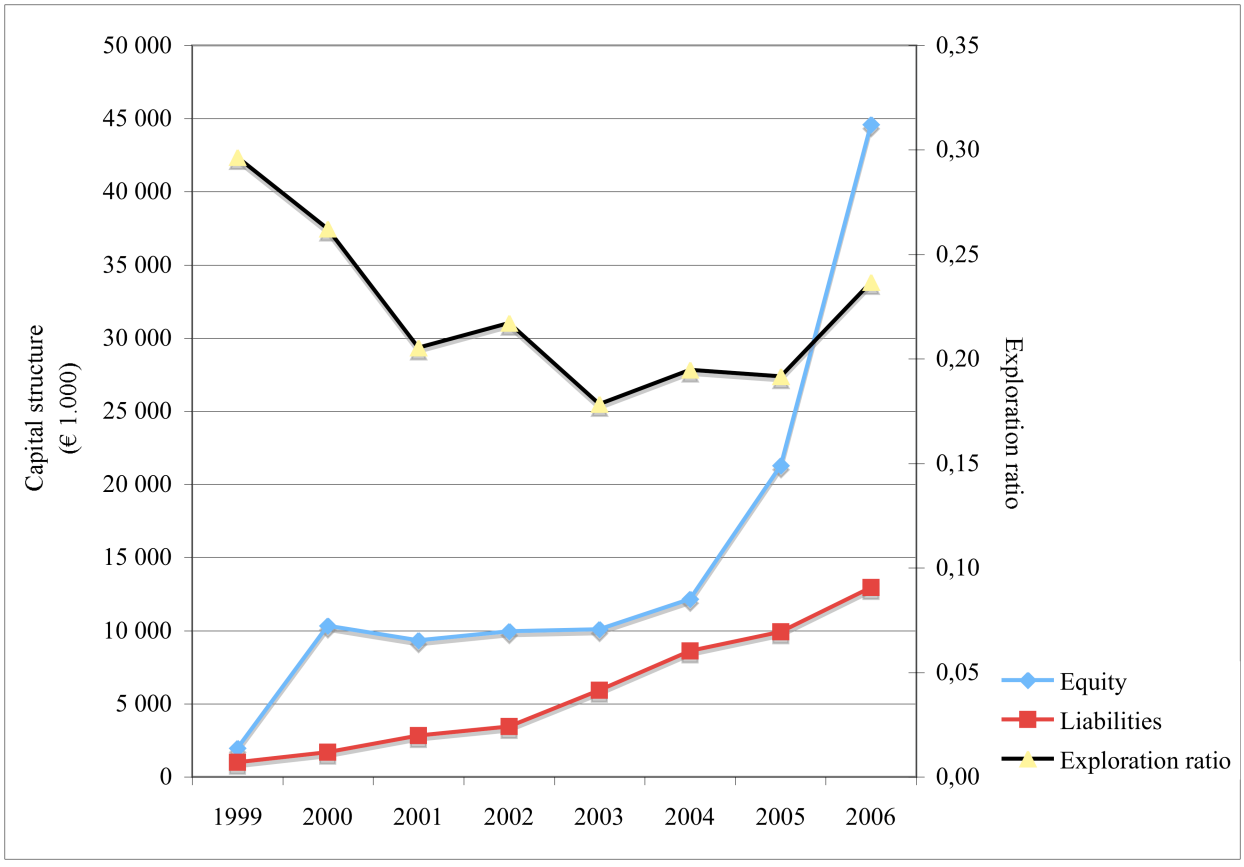

Figure 4. BasWare exploration ratio and capital structure 2000-2006

The company raised equity for capturing market with existing products and services, not for starting massive product development projects. Even though absolute explorative costs have been

increasing annually, their relative share of total costs and assets has remained lower compared with the situation e.g. in 1999. IPO-funding was mainly invested in business model exploration and product exploitation, thus providing strongly positive operating cash flows. Income financing has played a central role for example in funding the R&D projects.

Capital structure sustained practically unchanged from 2000 until 2003, when BasWare drawn EUR 2 million debt for funding working capital and thus product exploitation. Before this, the company had no significant long-term debts. Although liabilities after 2003 have increased, no remarkable long-term debts have been drawn. Liabilities have been recorded mostly from short-term payables, which seems that short-term debt was used into product exploitation. It also seems that debt was used when the company had accelerated its product-related exploitative operations to the highest speed. BasWare has been generating more and more revenue from service and consulting business, which has meant decrease in products' relative share of revenue. Services generated only 31 % of revenue in 2000, while the same Figure was recorded 65 % in 2006. R&D expenses have increased; totaling over EUR 10 million in 2006, while in 2000 this Figure was EUR 1.7 million. Service and maintenance business has worked as the main cash flow generators, which has revealed resources for R&D. R&D function, as the most explorative function, has succeeded in producing outcomes that have been profitable, meaning that investments in development have also generated cash flow. Therefore, BasWare has succeeded in generating profit shifting quickly from exploration to exploitation.

Growth of revenue has been significant during the past seven years. In 2006, net sales of company were eight times higher compared with the year of IPO. A simple calculation indicates that the annual growth of revenue has been over 34 %. Organic growth has been in the centre of growth as intended, but also four acquisitions have been made to capture markets and expand business more efficiently, thus exploring the business model. Momentum Doc AB was acquired in 2002 by paying EUR 1.48 million in cash. Good liquidity rate gained from the IPO and positive cash flow made the acquisition possible without issuing debt or new shares. The next two acquisitions were completed in 2005, when BasWare bought Iocore AS from Norway paying EUR 1.5 million in cash and another EUR 1.5 million by issuing new shares, and Trivet Software Oy paying EUR 0.9 million in cash. During the same year, BasWare raised new equity EUR 9

million through the private placement, which strengthened the capital structure and made the growth possible via acquisitions. These acquisitions have been only one part of the internationalization process, but they describe well the financing model of growth. Going international as a whole has been mostly funded with IPO-funding as well as income financing and thus no debt has been used.

5 FINDINGS FROM CASE 2: BIOTIE THERAPIES OYJ

5.1 Case description and background of Biotie

Biotie Therapies Oyj is a Finnish-based biotech company, whose main strategy is to develop biotechnical drugs. It has a very eventful history although the company is fairly young. The original company was founded in 1992 but its official operations begun in 1996 when Biotie got its first venture capital funding having EUR 3 million for starting the drug development. From the beginning, Biotie has centralized its resources into drug development. This has always been very expensive activity and thus, two years after the first financing round Biotie was on the road again, raising equity through a private placement approximately EUR 8.5 million in the beginning of 1999.

Biotie launched the IPO in June 2000, entering the Helsinki stock exchange and raising new equity EUR 18.4 million. Only two years later, Biotie was in the middle of the organization re-structuring. Although the IPO brought new shareholders for Biotie, the main shareholders were institutional investors who had significant ownership also in Contral Pharma and in Carbion, both Finnish-based biotech firms. Owners were interested in integrating these three companies into one, which was organized through two mergers. Biotie and Carbion were both merged to Contral Pharma, which changed its name Biotie. This new company created from three independent businesses launched the IPO at the same year listing its shares on Helsinki stock exchanges. Biotie got its current organizational form in this re-structuring. Table 4 indicates Biotie post-IPO performance, which also shows how the merger immediately affected the business. The new company grew quickly in terms of numbers of personnel or operating loss, but any other development did not happen. In other words, Biotie was leaping into financial crisis with a massive cost structure and almost nonexistent turnover. The Table 4 points out how the company has developed and growth year by year in terms of revenue, operating profit (loss), and numbers of personnel.

	Revenue (€1.000)	Operating profit (€1.000)	Personnel
1999	*0*	*-3 906*	*39*
2000	2	-6 865	55
2001	173	-6 684	68
2002	153	-26 256	112
2003	2 243	-12 395	66
2004	4 457	-7 080	47
2005	1 227	-7 381	47
2006	1 118	-8 361	37

Table 4. Biotie post-IPO performance

The main business idea has been developing and producing biotechnical drugs for chosen therapy fields. In 2000, Biotie announced that its goal is to become a leading international biotech drug manufacturer on the chosen therapy fields. In this time, the firm had decided to concentrate on developing drugs on the following therapy fields:

- Inflammation / infection diseases
- Blood vessel diseases, particularly thrombosis
- Cancer

During the past seven years, these therapy fields have been changed except inflammation and thrombosis, which have remained on the list since the beginning. Some of newcomers have been dropped out sooner than others. In 2002 Biotie chose addiction diseases as strategic therapy field. In 2003, the company was on the edge of disruption, having many costly drug development projects on many different therapy fields, which were legacies from merged companies. During this time R&D portfolio consisted from projects such as addiction diseases, rheumatoid arthrisis, intestinal infection diseases, psoriasis, thrombosis, and cancer. After re-structuring the business, Biotie decided to focus on three fields that have formed the base of strategic R&D projects since 2004. The basic idea of business strategy remains the same as it has been, to research and develop biotechnological drugs on chosen therapy fields. These fields are nowadays as follow:

- Inflammation / infection diseases
- Addiction diseases
- Thrombosis

5.2 Nature of business

Biotie is engaged in the business, which has been one of the most uncertain businesses ever seen (Pisano 2004). Developing biotechnological drugs require huge amount of resources for R&D. The underlying logic behind biotech business is to make a significant breakthrough which can be patented and which thus forms continuous cash flow from license royalties. As drug manufacturers have shown, exploiting a successful medicine is very profitable although development costs are huge.

Due to the massive cost structure of developing medicines, biotech business is so called "born global business", especially outside Japan and US markets. Biotie has had to actively search for international partners since its early beginning. It has had no choices to operate only on its domestic market because of logic of business. It has needed partners that are able to give support in R&D process as well as partners who are capable of exploiting probable successful outcomes of product exploration.

5.3 Operations and development of business between years 2000 and 2006

The core strategy of the firm, to develop biotechnical drugs, has remained the same since the IPO, but strategic implementation of the mission has varied much and changed many times. In Figure 5 the strategy path of Biotie during the years 2000-2006 has been illustrated.

The major strategic move was done in 2002, when the main owners of Biotie Oyj, Contral Pharma Oy, and Carbion Oy wanted to integrate these three biotech companies under one controlling unit. Biotie and Carbion were merged to Contral Pharma, which changed its name Biotie. The new Biotie was born and it launched immediately an IPO to list its shares in Helsinki stock exchanges, and collected some four million euros new equity. The new company was running all R&D projects that came from merged companies causing massive costs. Only R&D costs in 2002 were EUR 21,5 million, while the revenue totaled only EUR 153.000.

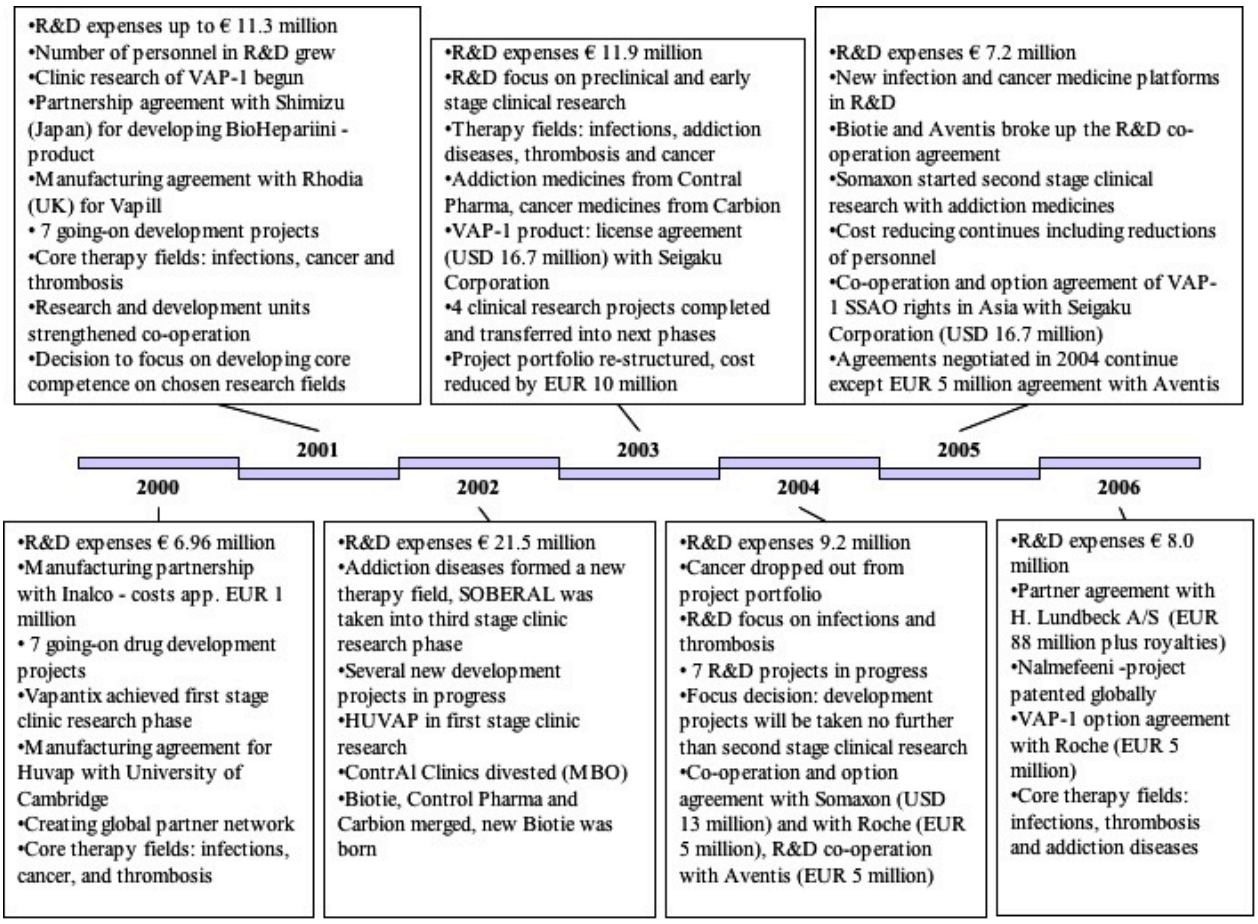

Figure 5. Biotie strategy path 2000-2006

Two of the main strategic moves happened during 2004-2005, when Biotie decided to concentrate on developing drug candidates until a second stage clinical research phase and then sell these platforms to huge global medicine companies. During these two years, the firm also decided to focus on developing drugs for blood vessel, addiction, and infection diseases. The next important move was done in 2005 by centralizing resources only into development of infection and blood vessel diseases after addiction medicines (e.g. HUVAP) would be successfully commercialized. A significant EUR 88 million agreement with H. Lundbeck A/S in 2006 was part of this commercialization process, thus providing essential income financing.

5.4 Financial development of Biotie

Biotie announced in its IPO prospectus about agreements that it had negotiated with international partners in 2000. These agreements were estimated to generate tens of millions, thus giving the

company a good source of finance. Assumptions were wrong, and Biotie started its early journey as a public company in very poor financial situation even though it had raised EUR18.4 million new equity in the IPO. The first two years as a public company were financially failures, costs totaling over EUR 20 million during this time. Portfolio was full of projects that required unbelievable sums of capital while the company had actually no kind of revenue (2000: EUR 2.000 and 2001: EUR 173.000).

	Equity (€1.000)	Liabilities (€1.000)	External finance (€1.000)	Financial events (€1.000.000)
1999	*5 917*	*1 052*	*726*	*Long-term debt (EUR 0.7)*
2000	17 430	1 194	18 764	IPO (EUR 18.4), long-term debt (EUR 0.35)
2001	6 951	880	13 008	New equity offering (SEO) (EUR 12.3), long-term debt (EUR 0.7)
2002	5 706	7 787	22 195	PP (EUR 15.0), IPO (EUR 4.0), long-term debt (EUR 3.2)
2003	6 428	7 152	13 788	SEO (EUR 10.5) long-term debt (EUR 3.3)
2004	1 739	7 923	2 719	Long-term debt (EUR 2.7)
2005	-19 583	28 514	7 833	SEO (EUR 6.0), long-term debt (EUR 1.9)
2006	-10 807	44 040	19 856	SEO (EUR 17.6), long-term debt (EUR 2.2)

Table 5. Biotie financial development and events

Biotie has required continuous external finance to run its operations. For this reason, Biotie has had numerous financing activities during the past seven years, raising equity through two IPOs, four seasonal equity offerings, and one private placement (Contral Pharma), totaling approximately EUR 98,15 million since 2000. Equity financing has not covered all the costs and thus Biotie has been forced to use also debt financing. Biotie has issued debts every year since the IPO. In addition to these financing activities, TEKES has also funded the firm with several kinds of instruments, including grants and equity loans. This funding has been used every year since the IPO was completed. All this funding has been pointed for R&D activities.

5.5 Conclusions from Case 2

When looking operations and activities in which the company has been engaged in, there are a few main topics that can be picked up into discussion. From the strategic perspective, there are

several major factors that have defined firm's strategy and performance. R&D has been in the central role of the business. When Biotie launched the IPO it had no ready-to-sell -product and therefore, operations on the product/technology dimension have been very explorative. Year 2002 was the time of mergers, and then the number of personnel as well as the number of R&D projects increased significantly. As the current CEO of the company described, this integration of three companies formed one big problem, causing unreasonable costs. This started another strategic move, centralization of the business, which was implemented and executed by reducing costs and number of employees. Third strategic moves that have taken place especially during the last two years of the observation period are commercialization agreements. This is, however, as a result of successful R&D.

The first IPO completed in 2000, was done because of Biotie needed funding for its R&D projects. Securing financial continuum formed a crucial factor for the company. R&D expenses in 2000 were approximately 7 million while no revenue was generated. Biotie had nothing to exploit when it launched the IPO, so the company depended on external finance. As mentioned, development of biotechnical drugs is somewhat costly business and therefore, Biotie raised equity over EUR 12 million and drew long-term debt EUR 0.7 million only a year after the IPO. The second IPO was launched in 2002, providing new equity EUR 4 million. Before this Contral Pharma had raised equity EUR 15 million through the private placement. To cover all costs that the future might have brought, the new Biotie drew also EUR 3.2 million long-term debt. This financing round had the same purpose as the first IPO, to secure financing for R&D projects.

As a result of the IPO, Biotie succeeded in raising huge amount of capital. In this year, R&D expenses increased almost EUR 3 million compared with the previous year. The weighted exploration ratio (see Figure 6) between years 2000 - 2004, however, has very limited explanation power because of its limitations. Activity based exploration ratio gives more valid information in this case, indicating exploration level between 0.9 and 0.71. This ratio describes better the development of Biotie and therefore, this is the only case where activity-based ratio is used in the same Figure with weighted exploration ratio (for more information of exploration ratio see also Appendix 1).

Biotie started developing its business model by creating partnership network for R&D projects. Biotie did not have an existing network when it started commercializing the product platforms. The business model exploration did bear fruits in 2006, when Biotie completed an agreement with H. Lundbeck A/S to commercialize HUVAP. Now, if the R&D project of HUVAP can be successfully completed, Therefore, Biotie has now potential to succeed in exploiting the product through this international medicine giant. For this reason the firm can concentrate on developing the product instead of developing product and business model at the same time.

Sums that have been invested in the business especially in 2006 are remarkable. The company raised equity over EUR 17 million in 2006, but equity still remained over EUR 10 million negative. In 2004, Biotie reached its revenue record generating more than EUR 4 million. During this year the company cleaned its R&D portfolio, and thus it decided to concentrate only on products on its core competence field. Reduction of employees was also continued, which begun after the mess of the merger was about to be cleaned, and for example R&D expenses declined from some EUR 21 million in 2002 down to EUR 9 million.

Figure 6. Biotie exploration ratio and capital structure 2000-2006

As both of the ratios indicate (Figure 6), engagement in explorative activities on both dimensions has been very strong. Losses have bitten equity and even though Biotie has raised new equity EUR 83.8 million between 2000 and 2006, equity has been reported negative in 2005 and 2006. The year 2004 was the beginning of shift toward more exploitative business. The company decided to take R&D projects no longer than the second stage clinical research, after which the projects would be sold out from the company. Biotie succeeded in negotiating provisional license agreements with several partners providing cash for the company. When the focus shifted more toward exploitation, Biotie dared to draw loans and as the Figure of capital structure illustrates, amount of debt begun to increase remarkably after 2004. Of course negative equity had to be covered somehow, and thus the debt financing was the only solution.

6 FINDINGS FROM CASE 3: OKMETIC OYJ

6.1 Case description and background of Okmetic

Okmetic Oyj is a Finnish-based technology company, established in 1985 on the basis of ten years knowledge from academic research. Okmetic has been one of those rapidly growing hi-tech companies, which benefited from the hi-tech hype by launching the IPO at the right time. Okmetic manufactures and sells high-quality silicon discs and silicon-based material solutions for semi-conductor and bulb industries. The basic strategy of the company has remained mostly the same during the observation period of this study.

Silicon is the most important strategic material for electronics industry because it is the main raw material of microcircuits. Microcircuit manufacturers produce circuits on the surface of a silicon chip and then sell ready chips forward. The strategy of Okmetic has been focusing on developing new products and technologies as well as securing quality-level of existing products that correspond requirements and needs of customers. Due to the nature of business, operational efficiency is a crucial part of success. Therefore, Okmetic has also concentrated on developing its business and manufacturing processes, thus trying to attain operational efficiency as well as new potential products. Co-operation with customers forms an important part of R&D. Following co-operative strategy gives the company opportunities to develop efficient manufacturing processes and secure right timing when launching new products into the market.

An essential part of strategy is to know what to sell and to whom. Okmetic has chosen its own field within the industry in which it focuses products and operations. The biggest market share in silicon disc industry is in discs, which diameter is between 200 and 300 millimeters. Okmetic, however, has concentrated on discs that represent minor share of the market, discs between 100 and 200 millimeters. The reason for this choice is simple. The biggest competitors do not develop their businesses in these segments, thus opening possibilities to gain benefits from niche segments. Okmetic has three core product ranges, which are customized silicon discs (ICprime), bulb discs (MEMS), and power semiconductor discs (POWER). In 2000, revenue shared between these products so that ICprime brought 53 %, MEMS 21 % and POWER 26 %. Until the year

2004, the company had changed its focus and left ICprime products as a less important product segment. In this year ICprime's share of revenue dropped down being only 34 % of net sales. In 2006, ICprime is not held anymore as an independent product category and strategy was focused toward MEMS and POWER products as well as the role of technology provider.

One strategic choice relates to market area. As demand of silicon products is more global than local, Okmetic has been forced to go international for achieving its growth goals. International operations form an important part of business, bringing some 96 % of net sales. The Figure has sustained at this level through the observation period 2000-2006. The main market areas are North America (brings over half of revenue), Europe (over 30 %) and Asia (less than 20 %). Table 6 has added to introduce Okmetic post-IPO performance.

	Revenue (€ 1.000)	Operating profit (€ 1.000)	Personnel
1999	45 844	1 218	444
2000	68 560	10 872	534
2001	57 305	-784	510
2002	57 737	-6 151	515
2003	50 117	-7 716	456
2004	54 524	-5 735	418
2005	49 821	580	338
2006	63 694	9 877	365

Table 6. Okmetic post-IPO performance

6.2 Nature of business

Nature of business in which Okmetic is engaged, is very cyclical. Demand of smaller silicon discs vary significantly due to variation of demand of products in which these discs are being used. However, derived demand and short-term orders are the two main factors that affect fluctuation in sales, which thus cause challenges for operation management. Cyclical market has been partially causing the change of strategy toward the product categories that has more stable demand as well as the role of technology supplier.

Controlling derived demand is, if not impossible, at least very challenging. For this reason Okmetic has systematically declined its ICprime business, which has suffered most from variation in customers' businesses. Sales of customized products declined most in 2001-2004 when the whole silicon industry suffered from recession. At the same time Okmetic's two other product categories sustained their demand-level, which even grew a bit.

Silicon chip manufacturing is a very competed industry, where big players operate with high volumes. As a result of "volume business", cost competition has long been as a competitive advantage, especially in mass production products as most of over 200 millimeter chips are. Ruthless cost competition has had impacts on firms' profits, and Okmetic is not an exception in this case. In addition to cost competition, rapid decrease in demand in 2001 has also had impacts on profitability.

6.3 Operations and development of business between years 2000 and 2006

The basic idea of the business has been small-size silicon chip manufacturing. As the domestic market for these kinds of products is extremely too small, international operations have played an important role in Okmetic's business. Nature of international business operations, however, is somewhat totally different compared with many other technology companies that are operating on the global market. Okmetic has the manufacturing units only in Finland and the US, the sales office subsidiary in Japan, and the subsidiary in Sweden, which is concentrated on R&D. Global demand is handled with the centralized sales organization.

There are a few strategically important moves that have affected Okmetic's business. Of course, the strategic choices that the company had made before going public formed the ground on which the company stands, but several changes have happened since. R&D expenses were used to be some 10% of net sales before the IPO, but when going public, the company dropped R&D expenses to remain some 5 % of net sales. However, focus of R&D had long been on long-term goals. In 2002, Okmetic decided to centralize R&D activities to serve short-term aims. This decision was executed in the next year, when the focus on ICprime product category was reduced

and POWER and MEMS products took places as the strategically most important categories. Three years later, ICprime product category was left outside while POWER and MEMS products were in the middle of the strategy and technology became as a new business line. ICprime products were customized for each customer, which caused two problems. First, time-horizon from order to supply was short, causing uncontrollable production planning. Second, customization required more resources and took more time than other products required. This business line was also the most competed business in which Okmetic was engaged.

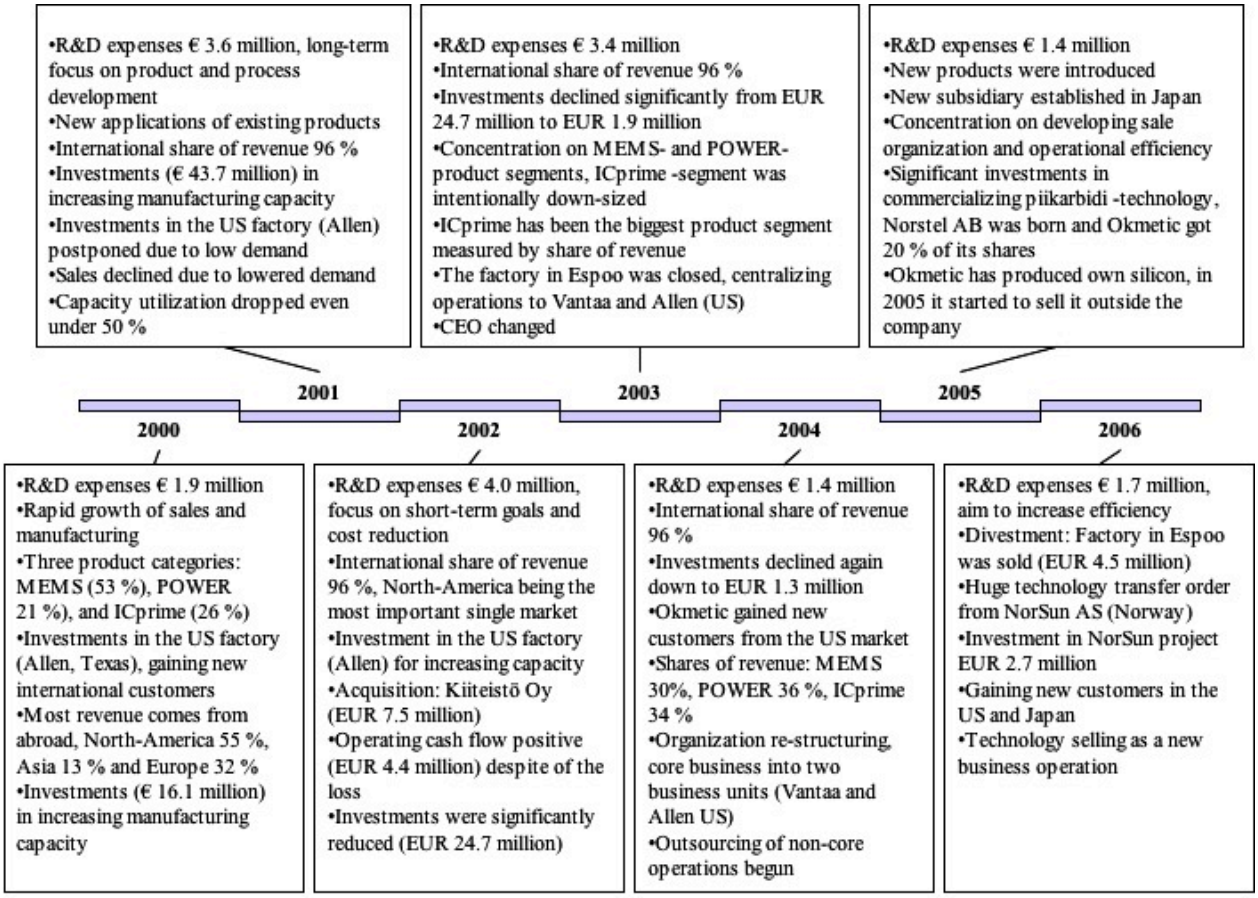

Figure 7. Okmetic strategy path 2000-2006

In 2004 and 2005, Okmetic's R&D expenses declined significantly compared with for example the year 2003. The main reason for this cumulates from the target of R&D operations. Okmetic concentrated on developing silicon carbide, and it succeeded to commercialize silicon carbide technology in the beginning of 2005. The focus of strategy changed, partially as a result of

opportunities of the new technology. Strong concentration on production efficiency also helped the company shifting toward the new role as a technology supplier, which makes the business more stable and predictable. At the same time, Okmetic decided to allocate resources on the fields of its core competences, outsourcing those operations that did not have strategic growth potential.

6.4 Financial development of Okmetic

Okmetic has been in good financial situation during the observation period, mostly as a result of massive external finance during the early years as a public company. Even though operations have generated losses in 2001-2004, operating cash flow has sustained positive in every year since the IPO. Positive operating cash flows have been used to capacity investments, which can be defined as business model exploration. Using incomes and short-term debt as a source of finance has been the major financing strategy the company has tried to execute.

Before launching the IPO, Okmetic raised equity and drawn loans in 1999, collecting thus more than EUR 12 million. The IPO, including the personnel issue and the private placement, provided the company new equity almost EUR 48 million. The good and stable financial situation gave the company an opportunity to start EUR 90 million investment program in 2000, which aimed at doubling the turnover within three years. The goal was not reached but the program was completed. Table 7 introduces financial development of Okmetic between years 1999 and 2006.

	Equity (€1.000)	Liabilities (€1.000)	External finance (€1.000)	Financial events (€1.000.000)
1999	36 139	53 803	12 488	PP (EUR 8.4), equity loan (EUR 2.9), long-term debt (EUR 0.4), short-term debt (EUR 0.8)
2000	87 284	38 158	47 851	IPO (EUR 47.9)
2001	94 384	139 073	9 039	PP (EUR 9.0)
2002	85 237	50 853	18 405	Long-term debt (EUR 2.4), short-term debt (EUR 16.0), acquisition (EUR 7.5)
2003	72 837	47 969	3 844	Short-term debt (EUR 3.0)
2004	32 708	56 552	3 000	Long-term debt (EUR 3.0)
2005	33 986	48 792	0	-
2006	40 080	39 500	10 000	Long-term debt (EUR 10.0)

Table 7. Okmetic financial development and events

6.5 Conclusions from Case 3

Looking from the strategic perspective, there are several factors that have been in central roles shaping the strategy. Without prioritizing these moves, the first factor is the shift from supplier of customized silicon chips toward supplier of technology and standardized silicon chips. Another important event was the capacity expansion in the early years as a public company. Third strategic issue has been the significant engagement in international operations, which is mostly due to smallness of domestic demand of silicon products.

Okmetic has also been an active player when looking from financial perspective. Before entering the Helsinki stock exchanges, the company raised equity (EUR 8.4 million) through the private placement in 1999. At the same time, Okmetic drew almost EUR 4 million loan. One year later, the IPO brought almost EUR 48 million new equity. The company intended to use IPO funding for capacity expansion and continuing the internationalization process. These were the two main reasons for raising new equity. Although the company had strong capital structure, it raised new equity EUR 9 million through private placement only a year after the IPO, ensuring thus adequate funding for the investment program. Between 2002 and 2006, Okmetic has drawn three times long-term debt, totaling approximately EUR 15 million. The company has trusted much on external financing even it has generated positive cash flow during the years 2002-2004 when it reported operating losses.

Before launching the IPO, Okmetic was a profitable company and sustained profitability in 2000. One year from the IPO, the company reported its first operation loss and decreased revenue, mostly due to decreased demand of silicon-based products. As noted earlier, Okmetic continued expanding its production capacity, which can be seen in firm's exploration ratio (see Figure 8). The ratio, however, did not declined relatively as much as it could have done, compared with increase of assets the company gained through financing activities between 1999 and 2001. In 2001 Okmetic raised new equity through the private placement in which US-Canadian based JDS Uniphase Corporation acquired new shares the Okmetic launched, worth EUR 9 million. Most of this money as well as IPO funding were used in capacity expansion investments. Investments in internationalization and capacity expansion between 2000 and 2002 totaled EUR 84.5 million. The company did not generate profit during 2001-2004, equity declined and capital structure

became more debt weighted. Okmetic drew long-term debts two times between these years, gaining thus new capital EUR 5.4 million.

Okmetic's exploration ratio, illustrated in the Figure 8, has remained at relatively low level during the observation period. In 2001, Okmetic invested almost EUR 44 million in its business model exploration, mostly in capacity expansion. Investments in capacity expansion continued during the next year, but declined significantly after 2001. When massive investments in the production and R&D declined, the exploration ratio begun to drop year by year, reaching its lowest level (0.05) in 2004 when Okmetic commercialized silicon carbide technology.

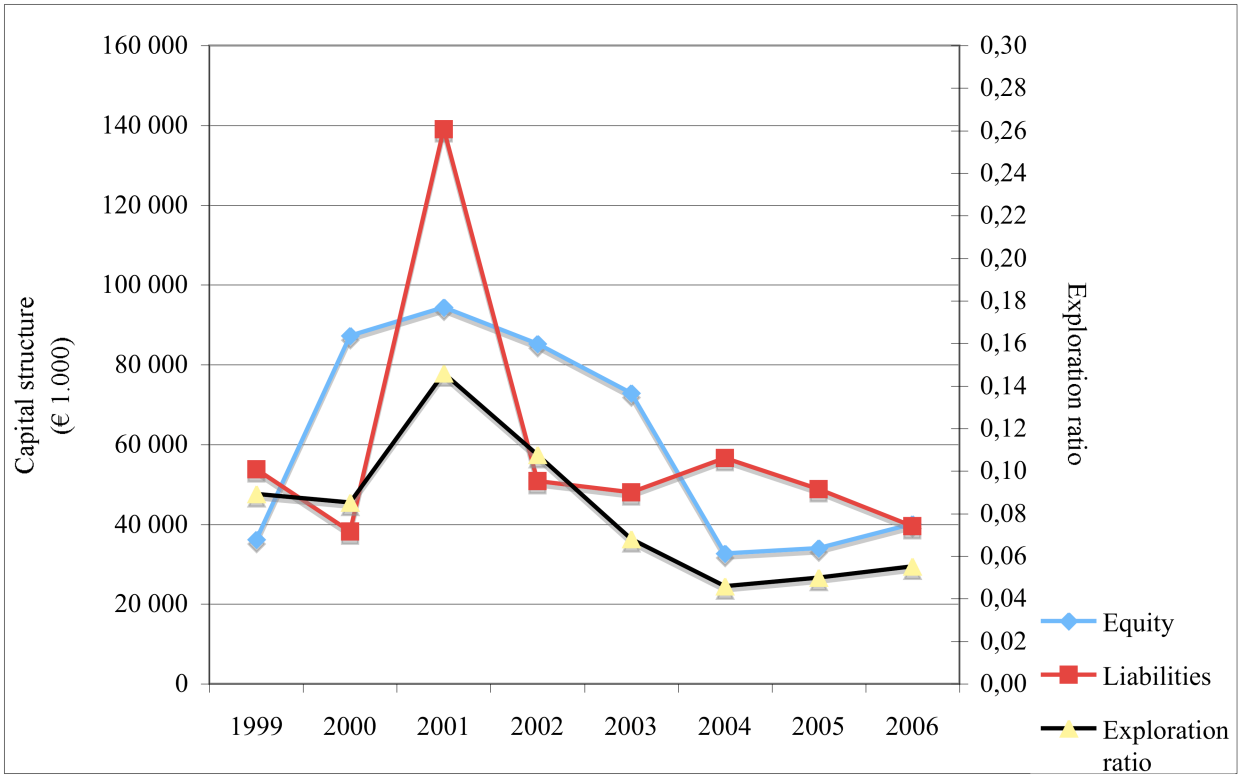

Figure 8. Okmetic exploration ratio and capital structure 2000-2006

Demand of silicon discs declined remarkably in 2001, causing decrease in revenue for the first time in firm's history. Competition within the industry has also been tough, thus increasing price competition. Although Okmetic had increased input in R&D activities, it was engaged itself in opportunistic business exploration by investing in production capacity, which prevented the

company to fully exploit outcomes of explorative activities on the product dimension. Therefore, it is reasonable to say that the real exploration level was much higher than the exploration ratio indicates. As Figure 8 illustrates, capital structure has changed significantly compared with for example the year 2000. After 2001 equity declined as a result of losses, and the most significant drop occurred in 2004, when the company sold Okmetic AB via management buy-out restructuring. The company centralized R&D operations and already in 2002 it focused R&D on short-term goals such as cost reduction. This focus sustained its importance and as the exploration ratio indicates, explorative costs were reduced year by year reaching the bottom in 2004. The company drew EUR 3 million long-term debt and also used own liquid assets to finance the commercialization of silicon carbide technology.

Explorative activities had created knowledge through organizational learning, thus making the company capable of transferring knowledge by supplying technological solutions for customers. This led Okmetic toward its new role as a technology supplier. Now the company is able to exploit not only products that it manufactures but also technologies that it has developed. Okmetic had engaged in strong product exploration before entering the stock exchange, thus developing the product base that it was aiming to exploit. Investments in R&D give a good example how the company had planned to operate after the IPO. Before launching the IPO, Okmetic had used at least some 10 % of revenue for R&D, while the same Figure after the listing has been recorded between 2 and 3 %. The goal was to exploit developed products and therefore the company had to engage in business model exploration when increasing production capacity. Expectations about development of demand of silicon discs fell but technology orders opened possibilities for Okmetic to fully exploit its competences that it had cumulated through the silicon manufacturing during the past years. The company had a good financial base to develop the business as a result of successful financing rounds. Although Okmetic reported operating losses during the four years, it generated positive operating cash flow in each year. Thus it had opportunities to use not only external financing and existing equity, but it was also able to invest money that it had generated from operations. However, due to this reason, Okmetic was also able to draw long-term debts.

7 FINDINGS FROM CASE 4: SSH COMMUNICATIONS SECURITY OYJ

7.1 Case description and background of SSH

SSH Communications Security Oyj is the Finnish-based (1995) company that offers Internet/internal data security services. In 1996 SSH begun to develop IPSec –technology, which became the ground of security services the company offers. The firm could be reasonably seen as an academic spin-off, which created technological background in the Helsinki University of Technology. Company aimed to expand quickly over international markets and it established its first subsidiary in California in 1998. In 1999 the company launched a private placement issue for institutional investors raising some EUR 13.5 million new equity.

Year 2000 was a busy time for SSH: it launched four new products to markets, established a new subsidiary in Japan, completed the personnel issue raising EUR 17.7 million new equity, negotiated a partnership agreement with RSA Security Inc, and launched the IPO raising EUR 24.2 million. Plans and aims of large-scale international growth required capital and due to hot IPO-market and "hi-tech hype", shares were easily sold in the IPO. Expectations were high and so was the stock price, thus providing adequate start-up funding for SSH. Expectations fell down and future did not appear as assumed. Table 8 sadly points out sadly how the business has gone after the initial public offering. No profit was promised in the IPO-prospectus, and no profits have ever been made since.

	Revenue (€ 1.000)	Operating profit (€ 1.000)	Personnel
1999	4 317	2 164	55
2000	15 624	-1 670	172
2001	19 851	-6 721	181
2002	16 801	-14 066	147
2003	13 851	5 191*	104
2004	8 230	-6 356	105
2005	9 297	-2 645	75
2006	9 456	-886	80

Table 8. SSH post-IPO performance

***** Includes EUR 10.5 million profit received from the sale of SSH's OEM business

7.2 Nature of business

The nature of business in which SSH operates can be divided into two separate parts. At the earlier stage, SSH was engaged in the Internet security business, which is very different by its nature compared with today's business of the company. SSH concentrates now on internal data transferring security, which keeps it partially outside of challenges that affect Internet security business environment.

IT-security business is somewhat very fast changing, no matter if it was related to the Internet or intranet data transfer. Quick changes in the operational environment require much explorative work from those parties who develop software products. Thus, this business field causes huge R&D costs for companies such as SSH. Strong investments are required to produce updated software, but it is not the only challenge. One essential character of this business is its business logic itself. Data transferring security solutions, especially Internet-based security systems, do not actually create real value or benefits for users. Those are made for preventing problems that would not exist if data processing could be done in another way or in closed secure network.

Turning into internal data transferring security SSH avoids those problems that appear in Internet security business. Internal data transferring security is a part of risk management in every company that is engaged in operations where data transfers are done. Knowledge intensive business is significantly based on data transferring, and thus securing this data is essential for many companies.

7.3 Business activities and operations between years 2000 and 2006

SSH has concentrated mostly on developing new software products that aim to make data transferring secure. The first vision, which SSH announced in 2000, was "making the Internet secure". This goal was one of those promises that were familiar during the hi-tech hype IPO-boom. However, R&D activities were centralized around this vision, and new products were developed quickly. For example in 2000, SSH launched four new products on the market gaining 64 % of revenue from license payments and the rest, 34 % from royalties. Although most of the

revenue was generated from license payments and royalties, SSH also operated as a technology supplier offering most of its products for customers that then delivered services to end-users.

SSH has done two major changes in their strategy during the post-IPO period, which have had impacts on the strategy path illustrated in Figure 9. SSH focused its strategy toward end-users in 2000, which can be seen as the first major strategic change. In 2002 the company announced that it would concentrate on serving customers such as financial institutions, large enterprises, and public authorities thus engaging in business model exploration. One year later SSH divested its OEM-business, which accelerated the shift from the technology supplier role back toward the role of software supplier for end-user organizations. This move caused decline in R&D expenses, which were reduced from over EUR 8 million in 2002 to some EUR 3 million since 2004.

After re-focusing the strategy and thus customer segments, the company stated the new strategy aiming to provide security processes for internal data transmission. In 2003, SSH launched a new software product called SSH Tectia. This was an important move toward implementing the new strategy, and in addition, this product became the first profitable product since the IPO. SSH had concentrated on maintaining its technology forerunner advantage and technological skills formed the base of competitive advantage. After changing the vision and thus strategy, business became more service oriented. Technology as a major competitive advantage was replaced by "24/7 technical support" and consulting providing the local license-related services for customers.

SSH has based its international operations and sales mostly on partnership agreements, having several international subsidiaries. Especially in 2006, the company announced that it would reduce importance of partnerships as a sale channel and replace them by establishing own subsidiaries. However, this change had not much affected business in the end of the year 2006.

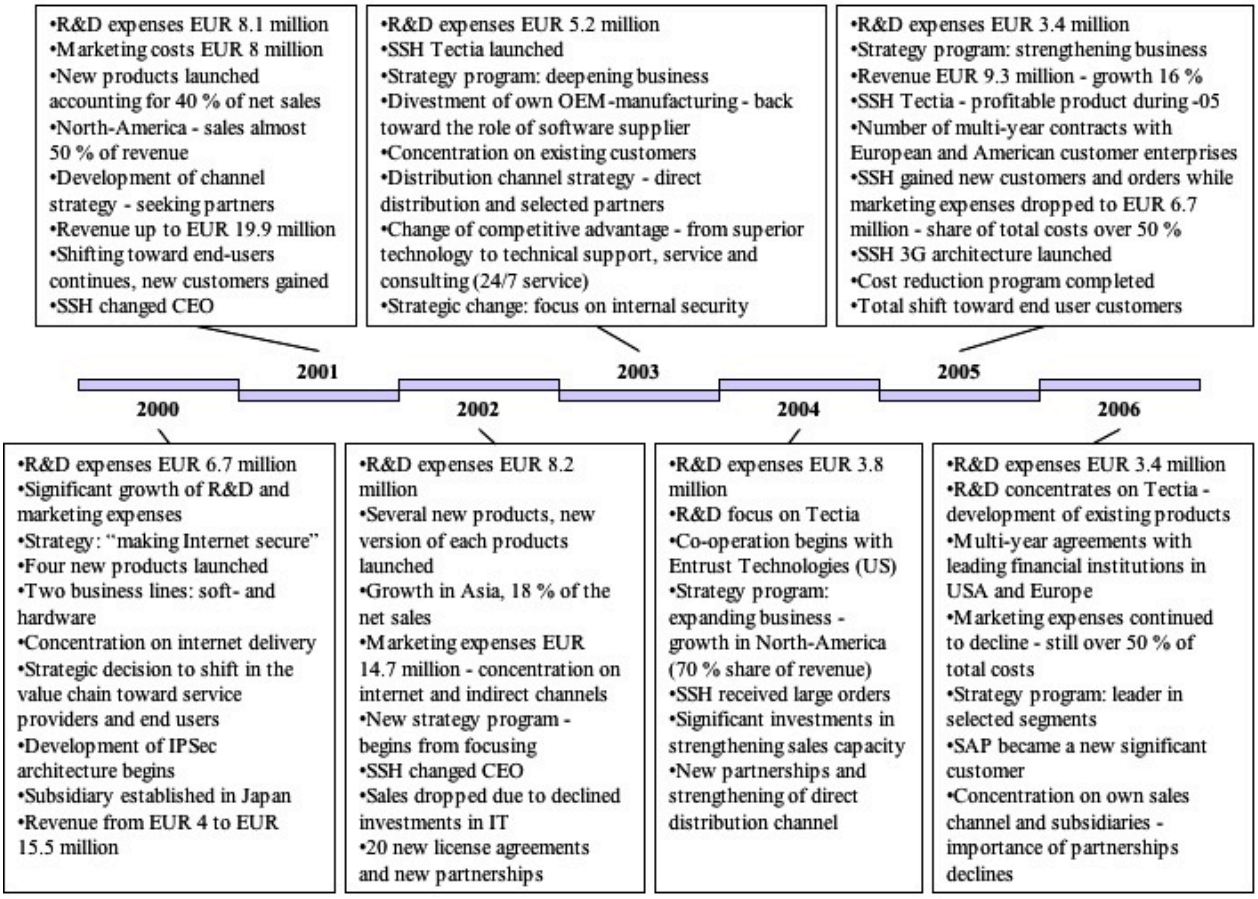

Figure 9. SSH strategy path 2000-2006

7.4 Financial development of SSH

Before launching the IPO, SSH had raised equity EUR 13.5 million in the previous year through private placement. Therefore, the capital structure of the company was very equity-weighted. Almost all assets were in form of cash or cash equivalents. Good liquidity and the strong equity base have been maintained after the IPO, which has given opportunities to implement its strategy even though cash flows have been strongly negative.

SSH timed the IPO in the middle of the boom, which made the company available to raise new equity over EUR 24 million. At the same time, SSH completed a personnel issue, which brought EUR 17.7 million new equity. The financing round totaled EUR 41.9 million, creating a good

ground for business. In the next year, SSH raised equity by launching a share issue, which brought EUR 23.4 million new equity. IPO funding and SEO in 2001 formed a massive capital structure with remarkable liquid assets (EUR 44.6 million) so that the company has not practically needed any external finance since.

	Equity (€1.000)	Liabilities (€1.000)	External finance (€1.000)	Financial events (€1.000.000)
1999	15 315	2 252	13 364	PP (EUR 13.5)
2000	54 252	5 058	41 900	IPO (EUR 24.2) and personnel issue (EUR 17.7)
2001	50 146	4 279	23 424	SEO (EUR 23.4)
2002	36 199	7 219	5	-
2003	41 141	2 707	5	-
2004	35 375	2 610	94	-
2005	25 442	3 296	30	Equity payback (EUR 8.15)
2006	17 961	3 453	53	Equity payback (EUR 7.1)

Table 9. SSH financial development and financial events

Assets counted in balance sheet after the IPO were approximately EUR 59.3 million whereas its balance indicated assets EUR 21.3 million after year 2006. Between these periods, SSH had returned EUR 15.2 million equity to shareholders. Total loss of equity during this period is thus counted EUR 22.8 million. The company has generated losses every year since the IPO, which has caused decrease of equity year by year. 2003 is the only year when operating profit has been positive, but this Figure consisted the sale profit of divested OEM business.

7.5 Conclusions from Case 4

SSH has two major changes in its strategy path – changing role from technology supplier back to software supplier, and changing mission and thus strategy from "making Internet secure" to "providing security processes for internal data transmissions". SSH has also an interesting background from the financial perspective. The company raised equity every year between 1999 and 2001, collecting equity over EUR 78 million for developing the business. The company had a few key reasons for raising new equity from capital market. First, it needed funding for creating international sales and distribution channel, which made possible to reach the intended goal of international growth. Second, and very important reason for these financing rounds was to secure

funding for increasing R&D expenses. SSH also announced that it needs equity for potential acquisitions in the future and strengthening capital structure as well as availability of working capital.

The company has engaged strongly in R&D by investing significant sums in developing new technologies and software products. Also business model exploration has been strong. During the past seven years period the company has changed its focus on three levels: customer segment, mission, and distribution channel. To give an overview of the company's exploration level and financial development, I illustrate SSH capital structure and exploration ratio year-by-year, which indicates that firm's explorative activities have been dominative and their funding has been equity-based.

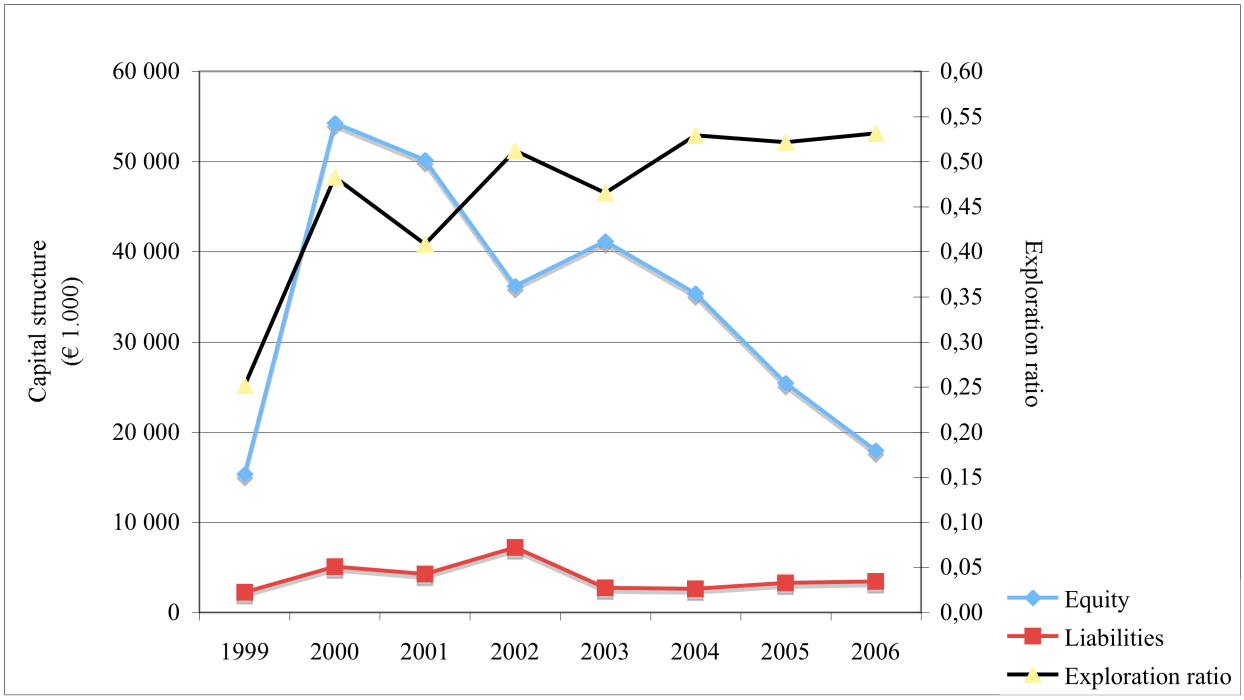

Figure 10. SSH exploration ratio and capital structure 2000-2006

Growth of exploration ratio, particularly between 1999 and 2001, can be seen for example in increase in R&D expenses and investments in business model exploration. At the same time SSH raised equity from some EUR 15 million up to EUR 55 million while having no significant debts. Significant increase in expenses in 2000 turned EUR 2 million operating profit (1999) to EUR 1.7 million loss. Decrease of equity was about to begin, even though SSH raised some EUR 23

million new equity in 2001. SSH continued capturing international market investing over EUR 10 million in sales and marketing, and concentrated on R&D activities increasing R&D expenses up to EUR 8 million. Equity has been increased only once after the IPO as a result of divesting the OEM business, which caused EUR 10.5 million profit.

Product and technology development has been in the central role in the firm's history. When changing target customer segment and mission, the company made strategic decisions that have affected not only business strategy but also R&D activities. Adequate equity funding has done it possible to formulate long-term strategy, implement is as intended, and finally change it, without worry about income financing. This can also be seen as a factor that has not forced the company aiming to make profits and generate positive cash flow. Changing the strategy has required re-structuring of distribution channel, causing thus expenses of business model exploration. These expenses were not declined until 2005, when SSH was able to fully concentrate on the new chosen customer segments and thus exploit its leading product, SSH Tectia.

An interesting observation based on the Figure 10 is that explorative activities significantly increased when the company raised new equity. According to this fact, it seems that SSH engaged more in explorative activities than it did before the IPO. However, SSH was able to gain positive financing cash flow due to massive liquid assets gained through the IPO and SEO, which provided the company extra source of finance. As the OEM business was divested in 2003, it did not only cause positive operating result but also significant decrease in material expenses, revealing thus working capital for other purposes. However, this divestment focused the strategy but had negative impact on revenue.

After the SSH Tectia was launched, the company has been able to increase revenue and decrease losses. Operations have not bound as much working capital as earlier, and the company has also been able to decrease R&D and marketing expenses. For these reasons, SSH does not need as much equity for funding the business as it has had and therefore, it completed equity paybacks in 2005 and 2006, returning over EUR 15 million to shareholders.

8 FINDINGS FROM CASE 5: TEKLA OYJ

8.1 Case description and background of Tekla

Tekla Oyj was established in 1966 and thus it is one of the oldest software companies in Finland. Today, Tekla is the international software company producing model-based software products and related services in building and construction as well as energy distribution industries. Ending up with these two fields of business, Tekla has come a long way through several businesses that have been divested or shut down.

The core business of Tekla has been constructed around model-based software products used in construction, energy and infrastructure planning as well as operation controlling. Model-based solutions are based on new technology platform, which is intended to bring effectiveness in engineering planning, whether it is related to construction, infrastructure or energy distribution. Tekla's strategy has remained relatively the same during the post-IPO period. Changes and variations can been seen in Table 10, which shows how concentration on different business lines have changed during this period.

	B&C*	**E&U***	**PI***	**Defense**	**Other**	**Revenue** (EUR million)
1999	34,8 %	26,1 %	10,7 %	14,1 %	14,3 %	18.09
2000	51,3 %	22,7 %	9,6 %	8,4 %	8,0 %	26.47
2001	46,0 %	33,1 %	10,4 %	7,0 %	3,5 %	39.2
2002	42,1 %	37,3 %	12,4 %	5,1 %	3,1 %	41.47
2003	42,4 %	33,0 %	13,4 %	5,0 %	6,2 %	39.81
2004	46,9 %	30,9 %	12,9 %	6,1 %	3,2 %	37.89
2005	66,4 %	16,6 %	11,1 %	5,9 %	0,0 %	37.95
2006	72,1 %	14,8 %	8,6 %	4,5 %	0,0 %	49.78

Table 10. Business lines and shares of revenue

* B&C = Building and construction, E&U = Energy and utilities, PI = Public infra

Tekla launched its IPO in May 2000, entering Helsinki Stock Exchanges and raising new equity to secure financing it needed. Post-IPO performance has varied much in terms of profit, but

losses and profits have gone systematically due to the independent strategic choices. Development of revenues, profit, and number of personnel are introduced in the Table 11.

	Revenue (€ 1.000)	Operating profit (€ 1.000)	Personnel
1999	*18 094*	*216*	*205*
2000	26 468	844	268
2001	39 199	2 505	382
2002	41 469	-3 498	456
2003	39 806	-9 453	428
2004	37 893	-1 474	368
2005	37 950	7 076	299
2006	49 782	13 773	324

Table 11. Tekla post-IPO performance

8.2 Nature of business

Tekla offers its products and services on the market, which has long been stable and continuously growing with only a few exceptions. The largest share of revenue during the past few years has been generated from construction industry. As noted, energy distribution forms another important business line for Tekla. In these industries, planning software solutions are not new innovations and customers have been used to use these software products, e.g. in construction planning. What makes Tekla different compared with other construction software providers is the technology platform. Tekla has brought the model-based software products on the market, making several functions available that are not available in software products using traditional technology. This feature, however, opens opportunities to integrate separate software functions together, which helps for example designing and controlling of buildings, and energy distribution networks.

8.3 Operations and development of business between years 2000 and 2006

Core strategy was divided into five sections in 2000 when the company listed. In a short form, the strategy was then mentioned to be as follow:

- Technological forerunner of model-based software products
- Growth and internationalization
- Market leadership on chosen business fields and geographical areas
- Development of business processes and operations
- Increasing knowledge of Tekla brand

Growth and internationalizations as well as market leadership goals were set according to premises that customer companies would turn to use model-based instead of document-based software. The underlying elements of the strategy have remained the same even though definitions of chosen customer segments have changed during the post-IPO period, thus re-directing strategy and business.

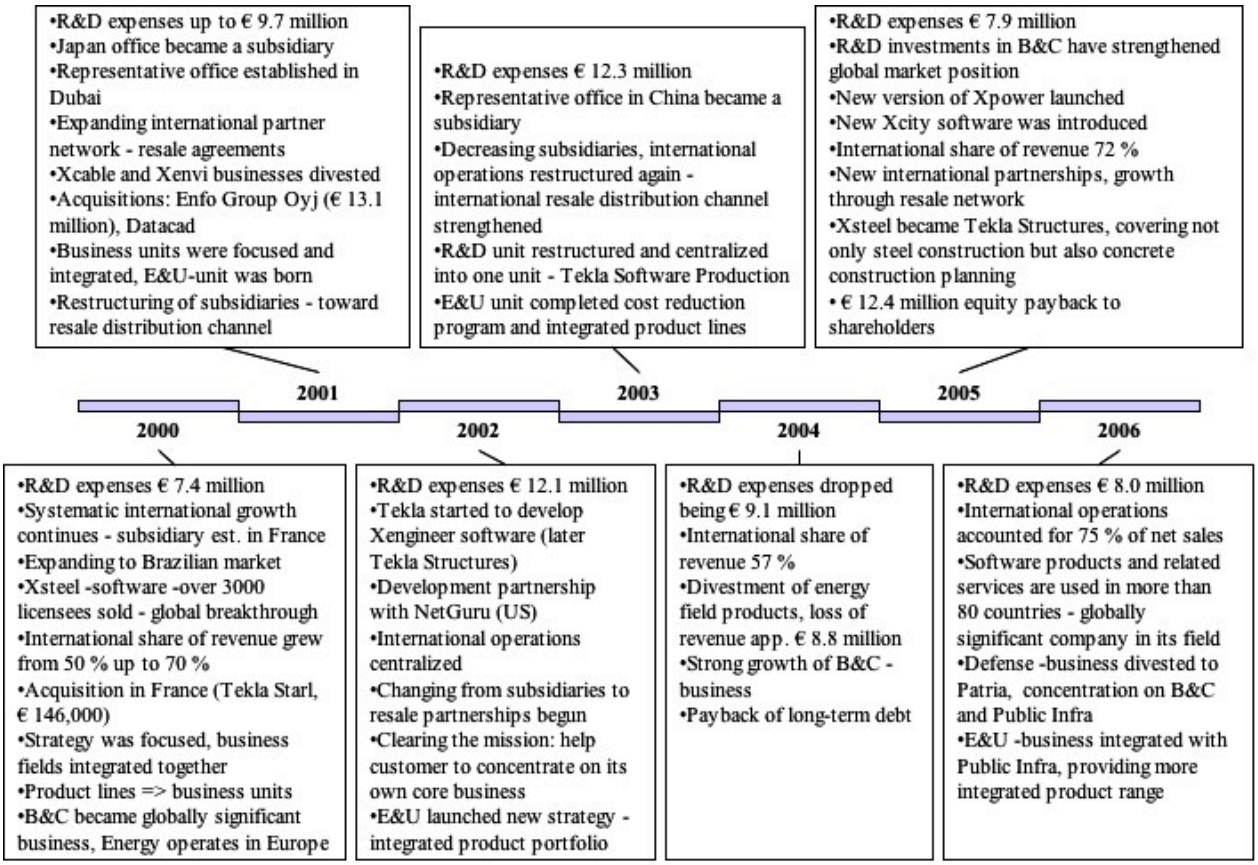

Figure 11. Tekla strategy path 2000-2006

Tekla decided to become international in the mid 1990s, when it founded its first subsidiary in Sweden, followed by subsidiaries in Malaysia (1998), the US (1999), the UK (1999) and Germany (1999). Internationalization has continued strongly during this decade and subsidiaries

were founded in France, Japan, China, India, and Dubai. Tekla has also created a worldwide partner network according to its strategy. Today, the company has own offices in 12 countries. Internationalization has been in the middle of strategy.

Looking at the strategy path of Tekla (Figure 11), it seems that the company has been centralizing resources on a few particular business operations and thus focusing toward the core business. Tekla has systematically dropped off and divested those product categories that have not had global growth potential. In the year of the IPO, the company had engaged in many separate business operations dividing resources almost equally between them. After this Tekla has centralized resources into the building and construction (B&C) branch as well as on the energy and utilities (E&U). Today, these two businesses forms over 85 % of revenue. Although the E&U branch has become the second important business, several changes have been executed within this field, thus focusing on the core business. For example in 2004 Tekla divested some of its energy field products, selling them to TietoEnator Oyj. This divestment was not a financial success causing a negative impact on the net profit. In this process Tekla also reduced over 100 employees and suffered from declining revenue.

In addition to focusing the business, Tekla has also systematically developed its service business. While divesting non-core products, the firm has concentrated on serving customers by providing product-related 24/7 -service for customers. Strategic choices related to international growth have focused on creating resale partnerships instead of establishing own subsidiaries in every country. Growth through the network binds less resources than subsidiaries do, and thus it makes business more flexible and requires less funding for fixed assets.

8.4 Financial development of Tekla

Tekla had relatively light capital structure and most of assets were financed with debt before the company launched the IPO in 2000. As the trend of the time was, also Tekla succeeded in raising new equity EUR 19.6 million. Opposite to many other companies that listed at the same time, Tekla did not raised equity through private placement and/or personnel issue before the IPO.

	Equity (€1.000)	Liabilities (€1.000)	External finance (€1.000)	Financial events (€1.000.000)
1999	2 753	7 063	747	-
2000	23 138	7 649	20 236	IPO (EUR 19.6),
2001	37 571	13 030	736	Acquisitions EUR 13.1 (EUR 0.7 in cash, EUR 12.4 by issuing new shares), long-term debt (EUR 0.74)
2002	33 539	9 564	344	Long-term debt (EUR 0.34)
2003	24 303	10 683	217	Long-term debt (EUR 0.22)
2004	23 443	8 747	46	Investment cash flow EUR 5.4 positive due to divestments
2005	17 210	11 375	0	EUR 12.4 equity payback to shareholders
2006	24 724	15 025	0	-

Table 12. Tekla financial development and events

As Table 12 points out, Tekla has not needed remarkable external finance since it raised equity in the IPO. The company organized the biggest single investment when merging Enfo Group Oyj, by issuing new shares and thus diluting ownership of existing owners. After this case, Tekla has not raised new equity and long-term debts the company has drawn totals below EUR 1.5 million. Instead of using long-term external financing the company has been an active user of short-term liabilities such as account payables. Income financing, however, has also been in the central role in financing business and product exploration.

8.5 Conclusions from Case 5

Tekla's strategic choices can be described as internationalization, focusing on the core businesses, and restructuring of distribution channel from subsidiaries to partnership network. Resources have been allocated especially on B&C and E&U, units that generated more than 85% of revenue in 2006. Tekla even focused its E&U business by divesting significant share of it in 2004, selling part of operations and products to TietoEnator Oyj. Tekla began its first international operations in the mid 1990s by establishing own subsidiaries. The strategy of having own subsidiaries was followed until 2002 when the executives decided to focus on resale partnerships instead of own subsidiaries. This combines two of the major strategic choices, going international and change of distribution channel strategy.

Before Tekla completed the IPO it was a part of Gerako Corporation, which owned 75 % of company's shares. In the IPO process, Tekla became an independent company being not a subsidiary anymore. The capital structure before the IPO indicated that the firm had over two times more liabilities (EUR 7.1 million) than equity (EUR 2.8 million). The company had three major reasons for the IPO. First, it needed capital for fast growth in domestic and foreign markets. Second reason was to provide adequate R&D funding, because of development of new software solutions has been in the centre of the firm's success. Third reason relates to the first one, but can be held as an independent issue: Tekla needed capital for potential acquisitions.

As the strategy path describes, Tekla has engaged in both, business model and product/technology exploration. Restructuring of the strategy and business lines has engaged the company in business model exploration. Tekla has been strongly concentrating on its core business, which has been seen through several divestments and one acquisition. Figure 12 illustrates how the capital structure and exploration ratio have developed between years 1999 and 2006. This figure points out how exploration ratio measured in terms of investments in separate activities has a) sustained at relatively low level, and b) has declining trend, which refers to concentration on exploitative activities on both dimensions.

Tekla succeeded in strengthening its capital structure through the IPO. Before this, the company had funded investments by using income financing, which was possible due to profitable business and positive cash flows. After raising significant amount of new equity the company had possibilities to develop the business model as well as engage more in R&D activities. The aim was to launch new products on each business lines, which increased R&D expenses immediately. Due to the aim of growth, Tekla acquired Enfo Group in 2001. The new share issue financed this transaction, and thus the company was able to avoid drawing debt.

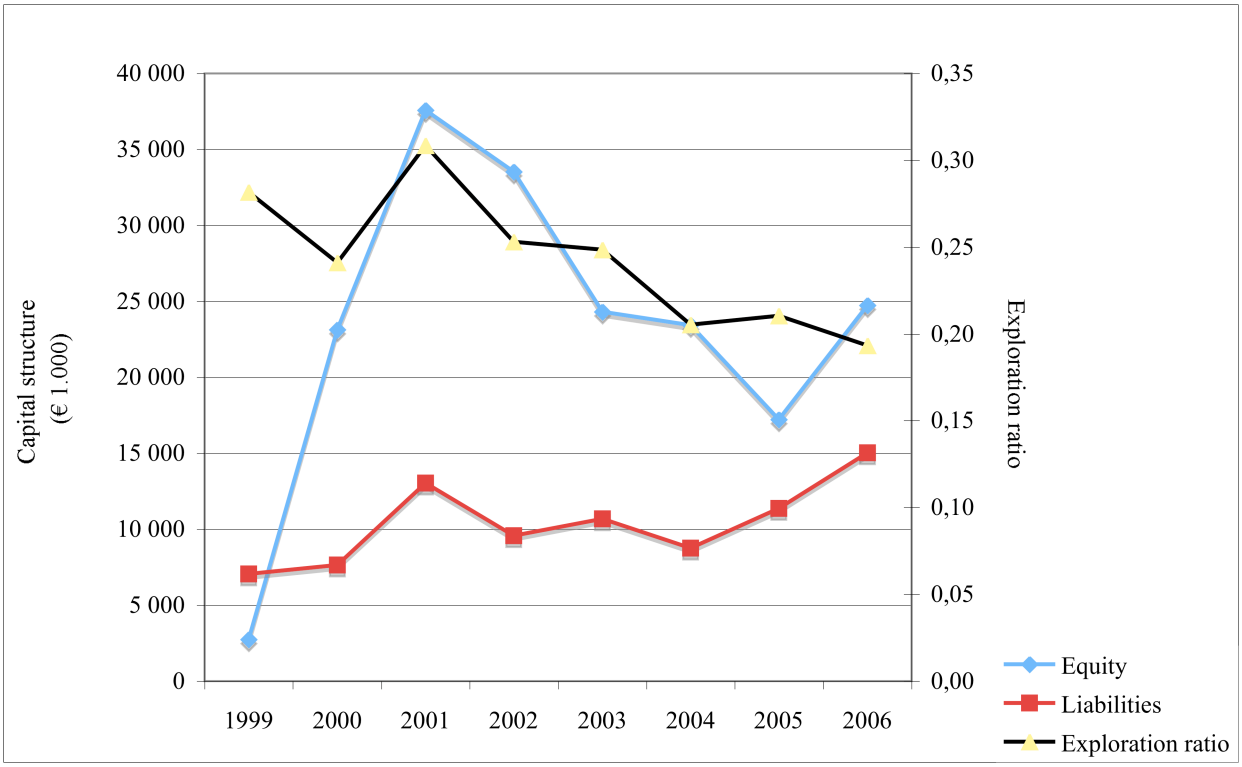

Figure 12. Tekla exploration ratio and capital structure 2000-2006

After 2001 the losses decreased equity, but good liquidity and adequate amount of capital provided opportunities to sustain the business model development. R&D expenses began to decline after 2003 and the focus was mostly on restructuring business lines so that all the products and product lines that did not have international growth potential were divested. As noted, R&D activities did not make the business during this time as explorative as the way of doing business. However, concentration on core business made the business turbulent during 2001-2004, but this exploration was very successful. During these years Tekla expanded its international operations and created resale network mostly through partnership agreements.

After the most significant restructurings were completed, Tekla had a clear strategy and it concentrated on B&C and E&U businesses. Construction business increased its importance as the biggest business line. Focusing the business affected profitability, and the company generated almost EUR 7.1 million operating profit in 2005. The restructuring of the business was not an only reason for the positive result. In 2003, Tekla began to develop the product called Tekla Xengineer, which later became Tekla Structures. This product is one of the most successful

outcomes of the R&D activities. Tekla has systematically sustained development of existing products by improving them and adding new valuable functions into them instead of developing totally new products each year. Tekla Structures was not an exception of this as it was developed on the basis of Tekla Xsteel. However, in 2003 the company decided to centralize R&D activities under one unit, which helped controlling the operations. This brought also more exploitative aspect into R&D operations.

Restructuring of the business was mostly completed not until 2005. In this year Tekla had its business running profitably and it has organized operations so that the need of capital declined. The company has had very good liquidity through all these years due to massive IPO funding. As a consequence of this, Tekla has been able to implement its strategy and make changes in it when needed. Mostly this flexibility is due to equity and income financing. The firm has not had significant long-term debts that could have affected decisions about the business. In addition, the company had clear plan about capturing domestic and international market with its existing products and products that it would have otherwise developed. Therefore, it needed capital for exploiting existing products not for developing new technologies or products.

9 EMERGENT THEORY AND PROPOSITIONS

In this chapter I discuss the findings from the cases introduced in the previous chapters by using cross-case comparison. Due to the analytical framework of the study, the cases are compared with each other by classifying activities into two functional dimensions that both contain explorative and exploitative activities. This classification is done based on the empirical findings. By doing this I can compare how explorative/exploitative activities and their combinations affect financing models and financial performance.

9.1 Dimensions of exploration/exploitation and financing models

Previous studies on the field of exploration and exploitation have not dealt with the issue how explorative/exploitative activities affect financing models that companies tend to use (e.g. Barton and Gordon 1988; Kochhar and Hitt 1998). Therefore, creating theoretical knowledge on this field requires theorization from the empirical findings. Dealing with financing models has several limitations that are relevant to notice here. Financial situation and performance, however, are both important determinants that affect financing decisions (e.g. Berger et al 1997). Particularly, operating cash flow has a significant impact when considering how to fund different activities. If a company has no or very little cash flow, it has any other option but finance its activities, whether explorative or exploitative, by using external funding, equity or debt (Maloney et al 1993).

Business model exploration

The findings from business model exploration provide evidences from similarity between strategic choices and financing solutions. Practically every case company has not engaged only in product/technology exploration, but also in business model exploration. I begin the case comparison and thus the theory creation by comparing findings from cases to explain how business model exploration affects firms' financing models. Typical activities on this dimension

represent operations and transactions such as acquisitions and other distribution channel structuring as well as changing focus of business and/or customer segments.

Acquisitions are one of the most significant single explorative business model operations that may change a business model remarkably at short notice (e.g. De Wit and Meyer 2004). The empirical findings point out that acquisitions have been completed to commit a strategic change or move. BasWare has completed three small size acquisitions and one bigger between years 2000 and 2006 for following reasons: to grow internationally, to change its distribution strategy, and to move toward service business. Due to a good financial position and positive cash flow, the company has been able to fund these transactions partially by existing equity, and mostly by issuing new shares. However, equity financing has played a central role in these operations. Also Tekla has done two acquisitions funding both of them by equity. The aim was to grow and re-structure the distribution channels, and reach a new customer segment. Both companies, BasWare and Tekla, announced in the listing prospectuses that IPO funding would be used to acquisitions. Any long-term debts have not been drawn to fund acquisitions. Therefore it is relevant to suggest that this form of business model exploration is likely to be funded by existing equity and issuing new shares.

Another important form of business model exploration is internationalization. The findings show that every company has strongly expanded international operations after launching their IPOs, except Okmetic, which generated over 90 % of its revenue from abroad before the IPO. Several companies such as Tekla, SSH, and BasWare began international expansion by first establishing own subsidiaries and then creating resale partnership network. Empirical data reveal that operating cash flows and/or equity financing have formed the source of finance in most of these operations. Particularly, IPO funding has covered most of the internationalization expenses in every company. There seems to be no case where significant amount of debt has been used into internationalization and/or distribution channel structuring investments.

Building on the findings, practically all operations that are defined as business model exploration and have required financial investments tend to be funded by using equity related financing solutions. Existing equity raised through IPOs has not only formed the significant source of

finance for many companies thus providing good liquidity level, but also an opportunity to raise new equity easier than private companies (cf. Pagano et al 1998). Therefore, companies have been able to use equity to fund explorative investments. The main findings dealing with business model exploration are summarized as follow:

Finding 1a

Business model exploration is likely to be financed by equity and operating cash flow. Raising new equity often funds the major single activities, e.g. acquisitions.

Findings 1b

IPO funding invested in business model exploration is more likely to predict positive operating cash flow and/or operating profits if a company has an existing exploitable product before the IPO.

Product/technology exploration

If business model exploration has been in important role among the case companies, it has, however, been as a minor factor in the most cases compared with the product/technology exploration. Emphasis on the product exploration usually aims at developing a new product or new version that could be successfully exploited. Each case company represents industries that are changing relatively fast and are technology oriented. These industry related factors have compelled the companies to invest heavily in product development. For example when launching the IPO Biotie had no exploitable product. As a result, its interest has been in developing products that once could be commercialized.

Every company announced in the IPO prospectus that one of the major reasons to raise equity is to ensure an adequate funding for the R&D activities. The need among the case companies for external financing depended on pre-IPO financial performance and the size of investments R&D projects required. Compared with the business model dimension, product/technology exploration forms a field where the need for investments vary significantly between companies. However, the

R&D projects required relatively massive funding in every case. Altogether, it seems that financing models between business model and product/technology exploration partially differs from each other.

The two case companies, Biotie and SSH, have never reported positive operating results since they entered the stock exchange. In spite of this, both have strongly engaged in numerous product development projects. As a result of investments in product development without adequate profit generating exploitation, cash flow financing has not formed an essential source of finance. SSH has generated revenue so that it has been partially able to fund its activities by operating cash flow. However, the existing equity has provided an important source of finance in addition to small cash flow funding. Biotie has not been able to avoid drawing debt. Thus it is a rare exception among the cases. Other three case companies have also engaged strongly in product development, but compared with Biotie and SSH, they have had existing exploitable products when launching the IPOs. For this reason, these companies have funded their R&D operations mainly by operating cash flow. Even Okmetic has been able to cover its R&D expenses by using cash flow financing, despite the company reported operating losses between 2001 and 2004. When Okmetic shifted partially from product manufacturing toward the role of technology supplier, it drew long-term debt for developing silicon carbide technology. Based on the empirical data, the main findings can be stated as follow:

Finding 2a

Product exploration is likely to be financed by operating cash flow if possible.

Finding 2b

If operating cash flow does not provide an adequate source of finance, companies tend to use existing equity for funding product exploration.

Finding 2c

Product exploration may also be financed by debt if a company has potential to exploit the product or technology immediately through its existing business model.

Product/technology and business model exploitation

Exploitative activities on both dimensions differ from explorative activities in terms of financing model, but they also have several similarities. The dimensions tend to have overlap in some situations and therefore, it is not realistically possible to separate these dimensions from each other in every single case or activity.

Product/technology exploitation, however, requires that a company has an exploitable product. Therefore, findings from the cases that classify exploitative activities are needed before analyzing the impacts of exploitation on financing models. Biotie is the only case company that has not been able to exploit any outcomes of its product development projects. The addiction disease drug may be the first product the company can fully exploit. Therefore the company has tried to create an exploitable business model. The R&D projects have been very costly and although equity has been raised many times since the IPO, the company has been forced to fund its operations by drawing debt. Massive debt raising, however, began around the same time when the first signs of possibilities to shift toward product exploitation appeared. This finding suggests that exploitation whether it is business model or product/technology related, could be funded, at least partially, by debt. Although the existing studies do not provide any direct evidences for this, there seems to be similarity between this finding and the findings of Kochhar and Hitt (1998) dealing with the capital structure solutions in diversification context. Findings from other cases also support this argument that although equity and cash flow financing are highly preferred, companies may use debt funding when financing product/technology and/or business model exploitation. This evidence may be misleading because the case companies have had a relatively large equity base due to IPO funding and other equity raisings.

Results could be different if companies with more debt weighted capital structures were also studied. However, cases are studied within the tight context and thus I go forward without considering more this limitation. For example, BasWare raised EUR 2 million long-term debt in 2003 for funding its increased working capital expenses. Okmetic drew EUR 3 million long-term debt in 2004 and EUR 10 million in 2006 to fund the commercialization of the new technology platform. This commercialization project contained not only technology exploitation costs but

also business model exploration, which were immediately turned into exploitation when the technology development was completed. SSH, however, has never raised equity or debt since it collected equity through the IPO. Exploitative activities have generated cash flow that has been invested mostly in existing exploration projects and partially in product and business model exploitation. In this case, the company's liquid assets and a strong equity base combined with some revenue have provided the adequate source of finance without need to raise new equity or draw any debt.

In sum, the comparison of the cases provide evidence that exploitative activities on both dimensions tend to be funded mostly by cash flow financing or by existing equity, but also debt funding represents more important source of finance than it does in explorative operations and transactions on any dimension. Thus building on these consideration the findings dealing with exploitation and financing models are stated as follow:

Finding 3a

Exploitative activities on BM and PT dimensions are mainly funded by cash flow. New equity is not likely to be raised to fund exploitative activities.

Finding 3b

Debt seems to form an important source of finance in cases when companies shift from product/technology exploration toward exploitative activities.

9.2 Exploration/exploitation and financial performance

This study mainly emphasizes to the exploration-exploitation and financing models, but as noted earlier, financial performance relates closely to financing models (e.g. Titman and Wessels 1988). Therefore, the financial performance related to explorative and exploitative activities on the functional dimensions is analyzed and discussed here. Exploring how the combinations of different activities relate to the firm-level financial performance develops the set of propositions.

Simultaneous exploration/exploitation and financial performance

Exploitative activity, whether it is product or business model related exploitation, seems to bind a company to the market when one dimension of the business is locked (cf. Smith and Tushman 2005). The reason for this can be found from the company's ability to focus only on one variable instead of two moving objects. As the Figure 13 illustrates, a company may choose which one of the dimensions "locks it in the market". For example, BasWare and Tekla have mostly concentrated on exploration only on one dimension while exploiting another. According to the findings, making the business more stable by engaging in exploitation on one dimension seems to have positive impacts on firm's performance measured in operating profits or cash flow.

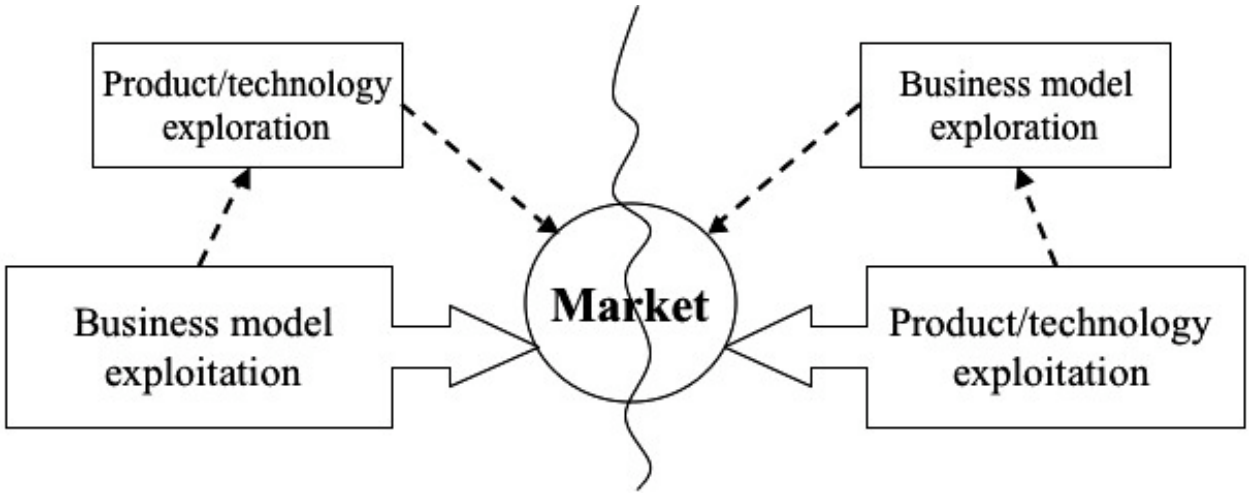

Figure 13. Weighting the balance between exploration and exploitation on functional dimensions

Exploiting one dimension does not provide profitability but it locks one part of the business so that the close touch with the existing market can be sustained while another dimension is shifted into exploration mode. This phenomenon can be seen in the several cases, for example when BasWare acquired Analyste Oyj in 2006. BasWare sustained exploiting its existing products while it renewed the business model. Okmetic, however, engaged in business model exploration in the beginning of 2000 by increasing its production capacity, but at the same time it exploited existing products. Tekla, for example, sustained its existing business model while it developed totally new product, Tekla Structures, which has then become a very successful product. Locking

one dimension in exploitation and exploring another dimension seems to make companies able to exploit the outputs of explorative activities sooner than they are able to do if a company engages in exploration on both dimensions. Findings from the cases indicate that choices between the balance of exploration and exploitation affect firms' financial performance. Therefore, building on the findings, the following propositions are stated:

Proposition 1a

A company is more likely to perform positively when it exploits one dimension while engaging in explorative activities on another dimension.

Proposition 1b

Companies that generate positive financial results are capable of changing the focus of exploration from business model exploration to exploitation when turning into product/technology exploration, and vice versa.

Simultaneous exploration and financial performance

Companies engage sometimes themselves in simultaneous exploration on both dimensions (Siggelkow and Rivkin 2006). Start-ups are understandably forced in some cases to explore on both dimensions due to lack of existing product and clear business model. However, listed companies are not stat-ups and therefore they have to have some kind of business model when entering the stock exchange. The entry stage business model, as the empirical findings indicate, is not very exploitative in every case. When launching the IPO, product/technology dimension, instead, may be in as early stage as it is in any start-up. Therefore one cannot always expect that a listing company has an existing exploitable product. As firms can explore as much as they have resources and ability to gain new resources needed in exploration, simultaneous exploration on both dimensions is possible. Therefore, it is reasonable to study impacts of simultaneous exploration on financial performance.

The empirical findings provide evidences that when a company is engaged in explorative activities on both dimensions, it seems to predict poor financial performance. The same kinds of results can also be found from existing studies (cf. Kyriakopoulos and Moorman 2004; He and Wong 2004). The findings from the cases indicate that the longer a company sustains simultaneous exploration the poorer the financial performance is likely to be. For example SSH has not been able to make profits since 1999, because its investments in R&D projects and business model renewal have caused significant expenses without bringing an opportunity to exploit products or business model effectively before exploring them again. Developing new products and product lines has required massive investments. However, change in the focus of business required again new investments in R&D, but forced the company to invest in distribution channel and marketing operations. Tekla has reported operating losses between 2002 and 2004. During this time the company engaged itself in explorative activities on the both dimensions by modifying the business model and developing new products to meet the goals that the new strategy required. Biotie, however, has never had any exploitative activities and thus it has used equity over 98 million without generating any operating profit. The cases provide evidence that companies are often forced to change business model after developing totally new product and vice versa. This seems to be a consequence as the new products are aimed to reach a new customer segment (cf. e.g. Biotie, Okmetic, and Tekla), which then requires restructuring of the existing business model, particularly creating or expanding distribution channels. Building on these findings, the last proposition is stated as follow:

Proposition 2

During the period when a company engages in simultaneous exploration on business model and product/technology dimensions, it is likely to perform poorly as long as at least one dimension is shifted exploitative.

10 DISCUSSION

This final chapter summarizes the study with discussion on its theoretical and managerial contributions. Also some proposals for future research avenues are discussed along with the limitations of the study.

10.1 Contribution to theory and practice

Exploration/exploitation studies have been mostly done from an organizational learning (e.g. March 1991) or a strategic management (e.g. Lohivesi 2000) viewpoint, but financial issues in this discussion have mostly been ignored (cf. Kochhar and Hitt 1998), although several strategy scholars have pointed out the importance of this kind of research (e.g. O'Brien 2003). The theoretical contribution of this study is to combine the exploration/exploitation and the financing model discussions, and thus bringing new knowledge into the field of strategy research. Creating the research framework for the thesis required a tool, which made the classification of explorative and exploitative activities possible. Forming the classified patterns of activities to be analyzed, I chose business model discussion (e.g. Zott and Amit 2007) as a base to create the framework. Therefore this study also contributes to the business model discussion.

The framework used in this study combines three separate theoretical discussions: exploration/exploitation, business models, and financing models. Exploration and exploitation research provides numerous studies that deal with strategic management issues that were needed in the thesis (Smith and Tushman 2005). Business model studies contribute to the exploration discussion and thus provide possibility to divide explorative and exploitative activities to the two functional dimensions. The business model dimension is based mostly on Zott and Amit (2007) research. Another dimension was adapted mainly from the research dealing with product strategies (Winter and Szulanski 2001). This integration with exploration/exploitation and business model discussions provides a possibility to compare not only dimensions and activities within them, but also finance related issues relating to the functional dimensions.

This study addresses some important topics that are relevant from the managerial viewpoint in terms of how managers may choose the sources of finance for different types strategic activities. Also the other side of this study, financial performance and influences of strategic activities on it may help managers to analyze businesses from a new perspective. First of all, this study has provided a theoretical simplification of a complex issue. Indeed, complexity and uncertainty are hard to manage and control and therefore keeping things simple gives a possibility to deal with complex and uncertain variables. Basically, there are four different combinations how companies can organize their business operations.

- Explore business model, exploit product/technology
- Explore product/technology, exploit business model
- Explore product/technology and business model simultaneously
- Exploit product/technology and business model simultaneously

Each of these combinations has different kind of impact on company's financing models and financial performance. Simultaneous exploitation on both dimensions is a fairly common case in many industries but among the case companies of this study it seemed to be a rare case. Exploitation on both dimensions typically leads to good financial performance but the risks of failure grow if a company cannot renew its strategy when circumstances change (e.g. Smith and Tushman 2005). Looking the combinations of activities in the eyes of a manager, there are several implications that are worth identifying. First I present financing model related implications by discussing how financing should be organized when shifting from one combination to another. Thereafter, implications of financial performance are discussed.

Implications on financing models

The case companies tended to be very equity oriented when choosing the source of finance, partially due to the significant IPO funding and other equity raisings. However, the benefits of debt financing were not used in many cases because the good liquidity levels offered possibilities to fund activities by existing equity. The findings of this study suggest that companies could use more debt into explorative activities and, accordingly, achieve higher return on equity. The major business model exploration operations such as acquisitions are reasonably funded by new equity offerings because they open new possibilities for investors to gain new sources of cash flow.

Exploitation on both dimensions seems to be mostly funded by equity. Especially product/technology exploitation, according to the findings, should be financed more by debt. Exploitation represents less risky activities on both dimensions and especially investments in product exploitation do not usually bound a company in long-term responsibilities. Business model exploitation may need investments in targets that cannot always be liquidated at the short notice, thus causing a risk to a company. The following list summarizes the financing model related implications providing suggestion how companies could organize their financing so that return on equity could be maximized without ignoring the risk factors of debt funding.

- Business model exploration: the major transactions that bound large amount of capital should be funded by new and/or existing equity to avoid too huge debt risks.
- Business model exploitation: activities that bound capital in non-mobilized investments should be funded by equity, but other less risky investments should be funded by debt.
- Product/technology exploration: the early stages of R&D processes are reasonable to finance by equity, but when the development projects go further and first signs of probable exploitation can be seen, debt funding should be increased to raise return on invested equity.
- Product/technology exploitation: activities that bound e.g. working capital relative short period should be funded more by equity. If exploitation requires some long-term investments that seem uncertain, existing equity could also be used.

Implications on financial performance

The latter half of the discussion within this chapter provide implications of exploration/exploitation on financial performance and also some suggestions how companies should organize their activities and shift from exploration to exploitation and vice versa. As noted earlier, there seems to be several conditions that predict financial performance of a company. The discussion whether a company should first explore its business model and then product/technology, or vice versa, depends on conditions and the context in which a company operates. In the cases used in this study, companies that engaged in business model exploration

after the IPO tended to be more profitable than those companies who explored the product/technology dimension. One understandable reason for this is that companies launching IPOs have some kind of history and thus the positive performers had developed exploitable products before going public. However, the basic question from a performance viewpoint is how to organize operations so that financial performance can be remained at good level. Based on this research, I suggest that the goal of making better financial result could be reached due to the following suggestions:

- When investing in business model exploration, exploit existing product/technology to achieve profitable performance
- When concentrating strongly on exploring products, exploit existing business model to achieve profitable performance
- If possible, avoid simultaneous exploration on both dimensions to achieve or sustain profitable performance

It is easily impugned that the company could always exploit one dimension while exploring another. Exploitation is not possible in every case, particularly when a company does not have an exploitable product. Therefore, several companies have to engage in product and business model exploration at the same time. However, it is worth paying attention to the fact that a company may be forced to explore both dimensions simultaneously, but then the question is how long it is useful to sustain exploration on the both dimensions. Looking for new business opportunities from year to year and investing continuously in different distribution channels does not seem to be profitable if the company is developing new products at the same time without being sure what the target customer segment is and what to sell them.

The need to explore business model and product/technology is often vital for companies in order to remain competitive. However, explorative activities need to be organized so that the classic objective of a company, profit making, would not be ignored. When a firm begins an explorative activity on one dimension, it should be able to lock another dimension to remain exploitative. Thus the firm can gain benefits and cash flow from exploitative activities while investing in uncertain operations. The ability to generate operating cash flow is somewhat important for a

company's financial situation. To have better return on equity, debt could be used more, and this is reasonable only if a company has adequate operating cash flows.

The Figure 14 illustrates how exploration and exploitation can be balanced in a situation, where exploring one dimension while exploiting another is possible. I suggest that a firm should first explore only one dimension whether it is business model or product/technology. After the chosen dimension is explored so that it can be shifted to be an exploitative activity, exploration on another dimension may begin. If a company has developed (an) exploitable product(s), it may be reasonable to explore business model first and then concentrate again on product/technology. Simultaneous exploration, however, is not suggested because the company may loss the touch with the market/customers by searching for new ones, and therefore, product development may miss the target. The basic problem in simultaneous exploration is how the company can develop right products for unknown customers or fit products into an uncertain distribution channel. This logic is presented in the Figure 14.

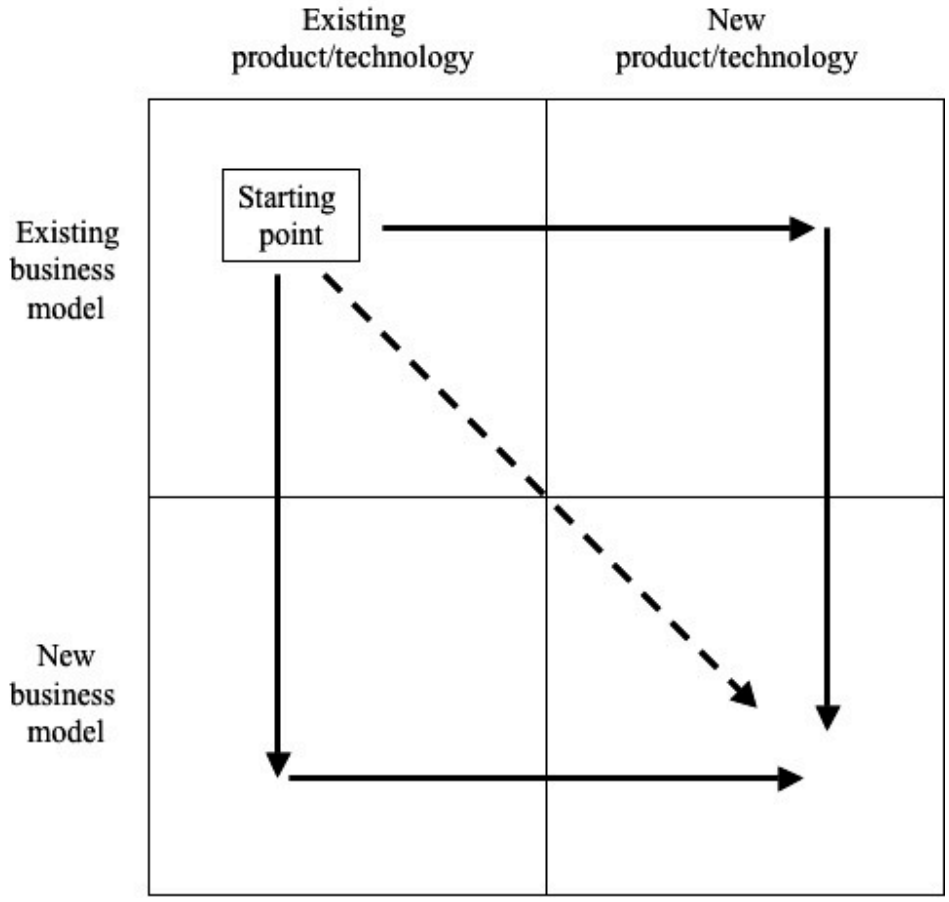

Figure 14. Organizing and finding balance between explorative and exploitative activities

10.2 Limitations of the study and directions for future research

The first empirical limitation is the use of public companies as the case material. This limits the study to one specific context, thus covering only listed companies. This limitation rises mainly from the company's ability to choose the source of finance. As noted, private companies are bounded to raise equity and debt only through private placements and private loans (cf. Subrahmanyam and Titman 1999). Therefore, public firms have much wider possibilities to raise equity not only by launching an IPO but also by issuing new shares. Debt funding is usually much easier to organize for public companies because they are able to conduct the public debt issue instead of using private loans. The source of finance and the ability to raise equity or debt may affect the firm's performance ability. Therefore, differences between public and private

firms need to be identified when discussing financing models and financial performance within the context of this research.

The second limitation consists of two issues related to exploration/exploitation. Dividing the business operations to two dimensions, and then dividing both of these dimensions to explorative and exploitative activities provide the basis to classify operations and activities into four categories. This makes the comparison between the cases and the integration of classified activities with financial issues possible. The classification and the divide to the dimensions are, however, somewhat artificial although it has reasonable theoretical contribution. The problem of this limitation rises from the question how exact the divide between exploration and exploitation has to be and how one operation can be defined as a business model and another as a product/technology related operations. Further research could specify more clearly how exploration and exploitation could be defined in quantitative terms. I tried to quantify an exploration ratio in this study to describe general development of explorative activities by using investments as an indicator (see Appendix 2). Counting exploration ratio, however, requires a more specific study and therefore it forms one possible research field to take further.

The third limitation deals with the problem of homogeneity of the cases and industries in question. Every case company operates in an industry, which is changing very fast. The case companies have launched their IPOs within the same year, which, on the one hand, makes them comparable but on the other hand, isolate them from other companies. Thus the comparison between other companies may be relatively difficult. Year 2000 was a peak year of hi-tech hype in Finland, and therefore these firms were able to raise equity easier than other companies before or after this time. This reason may have affected particularly the financing models and decisions among the case companies. Equity ratios of the case companies are relatively high compared with the average Finnish listed companies. Eliminating this problem can be done in further studies by using the framework created in this study and thus, using more case companies as sources of data. Quantitative studies can also provide valuable knowledge by testing the propositions using a larger database.

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APPENDICES

Appendix 1 Exploration ratios

Activity-based exploration ratio = $r_t \div c_t$ (1)

in which,

r_t = Explorative costs during the period *t*, and
c_t = Total costs during the period *t*

Assets-based exploration ratio = $r_t \div a_t$ (2)

in which,

r_t = Explorative costs during the period *t*
a_t = Total assets during the period *t*

Weighted exploration ratio = $[\ (r_t \div c_t) + (r_t \div a_t)\ ] \div 2$ (3)

in which,

r_t = Explorative costs during the period *t*
c_t = Total costs during the period *t*
a_t = Total assets during the period *t*

Activity-based exploration ratio

$$\boldsymbol{r_t} = (d_t * d_{\%}) + (p_t * p_{\%}) + (i_t * i_{\%}) + (o_t * o_{\%})$$
$$\boldsymbol{c_t} = d_t + p_t + i_t + o_t$$

d_t = R&D costs during period *t*
$d_{\%}$ = R&D exploration index (estimated value) in period *t*
p_t = Personnel and administration costs during period *t*
$p_{\%}$ = Personnel exploration index (estimated value) in period *t*
i_t = Investments during period *t*
$i_{\%}$ = Investment exploration index (estimated value) in period *t*
o_t = Other costs (operating and finance costs) during period *t*
$o_{\%}$ = Exploration index (estimated value) of other costs generated in period *t*

Assets-based exploration ratio

$$\boldsymbol{a_t} = b_t + e_t + t_t + n_t$$

b_t = Assets in the beginning of period t
e_t = External financing during period t
t_t = Revenue generated during period t
n_t = Other income and non-operating income during period t

Appendix 2. Statistics behind the exploration ratios

BasWare

	R&D	Personnel & administration	Investment	Other costs	Materials	Financing costs
1999	*893*	1 819	390	920	116	0
2000	*1 709*	3 447	1 182	2 102	244	0
2001	*2 270*	6 938	1 138	4 108	464	0
2002	*3 384*	10 953	2 163	6 303	1 019	0
2003	*4 113*	14 322	382	6 969	2 414	103
2004	*4 604*	16 478	1 660	8 225	2 391	137
2005	*6 204*	22 569	3 283	11 296	3 172	0
2006	*10 925*	32 953	6 681	14 474	2 593	99

	Balance	Revenue	External financing	Other income
1999	2 105	4 536	59	130
2000	2 947	7 455	8414	404
2001	12 036	12 399	6	283
2002	12 143	20 263	0	197
2003	13 392	25 597	2 000	212
2004	16 003	32 640	305	89
2005	20 779	42 810	9 056	96
2006	33 912	59 954	855	485

	Explorative costs	Total costs	Assets useable
1999	1 305	3 245	6 830
2000	2 683	6 975	19 220
2001	3 435	12 648	24 724
2002	5 455	20 438	32 603
2003	5 436	24 190	41 201
2004	7 081	28 891	49 037
2005	9 943	40 320	72 741
2006	16 842	56 800	95 206

	Asset-based exp. ratio	Activity-based exp. ratio	Weighted exp. ratio
1999	0,19	0,40	0,30
2000	0,14	0,38	0,26
2001	0,14	0,27	0,21
2002	0,17	0,27	0,22
2003	0,13	0,22	0,18
2004	0,14	0,25	0,19
2005	0,14	0,25	0,19
2006	0,18	0,30	0,24

Biotie

	R&D	Personnel & administration	Investment	Other costs	Material costs	Financing costs
1999	4 190	104	765	0	0	56
2000	6 961	162	1 065	691	0	464
2001	6 333	974	900	175	0	0
2002	21 541	3 197	1 100	2 306	0	0
2003	11 888	3 082	57	734	0	0
2004	9 244	2 951	142	0	0	0
2005	7 149	2 371	9	0	0	722
2006	7 970	2 207	800	0	0	812

	Balance	Revenue	External financing	Other income
1999	*4 800*	0	726	387
2000	6 969	2	18 764	946
2001	18 859	173	13 008	950
2002	7 934	153	18 645	1164
2003	13 520	2 243	13 788	1 722
2004	14 030	4 457	2 719	1 467
2005	9 686	1 227	7 833	1073
2006	8 930	1 118	19 856	913

	Explorative costs	Total costs	Assets useable
1999	4 611	5 115	5 913
2000	7 547	9 343	26 681
2001	7 003	8 382	32 990
2002	22 324	28 144	27 896
2003	11 919	15 761	31 273
2004	9 322	12 337	22 673
2005	7 154	10 251	19 819
2006	8 410	11 789	30 817

	Asset-based exp. ratio	Activity-based exp. ratio	Weighted exp. ratio
1999	0,78	0,90	0,84
2000	0,28	0,81	0,55
2001	0,21	0,84	0,52
2002	0,80	0,79	0,80
2003	0,38	0,76	0,57
2004	0,41	0,76	0,58
2005	0,36	0,70	0,53
2006	0,27	0,71	0,49

Okmetic

	R&D	Personnel & administration	Investment	Other costs	Material costs	Financing costs
1999	1 090	4 366	15 894	2 257	36 931	3 471
2000	1 891	4 987	16 257	3 106	47 708	3 428
2001	3 610	4 943	43 748	3 548	49 777	1 279
2002	4 042	4 334	24 742	2 719	59 519	1 969
2003	3 358	3 692	1 880	2 442	51 743	1 607
2004	1 363	4 368	1 335	6 475	49 632	2 556
2005	1 445	3 691	660	3 195	43 906	2 141
2006	1 700	4 303	1 203	3 087	48 165	3 458

	Balance	Revenue	External finance	Other income
1999	82 955	45 855	12 488	18
2000	97 174	68 560	47 851	5
2001	125 442	57 305	9 039	181
2002	139 072	57 737	18 405	2 684
2003	136 090	50 117	3 844	26
2004	120 806	54 524	3 000	217
2005	89 261	49 821	0	1 552
2006	82 779	63 694	10 000	1 999

	Explorative costs	Total costs	Assets useable
1999	7 957	64 009	14 1316
2000	9 672	77 377	213 590
2001	19 802	103 295	191 967
2002	14 063	93 283	217 898
2003	6 323	61 364	190 077
2004	4 321	64 366	175 179
2005	3 874	53 593	140 634
2006	4 830	60 216	158 472

	Asset-based exp. ratio	Activity-based exp. ratio	Weighted exp. ratio
1999	0,06	0,12	0,09
2000	0,05	0,12	0,09
2001	0,10	0,19	0,15
2002	0,06	0,15	0,11
2003	0,03	0,10	0,07
2004	0,02	0,07	0,05
2005	0,03	0,07	0,05
2006	0,03	0,08	0,06

SSH

	R&D	Personnel & administration	Investments	Other costs	Material costs	Financing costs
1999	1 200	1 600	52	1 600	3 400	56
2000	6 707	2 572	2 436	6 926	1 760	0
2001	8 070	5 017	1 621	10 027	4 632	435
2002	8 232	4 260	436	14 686	4 587	0
2003	5 178	2 616	1 080	9 582	2 506	808
2004	3 823	2 398	351	8 509	149	0
2005	3 424	1 936	137	6 738	85	0
2006	3 357	1 622	116	5 665	55	89

	Balance	Revenue	Exteernal finance	Other income
1999	1 186	4 317	13 364	548
2000	3 204	15 624	41 900	2 767
2001	57 200	19 851	23 424	4 210
2002	57 364	16 801	5	1 767
2003	41 980	13 851	5	12 488
2004	43 941	8 230	94	835
2005	37 986	9 297	30	871
2006	29 068	9 456	53	1139

	Explorative costs	Total costs	Assets useable
1999	2 829	7 908	19 415
2000	14 973	20 401	63 495
2001	18 989	29 802	104 685
2002	23 158	32 201	75 937
2003	15 354	21 770	68 324
2004	12 525	15 230	53 100
2005	10 237	12 320	48 184
2006	9 086	10 904	39 716

	Asset-based exp. ratio	Activity-based exp. ratio	Weighted exp. ratio
1999	0,15	0,36	0,25
2000	0,24	0,73	0,48
2001	0,18	0,64	0,41
2002	0,30	0,72	0,51
2003	0,22	0,71	0,47
2004	0,24	0,82	0,53
2005	0,21	0,83	0,52
2006	0,23	0,83	0,53

Tekla

	R&D	Personnel & administration	Investment	Other costs	Material costs	Financing costs
1999	*5 790*	9 812	1 228	6 124	2 022	0
2000	*7 410*	14 060	1 423	9 028	2 806	0
2001	*9 690*	20 824	14 310	12 450	3 961	0
2002	*12 080*	24 966	5 569	14 230	4 142	0
2003	*12 280*	23 394	1337	14 444	3 849	0
2004	*9 140*	21 457	842	14 752	2 434	125
2005	*7 860*	19 811	1 004	9 307	1 627	470
2006	*7 980*	22 904	1 325	11 114	2 008	906

	Balance	Revenue	External finance	Other income
1999	11 069	18 094	747	4490
2000	9 816	26 468	20236	1944
2001	30 790	39 199	736	3000
2002	50 615	41 469	344	1271
2003	43 113	39 806	217	640
2004	35 707	37 893	46	1145
2005	32 911	37 950	0	1641
2006	28 585	49 782	0	2089

	Explorative costs	Total costs	Assets useable
1999	6 954	19 186	34 400
2000	8 987	27 317	58 464
2001	18 736	51 545	73 725
2002	16 263	48 907	93 699
2003	14 130	43 024	83 776
2004	10 626	39 610	74 791
2005	9 479	32 219	72 502
2006	10 044	38 257	80 456

	Asset-based exp. ratio	Activity-based exp. ratio	Weighted exp. ratio
1999	0,20	0,36	0,28
2000	0,15	0,33	0,24
2001	0,25	0,36	0,31
2002	0,17	0,33	0,25
2003	0,17	0,33	0,25
2004	0,14	0,27	0,21
2005	0,13	0,29	0,21
2006	0,12	0,26	0,19