

School of Management

Indirect and direct business models and their effect on performance in IT companies

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Author: Kristoffer Sthen

kristoffer@sthen.se

Supervisor: Ossi Pesämaa, PhD

ossi.pesamaa@bth.se

Abstract

This thesis studies financial performance data for Swedish publically traded information technology companies over five years beginning 2008 to 2012. This thesis examines performance for two types of business models: so called direct business models and indirect business models. The performance data is used to determine if there are any differences in financial performance. The analysis shows that companies using direct business models have a significantly lower financial performance than companies using indirect business models. Furthermore, the analysis shows that the difference can be explained by the type of right sold. Selling asset ownership rights or selling matching rights have a significant negative impact on performance while selling usage rights have a positive impact on performance. This thesis offers support to the notion that more and more information technology companies adopt indirect business models.

Keywords: Business Model, Financial Performance, Information Technology Industry.

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Blekinge Institute of Technology

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Kristoffer Sthen

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1 Introduction

Strategy and business models are closely linked. Where strategy explains how to beat the competition, the business model explains who the customers are and how the company is making money by providing the customers with value (Magretta, 2002). Furthermore, strategy conceptually involves direction and how choices are made (Day and Nedungadi, 1994). Business models capture both direction and comprehend the major choices. Yet, business models are not static but dynamic (McGrath 2010). New business models can drive spectacular growth and may even completely reshape an industry (Johnson, Christensen and Kagemann, 2008). The application of information technology provides new opportunities for creating value by: lowering transaction costs, offering complementarities, increasing customization, and by reducing information asymmetry (Amit and Zott, 2001). As the cost for transistors is declining according to Moor's law, information technology enables more and more sophisticated business models.

In direct business models, revenue is commonly generated by selling direct physical assets for upfront payments. In the transaction, the ownership rights are transferred from the seller to the buyer. Through the application of disruptive information technology (Bower and Christensen, 1995), information technology companies are introducing highly sophisticated novel business models by lowering the marginal cost, enabling the targeting of larger segments of customers, and by increasing asset turnover. In these models companies are moving from selling physical assets to intangible assets, financial assets and services. Instead of transferring the ownership rights from the seller to the buyer, companies are trading the right to use the assets or generating revenue through indirect matching rights.

While direct business models are easy to comprehend indirect models are more difficult. One reason for this is that the cost and revenue models are difficult to match and thus their effects hard to predict. Yet, such indirect models have grown in popularity amongst companies operating in the information technology sector. The practice of indirect models is however not new. Many companies operate with the principle to draw traffic to their business. This could for instance be accomplished by selling the main product at low margin in anticipation of boosting indirect spending in other areas. The method is conceptually referred to as the razors and razor blades model or bait and hook model (Johnson, Christensen and Kagemann, 2008, Osterwalder and Pigneur, 2010).

One example of this business model pattern is a car distributor that sells cars at low margins in order to create traffic to the aftersales area where maintenance services, and parts are sold at high margins. Another example of the importance of creating traffic is the Swedish H&M Company. H&M sells designer clothes in attractive central areas to generate traffic. H&M's is focusing on high asset turnover. If clothes are not sold within a given time on the hanger, clothes are removed from the stores or sold at a discount. The idea is thus traffic. With high traffic it is possible to generate more revenues on indirect spending. This

opportunity may however still be overlooked by H&M and many other companies making the area interesting to study.

Malone et al (2006) have studied business model performance and its relation to the type of rights and the types of assets sold. Mahadevan (2000) have studied business models for Internet based E-commerce and Amit and Zott (2001) have studied value creation in E-business. Information technology companies have difficulties to generate revenue since the targeted customer segments are accustomed to receiving products and services for free. Therefore, to generate revenue, there is a constant need for new business models that utilize indirect customer behavior or mediate customer to direct products (Teece 2010). Since many small firms suffer from unclear models to generate revenues, there is a need for more accurate knowledge of models that capture indirect revenue.

Web of Science by Thomson Reuters™ returns 503 search results for the term: “Business Model” Performance. The most cited article was only cited 182 times. The most relevant article, according to the search engine, (Aziz and Rosli 2011) was cited 0 times and examines small and medium manufacturing companies in Malaysia. Business models and performance is apparently not a well-charted academic territory. As little is known about the effects of direct and indirect business models, there is also a need for describing how good these models are at generating financial results. No study has been identified that specifically evaluates the performance dimension of direct business models and indirect business models in the information technology industry. Hence, this thesis asks the following research question:

Are there any differences in terms of financial performance for information technology companies using direct business models and indirect business models and how can differences be explained?

1.1 Research objectives

This thesis studies financial performance data for Swedish publically traded information technology companies over five years beginning 2008 to 2012. To identify differences, five years of financial performance data is evaluated. Financial performance reflects how well the companies are able to deliver return to its owners. Without positive returns over time, the companies will not be able to deliver performance in other dimensions such as employee satisfaction or contribution to society.

Besides identifying differences in performance between direct business models and indirect models, the objective of the thesis is to explain why the differences occur. The study tries to shed some light on the business models in use by describing and decomposing the models using the asset / type right framework inspired by Malone et al (2006) and modeling performance to evaluate what factors have significant impact on performance. The findings of this study could be used to help start-up companies or traditional companies that consider changing business models.

1.2 Process and delimitations

The research process used in this thesis builds on the research process outlined by Krishnaswami and Satyaprasad (2010). The steps are:

1. Identifying research problem and question
2. Exploration and gathering of a theoretical frame of reference in order to develop research hypothesis
3. Development of the research design and measurement system
4. Collecting and summarizing data
5. Data analysis
6. Conclusions

The study looks at business models in isolation and not at the underlying strategy that resulted in selecting the business models. The thesis is based on secondary data provided by the selected companies. The thesis is by design delimited to studying publically traded companies because of the readily available secondary data concerning performance and configuration.

The study looks mainly at small companies. The reason for this delimitation is that smaller companies are more likely to have only one business model in use than large multinational companies with additional levels of complexity. For a large company utilizing many business models, it would be difficult to determine what part of the company performance that can be credited to each business model without being able to observe management accounts. Since the thesis evaluates business models against performance measures, the companies studied would have to adhere to the same accounting standards for the performance measures to be comparable. In order to handle these constraints, the study is, by design, delimited to companies classified as information technology companies and traded at the Swedish NASDAQ OMX and First North, medium and small cap lists.

1.3 Structure of thesis

The thesis consists of five chapters. The first chapter, Introduction, gives the reader an introduction to the thesis and orients the reader to the concept of business models and their relation to strategy. The chapter further defines the research question, research objective, research process and delimitations and finally the part you are currently reading, thesis structure.

The theory chapter summarizes the results of the literature review and gives the reader a general introduction to the topic including: defining what a business model is, how it can be used and how it relates to strategy. The chapter continues with exploring, different elements or building blocks of a business model, and how the building blocks can be arranged in different common patterns. The chapter also describes how business models can be evaluated in terms of financial performance and how they can be classified based on type of asset sold and type of right involved. Based on the building blocks, patterns,

financial performance and classification types, the chapter is concluded by forming eight research hypotheses.

The research design chapter defines and explains the research process used in this thesis. The chapter starts with explaining how the literature review is performed and the research design. The chapter continues with presenting how the data sample is selected, how financial performance data is collected and how the business model classification is performed. Next, the chapter explains the statistical methods used to analyze the collected data. The chapter ends by discussing reliability and validity of the study.

The results chapter presents the results of the application of the statistical methods describes in the research design chapter. The results includes: descriptive statistics of the data set, a two-sample T-test for equal means in financial performance for direct and indirect business models, and a regression model explaining how the type of assets sold and type of rights involved affects financial performance.

The analysis chapter examines the results from the results chapter and determines if the hypotheses formed in the end of the theory chapter shall be accepted or discarded. Comparing the results with the results of previously performed studies concludes the chapter.

The conclusion chapter ends the thesis by summarizing the results and by answers the research question. Finally, the implications, limitations and further research section discusses the practical implication of the results, limitations with the research results and proposes some topics for further studies.

2 Theory

This chapter outlines the theoretical frame of reference for business models. The aim of this chapter is to build a foundation evaluating business model performance and to form the research hypotheses.

2.1 Definition of business model

To understand the use of business models, the first step is to define what a business model is. In the reviewed literature, there are a number of definitions. Most definitions are quite similar, but there are also some differences. Starting with Johnson, Christensen and Kagemann (2008), a business model is built up of three main components. The first part is the customer value proposition. The customer value proposition component describes how the company brings value to the customer by performing a specific job for the customer. Opportunities to create a good customer value proposition can, as described by the authors, often arise when other products or services have not been design with a particular job in mind. Designing a new product or service that solves the real problem could hence be of great value to the customer.

The second part described by Johnson, Christensen and Kagemann (2008), is the profit formula. The profit formula explains how the company generates shareholder value by providing the customer value proposition. The formula consists of the following parts: A revenue model (price times volume), a cost structure (fixed and variable cost), a margin model (revenue – cost) and finally a resource velocity component (how fast to turn over the assets). The third part is the key resources and processes. This component of the business model describes what resources and processes are needed to deliver the customer value proposition. The resource part typically consists of assets such as people, technology, products, facilities, equipment, channels and brand. Processes consist of managerial and operational processes such as training, development, manufacturing, budgeting, planning, sales and service.

Osterwalder and Pigneur (2010) define a business model as *“A business model describes the rationale of how an organization creates, delivers, and captures value”*. Osterwalder and Pigneur (2010) argue that the business model could be seen as a blueprint for a strategy to be implemented. This view is aligned with the view presented by Casadesus-Masanell and Ricart (2010) where the business model is seen as the result of creating a strategy. To describe a business model, Osterwalder and Pigneur (2004) propose an ontology of nine building blocks showing how the company is able to make money by providing value to its customers. These nine building blocks are, covering the four main areas of a business: financials, customer offering, customers, and infrastructure.

In McGrath's (2010) view, a business model is built up of two core components. The first part is the “unit of business” and the second part is the process advantages need to create

the create it. The unit of business is, as described by McGrath (2010) the items on the bill sent to the customer. This could be the actual product or extra services that the customer is willing to pay for. Information technology has increased the number of choices for the *“unit of business”*. The second part of the business model described by McGrath (2010) is the process advantages. Where the “unit of business” describes what the customer is paying for, the process advantage describes the activities needed in order to sell the units. These activities could be detected by assessing key metrics that drives performance.

Amit and Zott (2001) use a more narrow definition of a business model. According to the authors: *“A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities.”* Zott and Amit (2010) build on Amit and Zott (2001), but describe a business model of a company as a system of activities that are interdependent. Different business models call for different sets of activities, and the resources and ability needed to carry them out. The system of activities needed to deliver value is as suggested by Zott and Amit (2010) built up of two parameters: design elements and design themes. A central theme in the system view is that the different activities that build up the business model are interdependent. The key element of the business model is, according to Zott and Amit (2010) the intended design.

According to Zott and Amit (2010) and Amit and Zott (2001), the revenue is not part of the business model. The business model is only explains the total value creation for all parties. Instead, Zott and Amit (2010) use the term revenue model to explain how the company generates revenue. This separation of value and revenue could in my opinion be a bit troublesome since it implies that a company could have a business model that is considered of high performance without generating any shareholder value.

Mahadevan (2000) provides a broader definition than Zott and Amit (2010) and Amit and Zott (2001) of a business model: *“...unique blend of three streams that are critical to the business. These include the value stream from the business partners and the buyers, the revenue stream, and the logistical stream.”* In this view, the business model includes: the value stream, revenue stream and logistical stream.

According to Demil and Lecocq (2010), a business model can be described by three main components. These components are: resources and competences, organizational structure, and proposition for value delivery (the RCOV framework). The authors argue that every organization is based on resources and competencies.

Gambardella and McGahn (2010) define a business model as: *“A business model is an organization’s approach to generating revenue at a reasonable cost, and incorporates assumption about how it will both create and capture value.”*

In summary, by combining key words from the different definitions and grouping them in similar categories, it is clear that the definitions are quite similar (Table 1).

The main difference between the definitions is that Zott and Amit (2010) do not include the revenue part into their definition. Instead this part is described as a revenue model. The three groups identified are used as the first level of the analysis framework. The first level includes: Customer Value Proposition, Resources and Processes, and Revenues and Costs.

Table 1 Comparison of definitions of the concept business models

	Customer Value Proposition							Resources and Processes							Revenues and Costs									
	Customer Value Proposition	Customer Offering	Customers	"Unit of business"	Content of transactions	Value capture	Proposition for value delivery	Value Stream	Resources and Processes	Infrastructure	Process advantage	Governance of transactions	Structure of transactions	Value creation	Resources and Competencies	Organizational Structure	Logistical stream	Profit Formula	Financials	Revenue	Cost	Volume and Revenue structure	Volume and Structure of cost	Revenue stream
Johnson et al (2008)	x								x									x						
Osterwalder and Pigneur (2010)		x	x							x									x					
McGrath (2010)				x							x													
Amit and Zott (2001), Zott and Amit (2010)					x							x	x											
Gambardella and McGahn (2010)						x								x						x	x			
Demil and Lecocq (2010)							x								x	x						x	x	
Mahadevan (2000)								x									x							x

2.2 Application of business models

Baden-Fuller and Morgan (2010) have studied the concept of business models, why they are useful, how they are used, and who uses them. According to the authors, business models are used in three main areas, for classification of businesses, as a model of a company to run experiments, and to use as a recipe for copying the business model to another business. The first usage of business models is, to use Business models as a scale model to be able to classify different businesses into different categories. This generic description of a company explains how the business creates value and distributes it to its customer in a profitable way.

A complete representation of a firm's business model could according to Casadesus-Masanell and Ricart (2010) be too complex and difficult to work with. Instead some simplifications are often needed. There are two basic ways of simplifying a business model. The first option is to use aggregation. Aggregation could be seen as zooming out with a camera to be able see the full picture. However, a natural consequence of aggregation is losing details. It is therefore central to carefully select what parts of the model should be aggregated in order not to lose principal details and understanding key choices and their

main consequences. Another way to simplify the model is to use decomposition. If different parts of the business model do not interact, it could be possible to split the model into different sub-models that could be studied and analyzed in isolation.

Baden-Fuller and Morgan (2010) distinguishes between using business models as scale models or as role models. Scale models are described as shorthand or simplifications of the real business used to describe some central elements while role models as describe the ideal state to be copied. Baden-Fuller and Morgan (2010) also differentiate between taxonomy and typology. The taxonomy refers to the different kinds (classes) of business models observable in the real world. The taxonomy is hence developed bottom-up using empirical data. Types on the other hands decided top down using a theoretical or conceptual frameworks. In addition, Baden-Fuller and Morgan (2010) describe ideal types, which are based on both observations and theory. This view is similar to the static view proposed by Demil and Lecocq (2010). In the static approach, the business model serves as a blueprint for understanding how the different building blocks of the company are set up and work together.

McGrath (2010) describes how business models can be used for experimentation and learning. As described by Pesämaa et al (2013), the learning orientation is a central part in understanding effective innovativeness. To be able to experiment, McGrath (2010) propose that prototyping and testing is a useful way of understanding how the strategy works. Business models could also be used to understand why some companies do better than others. The concept of business models provides four ways of understanding strategy. Business models provide an outside-in focus instead of an inside-out focus, making them easier to study. According to McGrath (2010), it is not possible to fully anticipate business models, highlighting the need for experimentation. In addition, business models clarify the dynamic characteristic of competitive advantage. Finally, business models could help understanding how strategy relates to planning and exploration.

Zott and Amit (2010) describe how seeing the business model as an activity system can helps understanding how the firm is actually doing business. The content of the activity system is the activities performed by the company. The structure of the activity system explains how the different activities in the system are linked together. The governance of the system describes who are actually performing the activities. The design elements consist of the content, the governance and the structure of the company whereas the design themes consist of novelty, complementarities, lock-in and efficiency.

Baden-Fuller and Morgan (2010) also propose using business models to get more knowledge. Sometimes it is not possible to apply general theories to the real world. Instead, models of the real world could be used to test assumptions and increase the understanding of how things work. In economics, mathematical models are used to explain the relation of supply and demand. In medical life science, “model animals” such as lab rats or banana flies are used for experiments. Business models could be used in the same way to provide real-life examples to study. In this way, business models can be used to test and

try out different experiments. In the transformational approach described by Demil and Lecocq (2010), the business model is used to communicate and reflect around innovation and change in the organization.

Besides using business models for classification and for experimentation, Baden-Fuller and Morgan (2010) propose using business models in the same way a chef uses a recipe. The business model can hence be used to demonstrate and provide advice on how a technology (ingredient) can be used to generate results. The business model could in this way be seen as something that captures the essentials about how the firm behaves. The recipe includes both information about what main elements goes into the cake (ingredients) and a set of rules for how they should be incorporated in order to produce a unique product service or result. However, not every chef will be able to make all recipes work. The recipe describes what combinations generate a desirable outcome but dose not guarantee it.

2.3 Relation between business models and strategy

In studying strategy, there are three main branches of research (Johnson et al, 2011). The first branch focuses on studying strategy in an internal or external context. This research branch tries to understand strategy by analyzing the external forces or the different characteristics of the organization and what resources contribute to competitive advantage. The process view, studies the implementation and formulation process of strategies. Finally, the content branch studies strategy content and tries to understand what types of strategy perform best given certain conditions (Johson et al 2011). Strategy and business models are closely linked. Where strategy explains how to beat the competition, business models explains whom the customers are and how to make money by providing them with value (Magretta, 2000). Business models could hence be seen as a projection or the outcome of the underlying strategy (Casadesus-Masanell and Ricart, 2010) and therefore resides in the content branch of strategy research.

Strategy and Business models are two similar topics. Casadesus-Masanell and Ricart (2010) brings some more clarity to the concepts by separating and relating the concepts of strategy, business models, and tactics. To do this, Casadesus-Masanell and Ricart (2010) present a framework for distinguishing between the three entities. Strategy refers to the choices of business models the company is doing in order to compete in the market. Business models on the other hand refer to the logic of the firm and the way it operates to create value. Tactic refers to the choices that are available given the selected business model.

Magretta (2002) also explains the difference between a business model and a strategy. According to Magretta (2002), the business model describes how all the pieces of a business fit together. However, the business model does not take into consideration the competitors. According to Magretta (2002), the business model is used to explain who the company's customers are and how the company is making money by providing the customers with value. Strategy on the other hand describes how the company intends to

beat its competitors by doing better. To be able to do better is in this context the same thing as being different (Magretta, 2002).

Teece (2010) describes the connection between a business model and innovation. The business model describes how an enterprise is delivering value to its customers, why the customers pay for the value, and how the payments are turned into profit. Business models are connected to innovation since, without a good business model, the innovation will fail and not be able to deliver or capture value. This problem is exemplified with Internet companies. Since customers expect the Internet services to be free of charge, revenue streams must come from somewhere else. Teece (2010) further describes how business models are connected to performance. Business models could not alone be held accountable for value creation. A good strategy is still needed. However, an efficient and effective business model is more likely to create profit.

To further clarify the relation between business models and strategy, Casadesus-Masanell and Ricart (2010) present an analogy. There are many different cars available. Some customers may prefer a large powerful sports utility vehicle while other customers may prefer a small, fuel-efficient one. The strategy could be seen as the construction of the car. To determine how well a car works, the vehicle must be put into a proper context. This is part of the strategy process. The car itself is the business model. To understand how a car works for a specific purpose, it is necessary to understand the different components of the car, how they are related to each other, and how they interact. The driving of the car represents tactics. This means the set of choices the driver has in operating the car. For example, the driver of a mini does not have the option to transport 7 kids while the driver of a large sports utility vehicle does not have the option to park in a small parking garage.

One caveat with business models described by Teece (2010) is that once implemented, they are transparent to competitors and hence easy to imitate. In order to protect the competitive advantage generated by a new business model, the business model needs to be coupled with the strategy. According to Teece (2010), there are some barriers to entry that could be addressed by the strategy to protect the new business model. First of all, the new business model could be based on new systems, processes, assets that are difficult to attain. Another alternative is to build the business model on strong intellectual property protection or based on a difficult-to-imitate organizational structure. Making these resources hard to imitate or replicate could help protecting the business model. Another approach is to try to keep the business model hidden and not disclose what elements it consists of and how they interact to create customer value. A third option for a new business model is simply to not be the first to implement it. This could make sense if the business model is thought to cannibalize on an existing profitable business.

2.4 Components of a business model

This section describes the main building blocks of a business model. To provide structure, the three categories identified in section 2.1 are used to describe the components of a

business model in more detail: Customer Value Proposition, Resources and Processes, Revenues and Costs.

2.4.1 Customer Value Proposition

Before deciding what value to provide, the first step is defining who the customer is. To facilitate the definition, customers could be clustered into different groups based on their needs (Best, 2009). This block defines which different groups of customers the business should provide value to. The business model could define a single or multiple segments. Osterwalder and Pigneur (2010) stress that it is principal to make a conscious decision about which customer segments to serve. In addition, Osterwalder and Pigneur (2010) follow the same approach as Best (2009) when it comes to segmentation, the segmentation should be based on customer needs, not properties.

Osterwalder and Pigneur (2010) describe five common example of customer segmentation. First, the business could decide not to segment the customers and instead target a mass market. The other extreme is to make a very targeted offer to a niche market. In between are the segmented markets where different segments are defined for customers with slightly different needs and the diversified market where the business serves unrelated market segments. In addition, Osterwalder and Pigneur (2010) describe the Multi-sided platforms as a type of market segmentation. In this market, the company serves independent customers segments with an offer that both would benefit from. Both segments need to be in on the deal for the offer to make sense. One example of this is the credit card companies where both customers and merchants are needed for the business model to work.

When the customer segments have been defined, the next step is to decide what type of relationship should be created for each customer segment. As described by Osterwalder and Pigneur (2010), the range of relationship types typically on the scale from personal to fully automated. The customer relationship could be based on a tight personal connection one-to-one with customer for example with a key account manager, or with an organizational unit dedicated for customer contacts. If the personal relationship is not as central, the company could go for self-service where the direct relationship is not maintained in the same manner. Taking this a step further, all interactions with the customer could be automated.

Osterwalder and Pigneur (2010) also describe two newer forms of relationship usages. The first one is community where the company helps in facilitating communication between different customers and / or prospects and helps each other to solve problems. Taking this approach a step further could be to involve the customer in actually designing or developing the product or service in a co-creation setup.

In order to deliver the value proposition to a customer, an interface is needed. The interface is referred to as channels by Osterwalder and Pigneur (2010). The channels could be defined in two dimensions. The channels could either be defined in five phases:

awareness, evaluation, purchase, delivery, and, after-sales, or by type: direct or indirect, own or partner. No matter how the channels are defined and selected, the key is, as described by Osterwalder and Pigneur (2010), to find the right balance between the channels and integrate them to create a seamless customer experience.

By using the Internet, Mahadevan (2000) argues, it is sometimes possible to reduce the supply chain by taking out dis-intermediaries and selling direct to the customer. Since fewer players are involved, the transaction cost could often be reduced as well as the possibility to answer to customer requirements. However, in the market of information, the opposite is true. Since the amount of available information is growing exponentially, it is difficult for individuals to be in direct contact with the source. Instead, a market for info mediation is growing. This typically involves producing, storing and handling meta-information to help the customer find the right information fast. Mahadevan (2000) also describe the process of meta-mediation. If the information market is very fragmented, it is possible to add value by extending the architecture with another layer of information handling.

The value proposition is, put simply, the combination of benefits provided to the customer to solve a problem or satisfy a need. The value proposition could either have quantitative characteristic such as speed or price, or qualitative properties such as superior customer experience or great design. (Osterwalder and Pigneur, 2010). Amit and Zott (2001) have studied how value is created in e-business companies. Based on a number of case studies, and a theory of entrepreneurship and strategic management, the authors have constructed a model. In this model, value is created in four potential ways. Value could be created through, efficiency, complementarities, lock-in and novelty.

Starting with efficiency, by using an e-business platform, Amit and Zott (2001) argue it is possible to increase the transaction efficiency by reducing the transaction costs. The lower the transaction costs, the more customer value the e-business can provide. In comparison to traditional businesses, an e-business can reduce transaction friction from information asymmetry. By bringing both the buyer and seller to the same level, the transaction efficiency could be increased. In addition, with more information, Amit and Zott (2001) argue it is possible to reduce cost of searching for the product, and the cost of having to bargain the price. More information could as well reduce the risk of opportunistic behavior. E-businesses could also make it easier and faster for the customer to buy and, by reducing and streamlining the buying process, make it possible to achieve economies of scale.

Amit and Zott (2001) describe how an e-business could create value by offering complementarities. A complementarity is a product that, when offered together with another product, provides more value than if the products were sold separately. This is also referred to as a synergy effect. An e-business could benefit from these products by offering bundling products together. The bundling could be either of a vertical or horizontal type. Horizontal in this context means products or services that are used together but offered via a partner firm. Vertical on the other hand means that the same company produces the products and services. Amit and Zott (2001) propose that on-line and offline products

and/or services could be bundled together to create more value for the customer. In addition, it could be beneficial to provide products that are not directly related to the original product. Finally, value could be created by linking business processes or by integrating technologies from one company to another.

Another way for an e-business to create value is, as proposed by Amit and Zott (2001) through lock-in. If a customer is motivated to do repeat-business with the company, the potential for creating value is increased. Customers could be considered locked in if the switching costs are raised. According to the study by Amit and Zott (2001), customers can be locked in a number of ways. Loyalty programs or customer reward programs can help in retaining the customers. The company could develop standards or a dominant design that makes it hard for customers to switch. The company could work on building a trust and in that way tie the customers closer to the business. Another way to create lock-in is to let the customer customize and tailor the products and services. Finally customers can be locked in by what Amit and Zott (2001) refer to as positive network externalities. Externalities are when the value created for each customer increase as the network of customers grows. One example of this phenomenon is social networks.

Amit and Zott (2001), describe a number of ways an e-business can use novelty to create value. E-business may be able to create new ways of handling transactions. By doing so, these companies can create value by making the transactions more efficient. The e-business may also create value by finding new ways of creating combinational products. In addition, e-business can create value by creating new offerings to customers that previously were excluded from doing business.

Osterwalder and Pigneur (2010) describe a number of elements that could build up a value proposition. The value proposition could emphasize newness by being the first to offer something. The proposition could focus on delivering high performance. The proposition could focus on being able to customize the offering to individual needs. The proposition could also focus on simply getting the job done for a customer. Another way of creating value is to provide great design (decorative or artistic) or by emphasizing brand characteristics and status. Competitive price (or even offering the product / service for free) is another way to provide the customer with value. Value could be seen as total benefits acquired minus price paid. Another related value is if the product or service could help the customer save other costs or potential costs by eliminating a risk (for example insurance). Finally, the value could be created by making it easy to access the product or service and by making the product / service easy and pleasant to use.

Mahadevan (2000) also describe how reducing cost could increase value. Reducing the transaction cost and the search cost could increase customer value. Supplier cost can be reduced by reducing the customer search cost, promotion cost, transaction costs, and by shortening lead times. Based on the created value, Mahadevan (2000) argues that there are four basic value streams. Value could be created in virtual communities where buyers and sellers meet. Value could be created by reducing the transaction cost through

electronic market places that provide efficient exchange of information at low cost. Exploiting information asymmetries between buyers and sellers could create value. By providing for example real-time bidding and reverse auctions, it is possible to create value from the information asymmetry. Finally, value could be created by extending the offering with additional products or services that creates synergies when combined.

2.4.2 Resources and processes

In order to produce and deliver the value proposition to the customer and maintain the desired customer relationship, some key resources are needed. Osterwalder and Pigneur (2010) describe four types of resources. The resources could be physical assets for example production facilities, or intellectual assets for example patents and intellectual property. Human resources are always needed extent, but in some businesses they are considered key. At last, financial resources are more central in some business models than others. Having the right resources is one thing, but in order to deliver value, the assets needs to be used in the right way. Osterwalder and Pigneur (2010) divide activities into three areas. The activities could be related production or related to problem solving. If the company is centered around a platform, activities related to up keeping and development of the platform are central to the company.

The company rarely does everything by itself. Most of the time, the company has a network of suppliers that delivers resources used in the business model. The relationship between the partners can differ. Osterwalder and Pigneur (2010) propose three rationales for creating a partnership with a supplier. The partnership could create optimizations and economies of scale by streamlining of processes and the partnership con result in a better allocation of resources. The partnership could be created to reduce uncertainty and risk. Finally, the partnership could be initiated to secure a special set of resources and activities.

Mahadevan (2000) refers to the combination resources and activities as logistic streams. The resources could either be external or internal and to be able to use the resources, competencies are needed (Demil and Lecocq, 2010). The organizational structure refers to the activities and the linking of those activities needed to deliver value to a customer. Finally, the value proposition refers to what value the organization delivers and to whom.

2.4.3 Revenue streams

Revenue streams are, as explained by Mahadevan (2000), the realization of a value proposition. Revenue streams could according to the author be generated by increased margins through reduced transaction cost and customer search costs. Charging suppliers to a virtual community a membership fee and/or a transaction cost based on sales could generate revenue. Selling advertisement space could generate revenue. Since the marginal cost for electronic products typically are close to zero, it is possible to exploit this by different pricing schemes. Different yield management techniques could be used. For example, different customers could be offered the same product but charged according to their willingness to pay. This scheme could increase the average price. Other options are to bundle products to boost revenue. Exploiting asymmetric information through variations of

auctions could generate revenue. Finally, the “free” option is available where today’s revenue is reduced in exchange for higher revenues in the future.

As described by Osterwalder and Pigneur (2010) the most common type is naturally revenue generated by asset sales. There are however a number of different ways to generate reoccurring revenue streams. Instead of selling the asset, the company could charge a usage fee depending on how much the customer uses the product / service. The company could for example sell a monthly subscription. Revenue streams could be generated from renting or leasing the product / service to the customer. Another way would be to license the property rights in exchange for a fee. One option described by Osterwalder and Pigneur (2010) is to earn revenue through brokerage fees. Acting as an intermediary between two parties and charging a fee for the service generate this stream of revenue. Another way to generate revenue is to display advertisements for services, brands or products.

For each revenue stream described above, Osterwalder and Pigneur (2010) describe two types of pricing models that could be used. The prices could either be set at a fixed level with so-called menu pricing, or the prices could be dynamically set based on the current demand (for example auctions or yield management).

Malone et al (2006) describe revenue streams in terms of what rights are being sold. According to the authors, a company can generate revenue streams by selling: ownership of assets with significant transformation (created by the company), ownership of assets with limited transformation (distributor), use of assets (landlord), matching of buyer and seller (broker). The different ways of generating revenue is related to what type of assets are involved in the transactions. The different types of assets are: financial, physical, intangible and human.

2.4.4 Costs

The cost structure is generated by the setup and operations of the key resources, key activities and the key partnerships. In general, cost should be kept as low as possible, but this is more central in some business models than others. In general, cost could be divided into fixed cost generated by fixed assets, or direct cost generated by providing the product/service. Osterwalder and Pigneur (2010) further classify cost structure into value-driven and cost-driven cost structures. The cost-driven business models are more concerned with keeping the costs low since the value proposition is tightly connected with the ability to offer a low price. For Value-driven business models, on the other hand, the value is put before cost.

According to Demil and Lecocq (2010), the customers paying for the value proposition is the only thing generating revenue back to the organization. The difference between the revenue generated by selling the value proposition and the cost generated obtaining, maintaining and operating the resources and competencies, and the organizational structure is the margin.

The cost incurred by the resources and processes could generally be decomposed into two parts: fixed cost and variable costs. Fixed costs are as described by Keat and Young (2009) inputs to the company' production function that cannot be changed short run. In other words, fixed costs are costs that have to be paid regardless of the sales volume (in the short run). For a company that has fixed costs, percentage change sales revenue results in a higher percentage change in profit. If the marginal cost for the transactions of generating the recurring revenue stream is too high, the company will make less profit for every additional sale. If this is the case, a business model that builds on generating recurring revenue might not be a good idea.

2.5 Patterns in business model design

The design of the business model could as explained by Zott and Amit (2010) take on different configurations. The design could be centered on novelty by providing new value (customer value proposition), new ways of linking the activities (resources and activities), and/or new ways of performing the activities (resources and activities). This section explores descriptions of common business model designs in order to identify common patterns.

2.5.1 Unbundled business model

In the view of Osterwalder and Pigneur (2010) there are three basic types of business models. The infrastructure business is based on the presence of a certain infrastructure. Since the fixed cost are typically high, large volumes are needed. The second type is the customer relationship management. In this business, it is difficult to acquire new customers. Hence, economies of scope are prevailing. The third and final type is the product innovation business. In this business, it is central to be the first to enter the market to be able to charge premium prices. In many companies, the different types co-exist leading to contradictory interests. The idea behind the unbundling business model is that a company with two types of business could benefit from separating the two businesses into separate units with separate business models. Doing this would increase focus and reduce trade-offs.

2.5.2 Facilitate transactions / communication

Business models can be designed around facilitating communication and transactions. Market makers can, as described by Mahadevan (2000) help in facilitating transactions by building a community for customers and suppliers. Zott and Amit (2010) refer to this as creating efficiency and by doing so reduce transaction costs.

2.5.3 Context

The business model can be built around structuring or aggregating already available information and putting it in a context. Making it possible for the customer to find what the customer is looking for generates value. Revenue is generated by selling advertising space. Value is, as described by Wirtz et al (2010) generated by summoning online content and making the content available to the customer in a good way. Revenue is generated by selling advertising space or through subscriptions or direct payments. The context business

model could benefit from using the customization and personalization factor as well as social networking.

2.5.4 Commerce

One common business model is the commerce pattern. In this model the company is selling products and services using the Internet. Product/service providers are having direct contact with the customer, providing products and services using the Internet for handling the transactions. Value is provided to the customer by efficient processes for selling goods and services. Revenue is generated through sales or commissions (Wirtz et al, 2010, Mahadevan, 2000). The business model could be designed to emphasize complementarities by bundling activities together creating more value as described by Zott and Amit (2010). A company using the commerce business model can as described by Wirtz et al (2010) align the processes to increase the interaction with its customers.

2.5.5 User added-value / co-creation

Having the users generating content can increase value. The user could also be included in generating creativity and create innovations. Wirtz et al (2010) describe how a company could leverage user-added value. To leverage user-added value the company should include functions as reviews, wiki-pages, and media uploads to the website. To encourage this, the company should provide incentives. To better understand user behavior, the company should monitor user behavior on the website.

2.5.6 Blades and razor pricing / bait and hook

One classical pattern is the model of Gillett's blades-and-razor pricing where the razors are giving away or sold at a low margin and the blades are sold at a premium. This model is referred to by Osterwalder and Pigneur (2010) as the "Bait and hook" model. The product is given away for free or almost for free and revenue is then generated by reoccurring future purchases to be able to use the product. The model could however be turned upside down as described by Johnson, Christensen and Kagemann (2008). According to the authors, Apple managed to invert the model with the introduction of the iPod. Instead of giving away the mp3 player, Apple decided to sell the music at low margin through the software iTunes store and selling the hardware at a premium price. A great business model combines hardware, services and software (Johnson, Christensen and Kagemann, 2008).

2.5.7 Long-tail

The long tail business model has as described by Osterwalder and Pigneur (2010) as having a different focus than traditional business models. Instead of using the 80-20 rule (20% of the customers contributes to 80% of the profit), the long tail focuses on the remaining 20% or the long tail of an eschewed distribution. The basic idea behind the principle is, as described by Anderson (2008) about offering a large number of tailored products instead of a few generic ones to a large number of customers. If the special tailored product sales are integrated over a large number of customers, volumes becomes attractive. To be effective with this model, an efficient platform and inventory management processes are required.

2.5.8 Multisided platforms / infrastructure for communication

The design pattern multi-sided platform works according to Osterwalder and Pigneur (2010) by facilitating communication and interaction between two (or multiple) groups of customers. The company provides a platform that brings the customers together. Value is only created if both groups of customers use the platform. According to the authors, the value created by the platform increases as the number of users increases. This effect is called the network effect. This idea is similar to the portal model described by Mahadevan (2000) where value is created by providing infrastructure for communication. Making it possible to exchange information creates value. Revenue is generated through advertising, time or volume based charges or through subscriptions.

2.5.9 Free and freemium

An interesting pattern is the pattern of free. In this model, one or more groups of the customers are able to get the product or service for free. This is possible since the other groups are financing the business in one way, or the other. McGrath (2010) describe five types of business models that includes elements of free. One of the best-known business models is according to McGrath (2010) is the advertising model. In this model, advertising pays for the unit of business making it possible to deliver it free of charge for the customer. Another option is the cross-subsidization model (or the bundling model) where one part of the product is given away but other parts of the products are premium-priced. The promotion model includes giving away a low cost product to promote something else. Open source could according to Osterwalder and Pigneur (2010) be seen as a free business model. The software is made public and free for anybody to use and enhance. Offering support, customization and enhancements to the free software could generate revenue.

Yet another business model described by McGrath (2010) is the freemium model (Teece, 2010). This model works by giving away a basic product for free anticipating some customers will pay for a more advanced version. A prerequisite for this model to work is that the marginal cost for making the free service available is sufficiently low. Otherwise, it will be difficult to acquire enough customer reach to find enough customer-base for the paid version of the product or service.

A variant of free is the barter model. In this model, the customer receives the product without a monetary cost. Instead, the customer gives something else in return. Finally the gratis model, the customer receives something of value without any provision. Revenue is instead generated by other related means.

Another traditional example described by Teece (2010), is the sports apparel business where sponsorship plays a key role. By sponsoring athletes, brands like Nike, Adidas, and Reebok etc. are able to charge premium prices on product sales. Sports apparel is however not the only business where new business models are in use. According to Teece (2010), performing artists today have several business models. Besides traditional record sales, performing artists could get revenue from doing live performances, movies, online

music sales, live streaming, but also through physical products such as T-shirts and merchandise.

Internet industries provides, as described by Teece (2010), some new challenges in creating business models. It is often difficult to price services since the customer could have found other ways of getting them for free (for example through piracy). Figuring out how to generate revenue is therefore central. Another mean could, as described by Teece (2010) be to generate extra revenues streams by for example exploiting cross-promotions and ancillary licensing.

2.5.10 Open business model

The open business model is according to Osterwalder and Pigneur (2010) a model where the company creates value by working with outside partners. The approach could either be outside in or inside-out. In an outside-in approach, the ideas are generated from outside the company. By taking in ideas from the outside, the company could develop and exploit the ideas by internal research and development. In the inside-out approach, the company could sell or license unused internal ideas and intellectual property for other companies to develop and exploit. A third approach to open innovation is to act as a connector between ideas and solutions. By providing a platform for exchanging ideas and solution, the company provides value.

2.5.11 General-purpose technologies

General-purpose technologies are technologies that could be used for multiple purposes by the customers. Gambardella and McGahn (2010) describe how general-purpose technologies could be used with different business models. As described by Gambardella and McGahn (2010), business model innovation is happening when the company finds new ways of making money from its underlying assets. Development of general-purpose technologies brings new interesting ways of creating business models.

If the technologies are of a general-purpose type, Gambardella and McGahn (2010) describe how an intermediate technology market can be created. Instead of developing complete software, a company could sell software modules. As a consequence, companies no longer have to develop all parts of the software themselves. Instead parts could be brought from suppliers. However, the rapid technology diffusion makes it difficult to rely on a unique technology as a source for a competitive advantage. General-purpose technologies may however increase the bargaining power of the customers. To deal with this drawback, Gambardella and McGahn (2010) propose to supply applications to multiple customers instead of in a one-to-one manner. If the technology is offered to multiple markets, the company can accept lower margins by going for breadth instead of depth.

Gambardella and McGahn (2010) have however identified two challenges with general-purpose technologies. First, when technologies become more general, more competitors will be encouraged to compete to create them. Second, general-purpose technologies are less predictable and hence more difficult to forecast the market demand. As described by

Teece (2010), business models are necessary in a free market. Business models are not a new concept. Teece (2010) present a number of examples from the traditional industry. In the 19th century Swift and Company managed to reengineer the meat packing industry by centralizing the slaughtering and in that created economies of scale.

A more recent example is the Malcom McLean Company who changed the shipping business by introducing specialized cellular container ships. Yet another example is Southwest airlines that changed the air business by introducing low-cost no-frills service. Another classic model is the razor-and-blade pricing model introduced by Gillette with inexpensive razors but premium-priced blades. The same business-model is according to Teece (2010) used for pricing jet engines. The jet engine manufacturer makes money on maintenance and parts instead of on the engine itself.

2.6 Business model performance

There are many different performance measures available. This thesis uses four common and recognized financial performance measures to evaluate business models. The logic behind choosing these measures is that unless the company is able to provide financial return to its shareholders, the company will not be able to sustain operations in the long run. Financial performance measures are therefore a good proxy for business model performance. The performance measures selected in this study are: Operating margin (OpMa), Return on Assets (ROA), Return on Equity (ROE), and Return on capital employed (ROCE). These performance measures are selected since they are well known and evaluate both the cost side and the revenue side of the business.

2.6.1 Return on equity / DuPont Identity

Return on equity can be decomposed into three parts to better be able to understand what parts of the business are profitable. This decomposition is called the DuPont Identity. The first part of the equation is the net profit margin that measures the company's overall profitability. The second part is the asset turnover that measures how good the company is at utilizing its total assets to generate sales. The third part is referred to as an equity multiplier. This part describes how much leverage the company has, or in other words, how much of the company's assets are financed by debt. (Berk and DeMarzo, 2011)

$$ROE = \left(\frac{Net\ income}{Sales} \right) \times \left(\frac{Sales}{Total\ Assets} \right) \times \left(\frac{Total\ Assets}{Total\ Equity} \right) = \frac{Net\ Income}{Total\ Equity} \quad (1)$$

Where:

$$Net\ Profit\ Margin = \frac{Net\ Income}{Sales} \quad (2)$$

$$Asset\ Turnover = \frac{Sales}{Total\ Assets} \quad (3)$$

$$\text{Equity Multiplier} = \frac{\text{Total Assets}}{\text{Total Equity}} \quad (4)$$

2.6.2 Return on assets

The Return On Assets (ROA) performance measure indicates how profitable the company is in relation to its assets. Relating return to assets gives an indication of how good management is at using the assets of the company to generate results. Return on assets can vary considerably between industries. Therefore, the measure should be used within one industry or for evaluating the same company for trends. (Berk and DeMarzo, 2011).

$$ROA = \frac{\text{Net income}}{\text{Total assets}} \quad (5)$$

The measure is calculated by dividing the company's net income by its assets. Since the measure relates income to total assets, the cost for financing the assets is included. (Berk and DeMarzo, 2011)

2.6.3 Operating margin

Operating margin is a measure that can be used to assess how profitable a company is. Where the gross margin reflects the company's ability to sell its products at a profit, the operating margin also takes into consideration other expenses apart from the direct costs. This ratio indicates how much profit the company makes before costs for taxes and interests are added. (Berk and DeMarzo, 2011)

$$\text{Operating Margin} = \frac{\text{Operating Profit}}{\text{Net Sales}} \quad (6)$$

2.6.4 Return on capital employed

A measure that measures how profitable the company is and how efficient the capital is employed is the Return On Capital Employed measure. Return on capital employed is calculated by dividing the Earnings Before Tax and Interest (EBIT) by the Capital employed. The capital employed is the sum of the shareholder's equity, that is, total assets minus current liabilities. (Berk and DeMarzo, 2011)

$$ROCE = \frac{EBIT}{\text{Capital Employed}} = \frac{EBIT}{\text{Total Assets} - \text{Current Liabilities}} \quad (7)$$

A high ROCE gives an indication of how effective the company is at using its capital. ROCE should be higher than the company's cost of capital. Otherwise, the capital employed by the company is not used to generate shareholder value in an efficient way. (Berk and DeMarzo, 2011)

2.6.5 Performance measures

Since the four performance measures are likely to be correlated, the four measures (6), (5), (1), (7) are combined into an aggregated composite measure simply referred to as Performance.

$$Performance = \frac{(ROA + ROE + Operating\ Margin + ROCE)}{4} = \quad (8)$$

$$= \frac{\left(\frac{Net\ Income}{Total\ Equity} + \frac{Net\ income}{Total\ assets} + \frac{Operating\ Profit}{Net\ Sales} + \frac{EBIT}{Capital\ Employed} \right)}{4} \quad (9)$$

2.7 Business model classification

In order to evaluate business model performance, a scale for classifying business models is needed. In order to be able to evaluate performance some aggregation of the building blocks and patterns described in the previous chapters is done. In order to evaluate business model performance, the business model classification is therefore aggregated to the level, as described by McGrath (2010) of items on the bill sent to the customer. That is, the assets involved in the business model and the type of rights sold to the customer.

Malone et al (2006) classify business models into four different categories based on what type of rights is being sold: creators, distributors, landlords, and brokers. Each business model comes in four different types depending on what assets are being sold. The types are: financial, physical, intangible and human. This classification is, as described by the authors mutually exclusive and collectively exhaustive. This means that the different classifications are non-overlapping and that the all business models can be classified using this typology. This typology with four different business models and four types is an aggregation of the previously described detailed components and patterns. One benefit with this aggregation is that the typology makes it possible to categorize a company's business model using secondary data.

2.7.1 Type of rights

The first classification dimension proposed by Malone et al (2006) is what kind of right the company is selling to generate revenue. This classification could be seen as a proxy for the customer value proposition component proposed by Osterwalder and Pigneur (2010). The first type of right described by Malone et al (2006), is the ownership right. When selling this right, the customer receives full ownership over the asset and is free to make use of the asset in any way. The ownership right type is in turn divided into two types. One type is selling asset rights where the company has significantly transformed the asset before selling it. This is referred to as the creator model. The second type is where the company is

not significantly transforming the asset before selling it. This is referred to as a distributor model.

The second type of right a company can sell is, as described by Malone et al (2006) the usage right. With this right, the customer is paying for the right to use an asset for a certain period of time and the usage possibilities are limited by an agreement between the seller and the buyer. The ownership over the asset remains at the selling company all the time. The seller of usage rights is referred to as a landlord. The term landlord is used both for physical and non-physical assets. The third type of right described by Malone et al (2006) is the matching right. With this right, the buyer pays for the right to be matched with something. One example of this is a real-estate broker that sells the right of matching buyer and sellers of property. This type of model is referred to as the broker model. One key difference between a broker and a distributor is that the broker does not hold the ownership of the assets before selling them.

2.7.2 Type of assets

The second classification dimension proposed by Malone et al (2006) is to divide the business models depending on what asset is being sold. The assets are divided into: physical assets, financial assets, intangible assets and human assets. These assets are quite self-explanatory, but some additional details are provided for increased understanding. As according to Malone et al (2006), physical assets include both durable and perishable physical assets. Financial assets include monetary products. Intangible assets include knowledge, brand, and intellectual property. In this thesis the category also includes software (as being intellectual property). Human assets include time and effort. Malone et al (2006) point out that human assets cannot legally be sold (slavery), but their time and effort can be sold (consultants).

2.7.3 The sixteen business models

By combining the type of assets and the type of rights, Malone et al (2006) arrive at 16 different business models. These models are presented in Table 2.

Table 2 16 Business models based on Malone et al (2006)

Type of asset	Type of Rights			
	Asset significant transformation	Assets limited transformation	Usage	Matching
	Physical	Manufacturer	Wholesaler/Retailer	Physical landlords Physical broker
	Financial	Incubator	Financial Trader	Lenders/Insurers Financial Broker
	Intangible	Inventor	IP Trader	Publisher/ Brand manager IP Broker
Human	N/A	N/A	Contractors Consultants	/ HR Broker

2.8 Research hypotheses

The thesis tries to prove that there is a difference between direct and indirect business models with the type of assets / rights classification in terms of financial performance. Hence, the following null hypothesis is assumed:

- H₀ Company performance is not related to the type of asset sold or the type of rights involved

To answer the research question, a definition of a direct business model is needed. Not any conclusive definition of a traditional business model or a novel business model was to be found in the literature review. The definition used in this thesis builds on the type / rights division proposed by Malone et al (2006).

Starting with type of assets, the most direct way of doing business is trading products for upfront payment. Since the thesis postulates that indirect business models are delivering higher performance than traditional ones, the following four alternative hypotheses are formed:

- HA₁ A business model involving physical assets has a negative effect on company performance
- HA₂ A business model involving financial assets has a positive effect on company performance
- HA₃ A business model involving intangible assets has a positive effect on company performance
- HA₄ A business model involving human assets has a positive effect on company performance

With the same reasoning, direct business models involve transferring ownership from the buyer to the seller whereas indirect business models commonly build on transferring usage rights or matching rights. Hence the following alternative hypothesis are assumed:

- HA₅ Selling asset rights with significant transformation has a negative effect on company performance
- HA₆ Selling asset rights with limited transformation has a negative effect on company performance
- HA₇ Selling usage rights has a positive effect on company performance
- HA₈ Selling brokerage services has a positive effect on company performance

The research hypotheses are visualized in Figure 1 below:

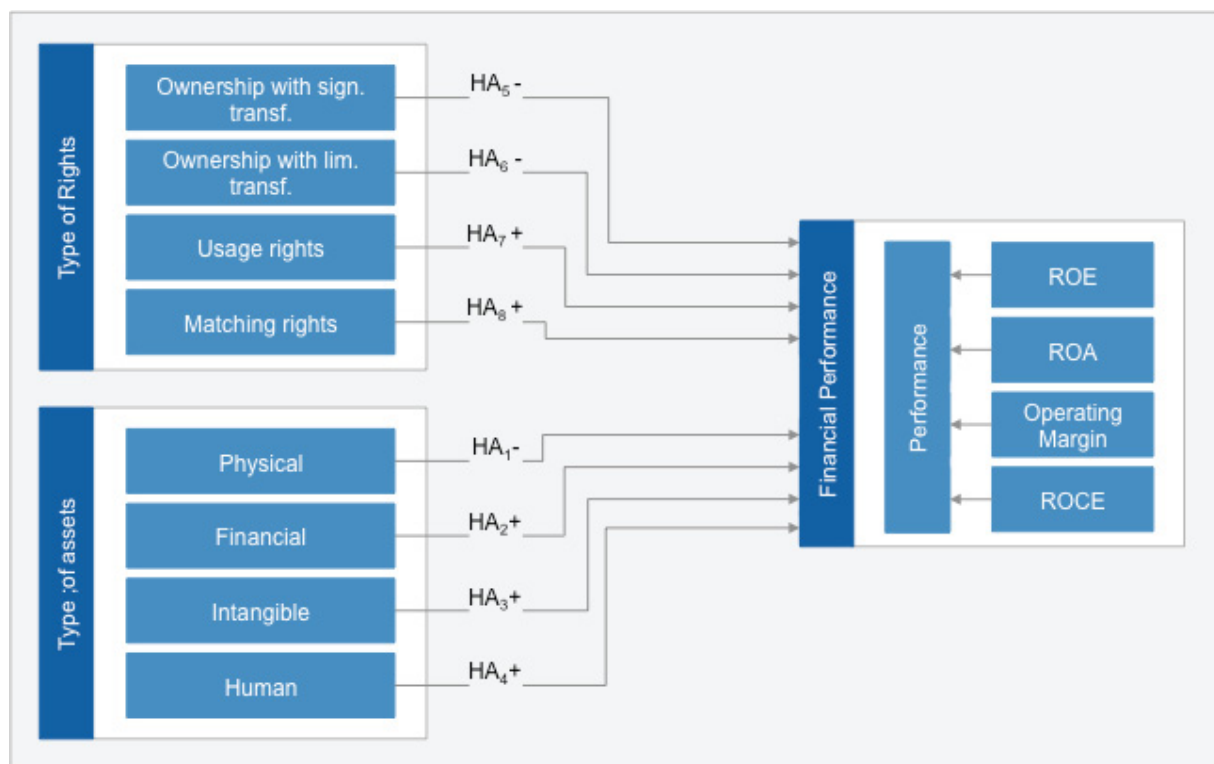


Figure 1 The research model

3 Research design

The unit of analysis selected for this study is the business model. The selected type of research method could, according to the definition proposed by Krishnaswami and Satyaprasad (2010), be categorized as an analytical study. The thesis takes a deductive approach to try to prove or disprove the theory. This study is based on a positivistic method and tries, through verification and observation, uncover an existing reality. The research approach selected is a quantitative approach with hypothesis testing and regression modeling. The aim of the approach is to prove or discard the null hypothesis based on collected secondary data.

3.1 Literature review

In order to establish a theoretical frame of reference for the topic of business models, a literature review is performed. The literature review is based on scientific articles and books by academic authors. The articles were found using the search-engine Summon@bth together with Google Scholar as a complement. References to identified articles were explored and used to better understand the topic of business models.

The literature review begins by defining what a business model is. Once the definition is set, the literature review continues with describing different applications of business models and how business models are related to strategy. The review continues with exploring the components or building blocks of a business model. When the components are known, the review continues with explaining different patterns in business model design. Based on the definition, application, usage, components, and patterns, a classification framework is developed. To evaluate the performance of a business model, four financial performance measures are selected and combined into a composite performance measure. Based on the classification and the performance measures, eight research hypotheses are formed.

3.2 Data sample

The data sample selected for this study is Swedish publically traded information technology companies. Information technology companies are interesting to study because the information technology industry is novel in relation to others and are hence more likely to adapt new, innovative business models. Information technology companies hence provide a good testing ground for evaluating performance of different types of business models. Sweden was selected since the market is well developed in terms of information technology and since the market size makes it possible to study a large proportion of the industry.

Publically traded companies were selected because of the readily available information about performance measures and detailed descriptions about how the companies are doing business. The information about the companies business is available since publically traded companies need to explain how they are doing business to existing and potential

investors. This is not the case for non-public companies. In addition, the annual reports are reviewed by authorized third party accountants and are considered a reliable secondary source of information. The data sample consists of companies classified as information technology companies and traded at the Swedish NASDAQ OMX and First North, medium and small cap lists. A complete list of the selected companies is presented in Appendix 1.

3.3 Data collection

The data collection for this thesis is divided into two parts. Financial performance data and business model classification data. The Financial performance data used in this thesis was based on the financial reports of the companies. The business model classification data was gathered from studying the sample companies' annual reports and classifying the business models using a predefined evaluation form.

3.3.1 Financial performance data

ROA, ROE and Operating margin (explained in section 2.6.3, 2.6.2 and 2.6.1) are extracted directly from the database extraction tool Retriever. Data for a five-year period is extracted. ROCE is not available directly from Retriever so this measure needs to be calculated based on other entities that can be extracted from Retriever. ROCE is calculated by:

$$\frac{EBIT}{Total\ Assets - Total\ Liabilities} \quad (10)$$

Table 3 Financial performance data

Construct	Scale Item	Unit of measure	Source
DOL	ΔEBIT	SEK	Retriever
DOL	ΔSales Revenue	SEK	Retriever
ROE	ROE	%	Retriever
ROCE	EBIT	SEK	Retriever
ROCE	Total Assets	SEK	Retriever
ROCE	Total Liabilities	SEK	Retriever
ROA	ROA	%	Retriever
Operating Margin	Operating Margin	%	Retriever

All performance measures were calculated based on the collected data. Two companies in the sample, PSI Group and Transmode, were excluded. PSI Group is listed on the Oslo Stock Exchange and hence excluded from the sample. Transmode was introduced 2011-

05-27. Since some of the measures selected in this thesis require historical data, Transmode was excluded.

Data for the selected companies in the sample are extracted from the database Retriever. Because of limitations in the OR function in the extended search option box, the companies had to be selected one by one. Once selected, the defined source data was extracted and saved in a spreadsheet document file. Due to “an unexpected error” in Retriever, the selection process was repeated several times. The repeatability aspect of Retriever data is hence confirmed.

3.3.2 Business model classification data

To evaluate the data, grouping of the business is needed. Classification data for type of assets involved and type of rights sold are gathered (Malone et al, 2006) from the sample companies’ annual reports using a structured evaluation form derived from the theory chapter. The scale used for the evaluation is nominal scale. The annual reports are extracted using Retriever or by accessing the investor relations sections of the companies’ official websites.

Table 4 Classification evaluation form

		Scale	Response
Assets	Physical	Are physical assets involved?	Yes=1 No=0
	Financial	Are financial assets involved?	Yes=1 No=0
	Intangible	Are intangible assets involved?	Yes=1 No=0
	Human	Are human assets involved?	Yes=1 No=0
Rights	Assets sign. transf.	Is the company selling significantly transformed assets?	Yes=1 No=0
	Assets lim. transf.	Is the company selling limitedly transformed assets?	Yes=1 No=0
	Usage	Is the company selling usage rights?	Yes=1 No=0
	Matching	Is the company selling matching rights?	Yes=1 No=0

The first step of the research process is to classify the business models of all the companies in the sample set. This classification is done with help of a questionnaire as described in Table 4. The purpose of this classification is to classify all the companies in the sample set based on the type-rights and assets sold. The sample is then divided into two groups for comparison based on the degree of direct model. To be able to evaluate the

degree of direct business model, an average weighted scale is introduced based on Type / Rights definition where all variables are of nominal scale:

$$\text{Degree of Direct Type} = \frac{(3 * \text{Physical} - \text{Financial} - \text{Intangible} - \text{Human} + 3)}{6} \quad (11)$$

$$\text{Degree of Direct Rights} = \frac{(\text{Asset sign.} + \text{Asset lim.} - \text{Usage} - \text{Matching} + 2)}{4} \quad (12)$$

The degree of direct business model is then defined by combining equation (11) and (12):

$$\text{Degree Direct Model} = \text{Degree Direct Type} * \text{Degree Direct Right} \quad (13)$$

The first group contains companies with a degree of direct model $> 0,5$ and hence determined to have a direct business models. The second group contains companies with degree of direct model $< 0,5$. Not any company in the data set ended up at $= 0,5$ so the decision on how to handle this eventuality was not needed.

3.4 Statistical test for equal means

This thesis takes an analytical approach to answer the research question. This section explains the statistical methods used to analyze the data and come up with a conclusion. The analysis determines if there is any difference between the performance means for the two groups (Figure 2). To reduce the risk of calculation errors, all statistical calculations are done using the software Minitab. To answer the first part of the research question, the sample set of companies is divided into two groups based on the degree of direct model, equation (13).

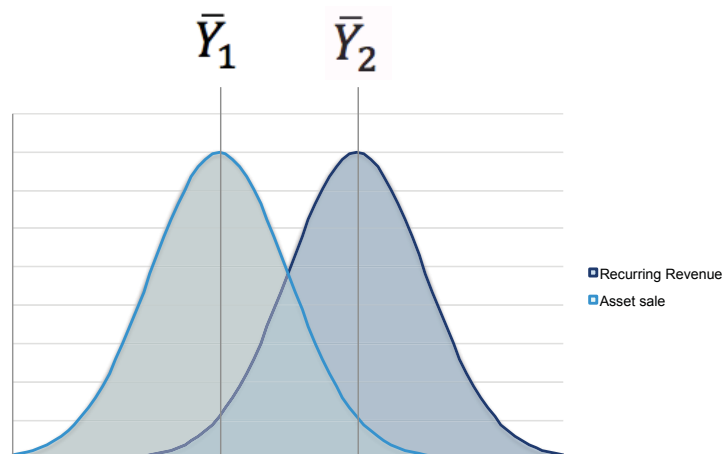


Figure 2 Comparing two population means

3.4.1 Null and alternative hypothesis

The first step in the process of hypothesis testing is as describe by Petruccelli et al (1999) to define the statistical hypotheses:

$$H_0: \mu_1 - \mu_2 = \delta_0 \quad (14)$$

$$H_{Ax\pm}: \mu_1 - \mu_2 \neq \delta_0 \quad (15)$$

The second step is to define the level of significance that will be used in the test. The alpha level describes how certain we have to be to disregard the null hypothesis. In this thesis 95% confidence intervals are chosen.

3.4.2 Test for normality

In order to determine what statistical test to use, the underlying data needs to be evaluated. The data can be evaluated using descriptive statistics and visual representation (q-q plots) or using a test for normality. One statistical test for normality is, as described by Petruccelli et al (1999), the Anderson-Darling test:

$$H_0: \text{Data is likely to be normally distributed} \quad (16)$$

$$H_A: \text{Data is not likely to be normally distributed} \quad (17)$$

The test statistic for the Anderson-Darling test is defined as:

$$A^2 = -N - S \quad (18)$$

where:

$$S = \sum_{i=1}^N \frac{(2i-1)}{N} [\ln F(Y_i) + \ln(1 - F(Y_{N+1-i}))] \quad (19)$$

Where F is the cumulative probability distribution and Y_i is order data.

3.4.3 Transformation

If data is not normally distributed it as, as described by Pyzdek (2003), often possible to transform the data by using mathematical operations and make the data set normally distributed. One technique that could be used is the Box-Cox transformation to detect what transformation is suitable to apply. However, since financial data is unlikely to be non-negative, the Box-Cox transformation is not applicable since it requires non-negative data. Some companies will likely have negative returns for some years. Instead the Johnson transformation can be used.

$$\gamma + \eta \sinh^{-1} \left(\frac{x - \varepsilon}{\lambda} \right) \quad (20)$$

where:

$$\sinh^{-1}(x) = \ln \left(x + \sqrt{1 + x^2} \right) \quad (21)$$

Pyzdek (2003) points out that the transformation by design changes the scale of the data. A consequence of this is that the means values of the data set will not be the same after the transformation.

3.4.4 Test statistics

The next step is to compute the test statistic used for the test. Since the variance of the population is not known, and cannot be assumed to be the same for both groups, the estimated standard error is estimated using (Petrucelli et al, 1999):

$$\hat{\sigma}(\bar{Y}_1 - \bar{Y}_2) = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} \quad (22)$$

The sample needs to be tested for normality. The data has to be checked for normality and outliers. Once this is done, the standardized test statistic can be estimated by (Petrucelli et al, 1999):

$$\frac{\bar{Y}_1 - \bar{Y}_2 - \delta_0}{\hat{\sigma}(\bar{Y}_1 - \bar{Y}_2)} \quad (23)$$

where:

$$\hat{\sigma}(\bar{Y}_1 - \bar{Y}_2) = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} \quad (24)$$

3.4.5 Compute probability for test statistic

The P-value can then be computed with help of an N(0,1) distribution.

$$Z = \frac{(\bar{Y}_1 - \bar{Y}_2) - \delta_0}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad (25)$$

The P-value for testing the hypotheses is given by:

$$p_{\pm} = P(|Z| \geq |z^*|) = 2\min(p_-, p_+) \quad (26)$$

If at least one of the samples is small, and the population variances cannot be assumed to be equal, an alternative test statistic is needed.

$$T^{(ap)} = \frac{(\bar{Y}_1 - \bar{Y}_2) - \delta_0}{\hat{\sigma}(\bar{Y}_1 - \bar{Y}_2)} \quad (27)$$

For H_0 , the distribution of $T^{(ap)}$ can be approximated at t_v . To determine v , we need to calculate the degrees of freedom. The degrees of freedom v is given by:

$$v = \left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} \right) / \left[\frac{(S_1^2/n_1)}{n_1 - 1} + \frac{(S_2^2/n_2)}{n_2 - 1} \right] \quad (28)$$

Since v is unlikely to be an integer, the result is commonly rounded down to the nearest integer. (Petrucelli et al, 1999)

3.4.6 State conclusion

The final step is to state the conclusion and decide if the null hypothesis should be accepted or if the null hypothesis should be rejected in favor of the alternative hypothesis. (Petrucelli et al, 1999).

3.5 Multiple regression model

Once the null hypothesis has been accepted or rejected, the next step needed to answer the research question is to explain why the outcome looks the way it does. One way of testing this is to develop a regression model to evaluate what factors are causing the outcome. Since the theoretical model involves several variables (or predictors), and one performance measures (Response variable), the multiple regression model is selected. Petrucelli et al (1999) outline the following steps for creating a multiple regression model.

3.5.1 Model specification

The first step described by Petrucelli et al (1999) is to specify the model. This involves specifying the regressor, the response variable and the distribution for the random error term. The predictor variables are given by the theory chapter and the response variable is defined as Performance, equation (9). The random error is assumed to be normally distributed (this needs to be tested). Since all factors are assumed to affect the response equally, an additive model is selected. If it is not possible to fit this model, alternative models needs to be evaluated. The thesis will hence test an additive multiple linear regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \epsilon \quad (29)$$

3.5.2 Model fitting

The second step described by Petrucelli et al (1999) is to fit the model to the data. This is done by estimating the model parameters using the least square method.

$$SSE(\beta_0, \dots, \beta_n) = \sum_i^n [Y_i - (\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n)]^2 \quad (30)$$

The values that minimizes (30) is referred to as the least square estimators of intercept and slope. The least square estimators are calculated by using partial derivatives for each and setting the derivatives to zero.

$$\hat{\beta}_1 = \frac{\sum_i^n (X_i - \bar{X})(Y_i - \bar{Y})}{\sum_i^n (X_i - \bar{X})^2} \quad (31)$$

The residuals are then the given by:

$$e_i = Y_i - \hat{Y}_i \quad (32)$$

And the model with the fitted predictors:

$$\hat{Y} = \hat{\beta}_0 + \hat{\beta}_1 X_1 + \dots + \hat{\beta}_8 X_8 \quad (33)$$

3.5.3 Model assessment

The third step described by Petrucci et al (1999) is to assess how well the model fits the data. One way of doing this is to calculate the coefficient of multiple determination, R^2 . R^2 describes how much of the total variation can be explained by the regression model.

$$R^2 = 1 - \frac{SSE}{SSTO} \quad (34)$$

Where:

$$SSE = \sum_i^n e_i^2 \quad (35)$$

$$SSTO = \sum_i^n (Y_i - \bar{Y})^2 \quad (36)$$

The next step is to test if the model is significant and, if so, what regressors are making a significant contribution and which are not. Calculating confidence intervals for the model and the model coefficients in the same way as with the two-sample T-tests does this.

$$H_0: \beta_0 = \beta_1 = \dots = \beta_n = 0 \quad (37)$$

$$H_A: \text{Not all } \beta = 0 \quad (38)$$

According to Petrucci et al (1999) the regression model is tested by:

$$F = MSR/MSE \quad (39)$$

Where:

$$\text{Mean Square due to Regression} = MSR = \frac{\sum_i^n (\hat{Y}_i - \bar{Y})^2}{p} \quad (40)$$

$$\hat{\sigma} = \text{Mean Square Error} = MSE = \frac{\sum_i^n e_i^2}{n - p - 1} \quad (41)$$

n, p describes the degrees of freedom.

Besides evaluating if the regression model is significant, it is even more interesting to evaluate if the individual predictors are significant. This can as described by Petrucci et al (1999) be tested using a T-test and the following test statistic:

$$T = \frac{\hat{\beta}_i}{\hat{\sigma}(\hat{\beta}_i)} \quad (42)$$

3.6 Reliability and validity

The financial performance data collected from the study was collected directly using the database tool Retriever. For the classification data, the data was collected using one appraiser, reducing the risk of biasing between the different samples. The classification is done using a nominal scale, which provides robustness to the classifications. In addition, a company was allowed to have different types of business models, reducing the risk of placing a company in the wrong category.

The sample size is large enough to provide significant results. All statistical tests are performed at alpha 95% confidence. For the 2-sample T test, the validity is addressed by evaluating the test statistic and computing confidence intervals (Equation (26)). The regression model is evaluated using the coefficient of multiple determination, R^2 . Besides evaluating how much of the variation can be explained by the model, the model is evaluated using the F test. The individual regressor coefficients are evaluated using a T-test for being significantly different from 0.

4 Results

4.1 Descriptive statistics

Before starting to analyze the data, the data is visualized to increase the understanding of the data set. Starting with the performance measures. In order to combine the performance measures of ROE, ROA, Operating Margin and ROCE into one composite measure a precondition is that the variables are correlated. A matrix plot gives an indication of the correlation.

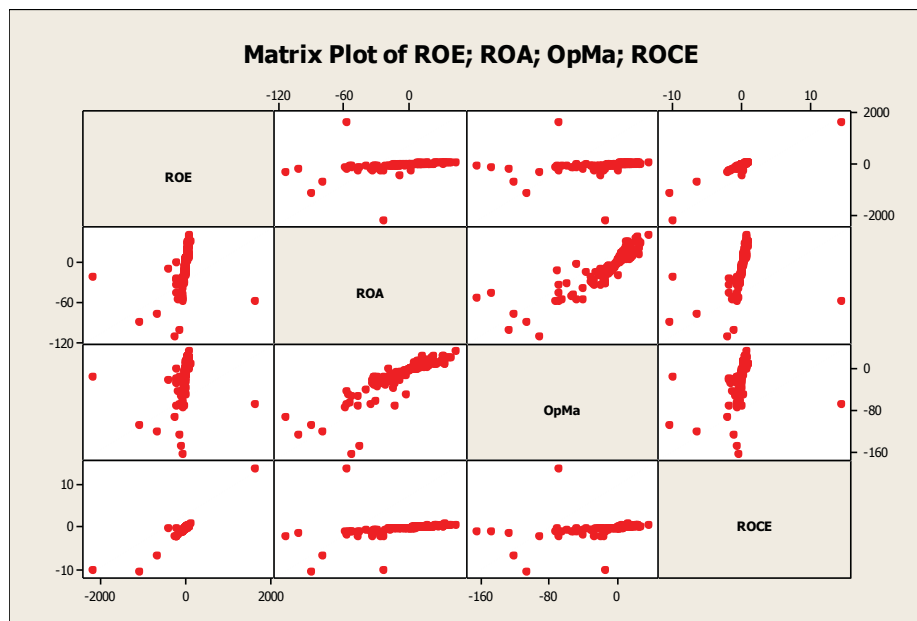


Figure 3 Matrix plot of ROA, ROE, Operating Margin and ROCE

Pearson coefficients were calculated for all the performance measures. The result is presented in Table 5 below.

Table 5 Pearson correlation

Correlations:				
	ROE	ROA	OpMa	
ROA	0,772			
	0,000			
OpMa	0,624	0,848		
	0,000	0,000		
ROCE	0,829	0,933	0,736	
	0,000	0,000	0,000	
Cell Contents:	Pearson correlation			
	P-Value			

All the four performance measures were found to be positively correlated with a P value of 0,000. Therefore the four performance measures were combined into one aggregated composite scale.

Before continuing the data is evaluated for outliers. To reduce the risk of misinterpreting the data, companies with highly negative performance or highly volatile negative performance are excluded from the study. These companies are likely to be start-up companies or companies in a growing phase. Including these companies would distort the results of the study since the low financial performance could be related to growth and not necessary to the business model. The following companies were excluded:

Table 6 Excluded companies

Company	Reason for exclusion	Source
BIMObject AB	Expansion	Annual report 2012
Bredband2 AB	Growth / Expansion	Annual report 2012
Cryptzone Group AB	Acquisition / Expansion	Annual report 2012
Exini Diagnostics Aktiebolag	FDA Approval / Expansion	Annual report 2012
Header Compression Sweden Holding AB	Missing data 2008-2010	Annual report 2012
Invisio Communications AB	New product launch / Expansion	Annual report 2012
Mindmancer AB (publ)	Product development / Expansion	Annual report 2012
Smarteq AB (publ)	Product development	Annual report 2012

To understand if the Performance measure is stable over time, the data set is plotted over time based on year. The mean Performance is stable over time (Figure 4).

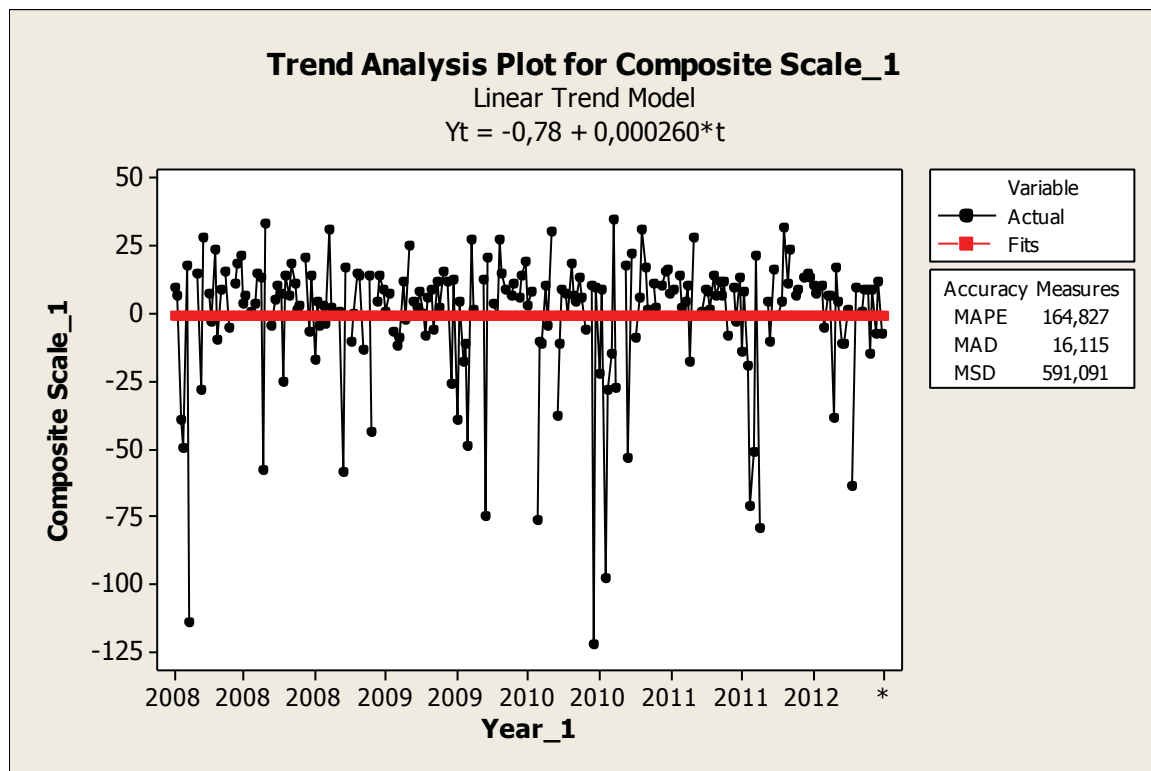


Figure 4 Trend analysis plot for performance data

To understand how the performance data relates to the type of business model, the performance data is plotted against the year and grouped by type (Figure 5).

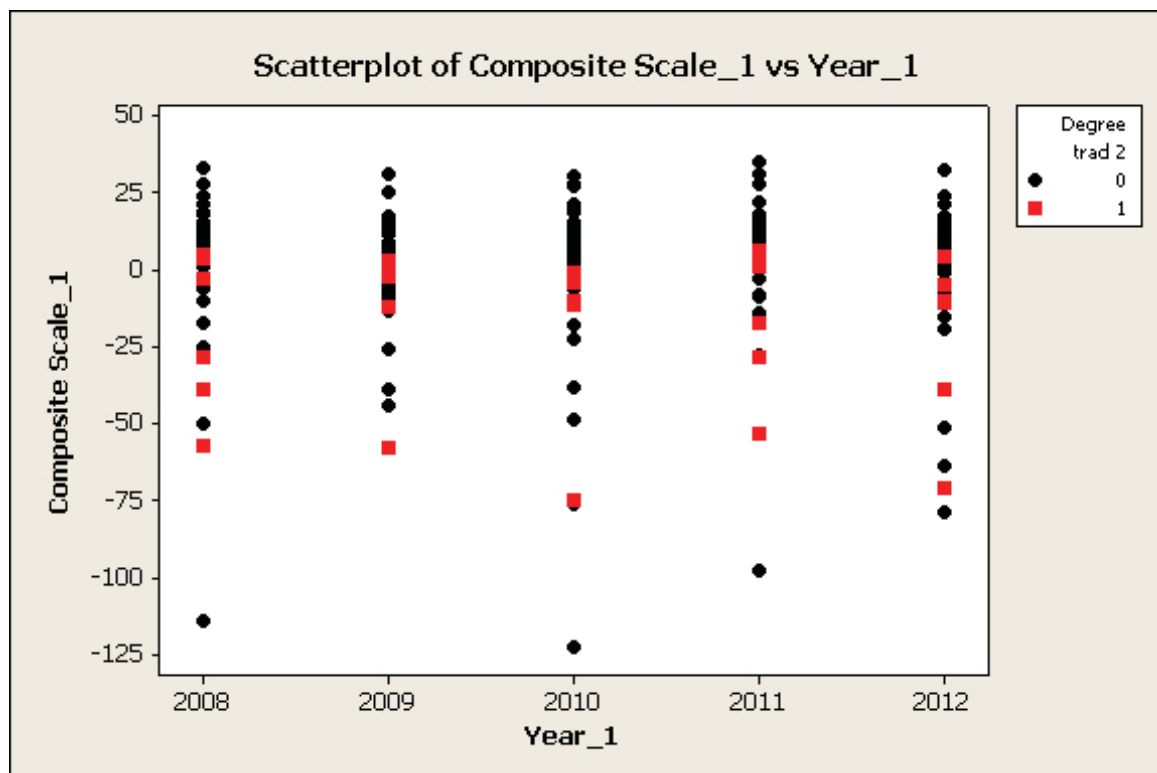


Figure 5 Business model performance over time

4.2 2-sample T-test

The data in the performance measure was tested for normality using the Anderson-Darling test. According to the test result, the data set was found not to be normally distributed. Therefore, the data was transformed using the Johnson transformation. The transformation function used is:

$$0,621097 + 0,782916 * \text{Asinh}((X - 11,6450) / 6,93702) \quad (43)$$

The Anderson-Darling test was re-run using the transformed data with significant results, $P > 0,05$ (Appendix 2).

The data set was divided into two groups based on the business model used. One group contains companies with direct business models and one group with companies using indirect business models.

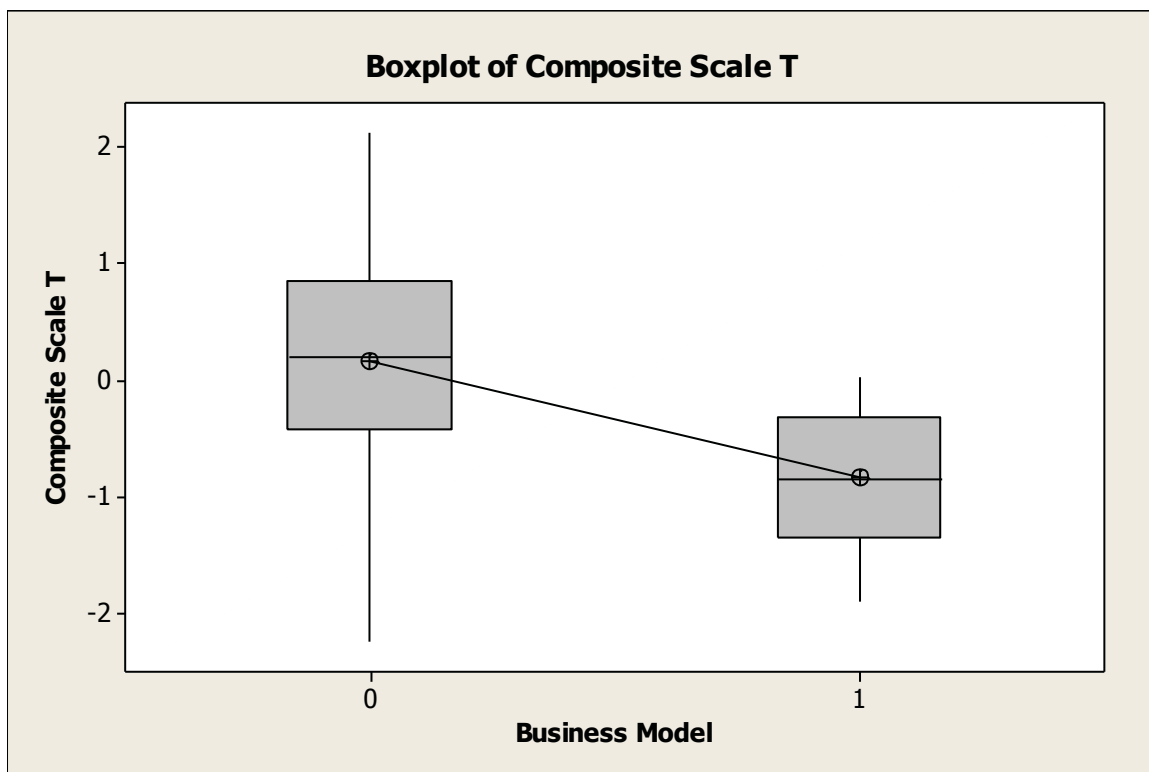


Figure 6 Boxplot of composite scale versus business model

The T-test shows a significant difference in Performance between the two groups. The P-value for the T-test was less than 0,000. Companies with direct business models have a significantly lower mean of Performance than companies with indirect business models. Since the data is transformed, it is not meaningful to study the values themselves.

4.2.1 Regression

A linear additive multiple regression model was used.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \epsilon \quad (44)$$

The model was fitted using the least square method. The estimator's coefficients for the predictors were estimated using the partial derivatives. For each estimator, the T statistic and P value was calculated. The result is presented in Table 7.

Table 7 Regression model predictors

Predictor	Coef	SE Coef	T	P
Constant	-0,6085	0,2272	-2,68	0,008
Physical	0,3928	0,2004	1,96	0,051
Financial	0,849	0,4816	1,76	0,079
Intangible	-0,0159	0,1562	-0,1	0,919
Human	0,3446	0,1803	1,91	0,057
Sale sign	-0,588	0,2027	-2,9	0,004
Sale lim	-0,7857	0,2954	-2,66	0,008
Usage	0,6904	0,229	3,02	0,003
Matching	-1,6482	0,69	-2,39	0,018
S = 0,854160 R-Sq = 25,8% R-Sq(adj) = 22,8%				

Based on Table 7 it can be concluded that Sale with significant transformation and limited transformation has a significant negative impact on performance. Usage rights have a significant positive impact on performance, and matching rights has a significant negative impact on performance. The model has an R^2 of 25,8%.

To evaluate the regression model, an ANNOVA (Analysis of Variance) table was produced. The ANNOVA table is presented in Table 8. From Table 8 can be concluded that the Regression model is significant.

Table 8 ANNOVA

Source	DF	SS	MS	F	P
Regression	8	50,6344	6,3293	8,68	0,000
Residual Error	200	145,9177	0,7296		
Total	208	196,5521			

The residuals are tested for normality and independence. The result is presented Figure 7. According to Figure 7 the residuals are normally distributed. Since the regressors are of a nominal scale, the Residual versus Fitted values plot is expected to produce a discrete pattern but does not indicate any correlation. Looking at the order of the observation (Alphabetic order grouped by year), not any trends can be observed.

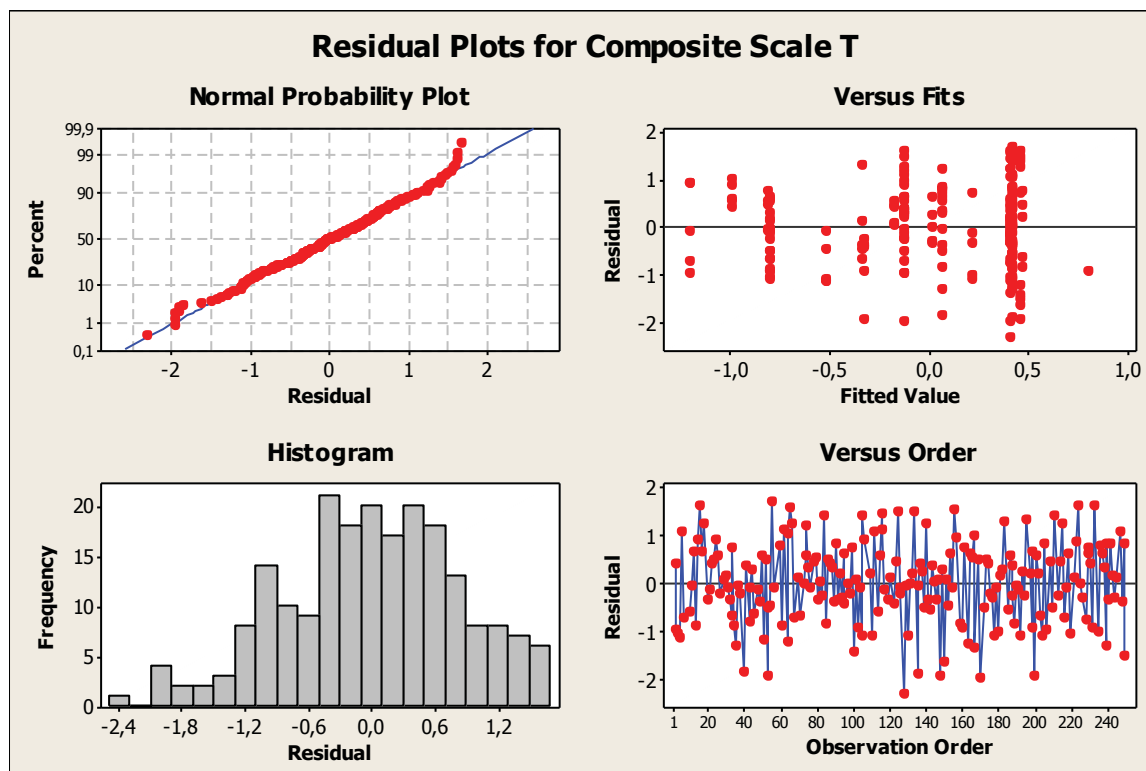


Figure 7 Residual plots for composite scale

5 Analysis

The thesis tries to determine if there is a difference in performance between Swedish publically traded information technology companies using direct business models and indirect business models. The thesis also tries to determine what is causing the difference.

To determine if it is appropriate to combine the performance measures ROE, ROA, Operating Margin and ROCE into one performance measure, the correlation is evaluated. Since the four performance measures are highly correlated (Figure 3), the measures are combined into a composite performance measure. Based on business model classification measure defined in equation (13) in section 3.3.2 the performance data is split into two groups. When evaluating the performance data using a two-sample T-test, a significant difference is identified (Figure 6). The sample mean of the composite performance measure for the group of direct business models is significantly lower than the comparison. One interesting observation is that this trend is stable over time (Figure 5).

To understand what caused the difference in performance, a multiple linear regression model is fitted to the data set. The model has an R^2 of 25,8 % respectively 23,8 % (adjusted), which is considered sufficient for the type of data analyzed. The P value for the regression as a whole is less than the alpha selected (degree of significance) $0,000 < 0,05$. The model is therefore considered significant to explain and answer the hypotheses related to the data set.

Starting with the asset dimension. Not any β can be considered significant. Therefore the alternative hypotheses: HA_1 physical assets ($\beta=0,3928$; $P=0,051>0,05$), HA_2 financial assets ($\beta=0,8489$; $P=0,079>0,05$), HA_3 intangible assets ($\beta=-0,0159$; $P=0,919>0,05$), and HA_4 human assets ($\beta=0,3446$; $P=0,057>0,05$) cannot be accepted.

Looking at the type of rights dimension, all β s are considered significant. Selling ownership rights for products produced by the company has a negative impact on performance ($\beta=-0,588$; $P=0,004<0,05$). The same goes for selling ownership rights to products distributed by the company ($\beta=-0,7857$; $P=0,008<0,05$). Selling usage rights on the other hand has a positive impact on performance ($\beta=0,6904$; $P=0,003<0,05$). Selling matching rights on the other hand has a significant negative impact on performance ($\beta=-1,6482$; $P=0,018<0,05$). Comparing these results to the alternative hypotheses, HA_5 is accepted, HA_6 is accepted, HA_7 is accepted. HA_8 on the other hand is not accepted since the predicted direction of selling matching rights is presumed to be positive. According to the sample data, matching rights have a negative impact on performance.

Comparing the results to previous studies of business model performance, Malone et al (2006) found, in a study covering multiple industries that some business models perform better than others. The authors found that selling ownership rights and usage rights for

physical assets produced higher cash flow on asset than the comparison. The result was however not consistent in all performance dimensions. In addition, Malone et al (2006) found that the performance measure “Tobin’s q” is higher for physical landlords than intellectual landlords. This result is different compared to the findings in this study. One key difference between this study and the comparison studies is that this study only covers one industry whereas the study by Malone et al (2006) covers multiple industries. This finding suggests that business model performance is related to the industry. This suggestion is supported by Sahut et al (2013) who describe how managing the resources and skills are correlated to performance in the context of heavy industries.

Zott and Amit (2007) have studied business model performance in the entrepreneurial field. The empirical results of the study indicate that indirect business models have positive impact on performance and that the relationship is stable over time. This result is in line with the results of this study (Figure 5), which shows that the performance for the industry is stable over time despite the drastic economic downturn in 2008.

Sahut et al (2013) summarizes findings of recent performance studies of business models. According to the authors, business models involving intangible assets have higher performance than physical assets. The study further indicates that “seller of use” is more likely to be beneficial than “seller of ownership”. This result is confirmed by this study where sale of ownership has a positive affect on performance.

6 Conclusions

6.1 Summary conclusions

In order to answer the research question, this thesis has studied 250 samples of performance data for 50 Swedish publically traded information technology companies. The performance data is used to determine if there are any differences in financial performance. This thesis examines performance for two types of business models: direct business models and indirect business models.

The statistical analysis shows that companies using direct business models have a significantly lower financial performance than companies using indirect business models. A regression model was fitted to explain what factors caused the difference. The analysis shows that the type of asset involved is indifferent to performance. What causes the difference in the data studied is instead the type of rights sold. Assets right or matching rights have a significant negative impact on performance while usage rights have a positive impact on performance. This thesis offers support to the notion that more and more information technology companies adopt indirect business models.

6.2 Implications, limitations, and further research

The thesis has some practical implications. Swedish information technology companies selling or distributing direct products should consider moving from selling asset ownership rights to selling usage rights. An example of this could be moving from selling internet routers to selling connectivity services where the routers are offered as part of a service package. Another example is to move from selling software as a product to selling software as a service (SAAS). Revenue is generated when the customers pay for using the software instead of for buying the software. One current example of this is Adobe's move to only offer its software application through a cloud-based subscription service. The result of this thesis offers support to the notion that this move is financially beneficial.

Besides the delimitations described in section 1.2, this section describes some limitations in generalizing the findings. First, although the thesis covers all small and medium publically traded companies in the information technology industry in Sweden over five years, the sample size is limited. Studying a broader industry would result in more sample data. In addition, the sample is limited to one industry only. The results cannot be generalized for other industries without further research. In fact, the analysis suggests that business model performance is industry dependent. One topic for further research would be to extend the research to another industry or to contrast two industries. One other limitation is the classification of the business models is only done once. By doing multiple classifications for the same companies over time would provide interesting data about how changes in business models affect performance.

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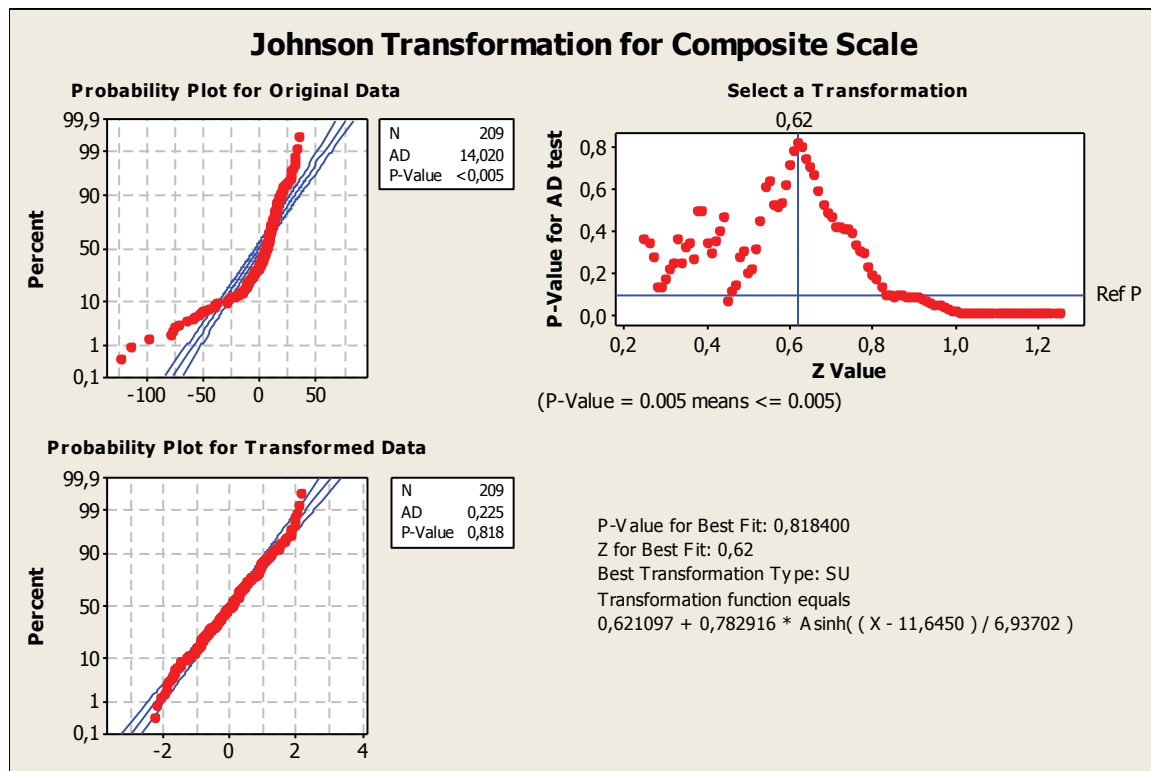
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Appendix 1 – Data Sample

Addnode Group Aktiebolag (publ)	Industrial and Financial Systems, IFS Aktiebolag
Anoto Group AB	Invisio Communications AB
Aqeri Holding AB	InXL Innovation AB
Aspiro AB	JLT Mobile Computers AB (publ)
Avega Group AB	Kentima Holding AB (publ)
AVTECH Sweden AB (publ)	Knowit Aktiebolag (publ)
BIMobject AB	MedCore AB
Bredband2 AB	Micro Systemation AB (publ)
Caperio AB	Mindmancer AB (publ)
Cassandra Oil AB	MSC Konsult Aktiebolag
Connecta AB	MultiQ International Aktiebolag
Cryptzone Group AB	Net Insight AB
CYBERCOM GROUP AB	NOVOTEK Aktiebolag
Deltaco Aktiebolag	Oniva Online Group Europe AB
Diadrom Holding Aktiebolag	Phonera AB (publ)
DORO AB	Precio Systemutveckling AB (publ)
Enea Aktiebolag	Prevas Aktiebolag
Exini Diagnostics Aktiebolag	Proact IT Group AB
FormPipe Software AB	ReadSoft Aktiebolag
Generic Sweden AB (publ)	Seamless Distribution AB
Header Compression Sweden Holding AB	Smarteq AB (publ)
Hifab Group AB	Softronic Aktiebolag
HiQ International AB	Stockwik Förvaltning AB
HMS Networks AB	Vitec Software Group AB (publ)
I.A.R. Systems Group AB	ZetaDisplay AB

Appendix 2 – Johnson Transformation



Appendix 3 – Minitab output

Two-Sample T-Test and CI: Composite Scale T; Degree trad

Two-sample T for Composite Scale T

Degree		N	Mean	StDev	SE Mean
trad 2					
0		179	0,160	0,950	0,071
1		30	-0,843	0,590	0,11

Difference = $\mu(0) - \mu(1)$

Estimate for difference: 1,002

95% CI for difference: (0,744; 1,261)

T-Test of difference = 0 (vs not =): T-Value = 7,77 P-Value = 0,000 DF = 57

Regression Analysis: Composite Scale T versus Physical; Financial; ...

The regression equation is

Composite Scale T = - 0,608 + 0,393 Physical + 0,849 Financial
- 0,016 Intangible + 0,345 Human - 0,588 Sale Sign
- 0,786 Sale Lim + 0,690 Usage - 1,65 Broker

209 cases used, 41 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-0,6085	0,2272	-2,68	0,008
Physical	0,3928	0,2004	1,96	0,051
Financial	0,8490	0,4816	1,76	0,079
Intangible	-0,0159	0,1562	-0,10	0,919
Human	0,3446	0,1803	1,91	0,057
Sale Sign	-0,5880	0,2027	-2,90	0,004
Sale Lim	-0,7857	0,2954	-2,66	0,008
Usage	0,6904	0,2290	3,02	0,003
Broker	-1,6482	0,6900	-2,39	0,018

S = 0,854160 R-Sq = 25,8% R-Sq(adj) = 22,8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	8	50,6344	6,3293	8,68	0,000
Residual Error	200	145,9177	0,7296		
Total	208	196,5521			