

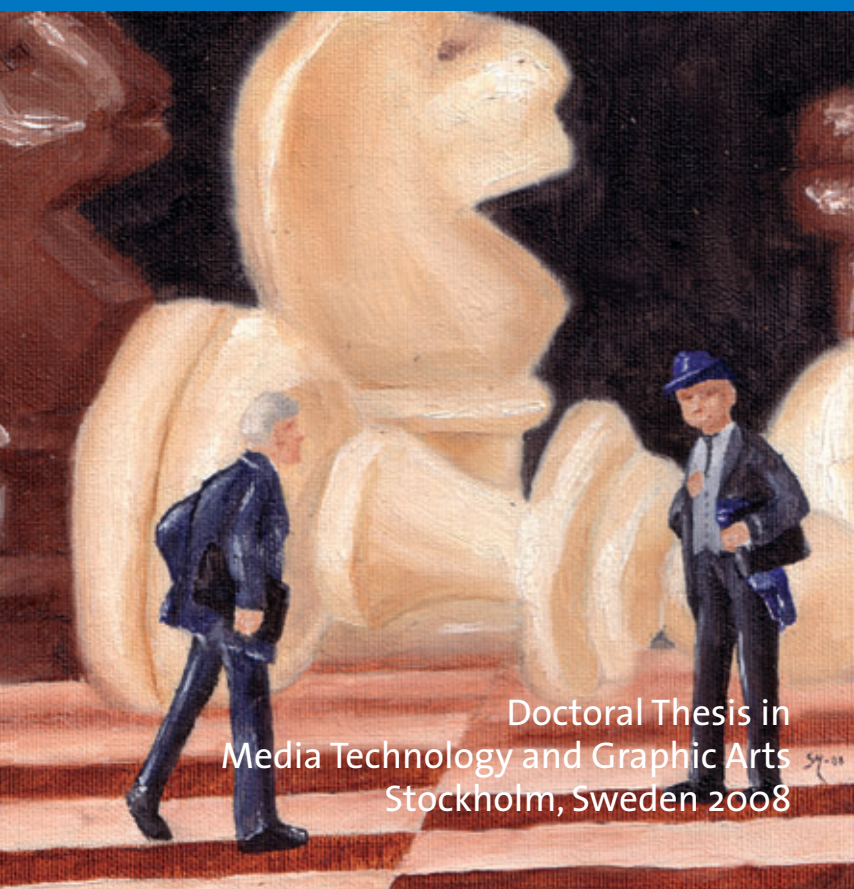
Institutional Arrangements and Competitive Posture

Effects of Company Structures in
the Commercial Printing Industry

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**KTH Computer Science
and Communication**



Doctoral Thesis in
Media Technology and Graphic Arts
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and Communication

Thomas Mejtoft

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Doctoral Dissertation in Media Technology and Graphic Arts
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*Institutional Arrangements and Competitive Posture:
Effects of Company Structures in the Commercial Printing Industry*

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To the ones who are always there.

Abstract

The research objective of this dissertation is to investigate the impact of institutional arrangements, with respect to vertical integration and cooperation, on competitive advantages within the commercial printing industry, with specific focus on digital printing. This dissertation comprises six research papers, based on four qualitative case studies and a quantitative survey study, all carried out in Sweden in the years 2004-2008.

The results show that vertical integration is a way to achieve competitive advantages in the commercial printing industry and is a widely used strategy in Sweden. Being able to contract full service companies is appreciated by customers to printing houses, especially direct customers, due to their need for a supplier of complete solutions for printed matters. Consequently, a vertically integrated company can provide value added services which makes it possible for customers to minimize their organization regarding production and purchasing of printed matters. Other reasons for vertical integration are the need to ensure fast deliveries to customers and having a steady supply of appropriate jobs. Despite the believed strategic importance by the industry, the results show that the level of vertical integration has no significant impact on profitability. Vertical integration is strategically important for digital printing houses in order to develop their business because digital printing allows for fast deliveries, on-demand printing and variable data printing. Despite the commoditization of printed matter, the findings indicate that the industry, in general, focuses on providing a high service level even though it means having to set higher prices. Furthermore, the results point toward that this strategic positioning is beneficial for digital printing houses because they experience a lower degree of competition and a lower price pressure.

Vertical integration can, however create inflexibility due to ownership and employment. The findings suggest that cooperation can be used to achieve fast access to valuable resources, such as production equipment and knowledge, and, hence, increase printing houses' resource flexibility. Even though internal control of resources is regarded as important to be able to satisfy customers' needs and produce customers' orders on time, cooperation with partners can create similar strategic effects. Furthermore, cooperation can give cost and flexibility advantages compared to vertical integration by reducing internal need for production capacity and allowing access to complementary resources. Nevertheless, it is common to combine vertical integration with cooperation to create competitive advantages and make a company more flexible and dynamic toward market changes.

Keywords: business strategy, cooperation; customer value, institutional arrangements, printing industry, vertical integration

Sammanfattning

Denna doktorsavhandling har till syfte att studera hur institutionella strukturer, såsom vertikal integration och samarbeten, påverkar konkurrensfördelar i den kommersiella tryckindustrin, med fokus på digitaltryckerier. Den här avhandlingen består av sex forskningsartiklar baserade på fyra kvalitativa fallstudier och en kvantitativ enkätundersökning, genomförda i Sverige under åren 2004-2008.

Resultaten visar på att vertikal integration både är ett sätt att uppnå konkurrensfördelar inom den kommersiella tryckindustrin och är dessutom en allmänt använd strategi i Sverige. Att ha möjlighet att kontraktera ett fullserviceföretag är uppskattat av kunder till tryckerier, speciellt direktkunder, på grund av deras behov av att ha en leverantör av kompletta lösningar för trycksaker. Ett vertikalt integrerat företag kan erbjuda värdehöjande tjänster som gör det möjligt för kunder att minimera sin organisation kring produktion och inköp av trycksaker. Andra anledningar till vertikal integration är behovet av att möjliggöra snabba leveranser till kunder och få tillgång till lämpliga arbeten. Trots den tilltro som industrin visar för den strategiska betydelsen av att vara vertikalt integrerad, påverkar inte nivån av vertikal integration den procentuella vinstnivån. Vertikal integration är strategiskt viktig hos digitaltryckerier för att utveckla deras affärer då digitaltryck är mest lämpligt för snabba leveranser, korta upplagor och variabeldatastryck. Trots att tryck anses som en produkt med mycket små skillnader mellan olika leverantörer, visar resultaten på att tryckindustrin generellt har fokuserat på att hålla en hög servicenivå men den konsekvensen att behöva ha en högre prisnivå. Vidare indikerar resultaten att fokus på en hög servicenivå har gjorts mer fördelaktigt av digitaltryckerier eftersom dessa upplever en svagare konkurrenssituation och en lägre prispress från marknaden än konventionella tryckerier.

Vertikal integration kan dock minska flexibiliteten på grund av ägande av utrustning och anställning av personal. Resultaten visar på att samarbeten kan användas för att få snabb tillgång till värdefulla resurser, såsom produktionsutrustning och kompetens och därigenom öka ett tryckeris resursflexibilitet. Trots att kontrollera resurser internt anses som viktigt för att tillgodose kunders behov och producera order på utlovad tid, kan samarbeten med partners skapa liknande strategiska effekter. Vidare kan samarbeten ge kostnads- och flexibilitetsfördelar gentemot vertikal integration genom att ge möjlighet att begränsa den interna kapaciteten och ge tillgång till kompletterande resurser. Det är med andra ord vanligt att kombinera vertikal integration med samarbeten för att skapa konkurrensfördelar och göra företaget mer flexibelt att möta förändringar på marknaden.

Nyckelord: affärsstrategi, digitaltryck, institutionell struktur, kundvärde, samarbete, vertikal integration

Preface

"In a world gone mad, only a lunatic is truly insane."

– Homer J. Simpson*

I would like to express my appreciation to everyone who has contributed to this work through friendship, knowledge, collaboration and experience. First of all, I would like to show my deepest gratitude to those who deserve it the most – *all my friends*, and especially *my family* for their friendship, support and encouragement while I was working with this research project. I would in particular like to mention my sister *Sara* for always making ideas into reality with her lovely paintings, my mother *Lena* for carrying loads of books back and forth to Umeå University Library and my father *Thommy* and my grandmother *Ruth* for their encouragement and never ending belief in me.

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* Quote from the TV show *The Simpsons*, *Thank God It's Doomsday* (Payne & Marcantel, 2005).

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Since this research is interdisciplinary and touches both media technology and business strategy, I have had a great dependence of the participation of *external persons, companies and organizations*. I am most grateful for the positive atmosphere that met me each and every time I wanted to make interviews, surveys or just wanted to talk and get input to my research. Without all them this dissertation would have been just an empty shell of ideas.

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Bye for now!

Örnsköldsvik, Sweden, October 2008.


Thomas Mejtoft.

List of Included Publications

Paper I

Mejtoft, T. (2006). *Strategies for Successful Digital Printing*. Journal of Media Business Studies, Vol. 3, No. 1, pp. 53-74.

Paper II

Mejtoft, T. (2006). *Perceived Satisfaction by Customers in the Digital Printing Value System*. TAGA 2006 Proceedings, pp. 486-511.

Paper III

Mejtoft, T. (2007). *Creation of Customer Value Using Digital Printing in a Dynamic Business Environment*. TAGA Journal, Vol. 3, No. 3, pp. 128-143.

Paper IV

Mejtoft, T., & Nordin, Å. (2007). *Strategic Alliances in the Digital Printing Industry*. TAGA 2007 Proceedings, pp. 38-62.

Paper V

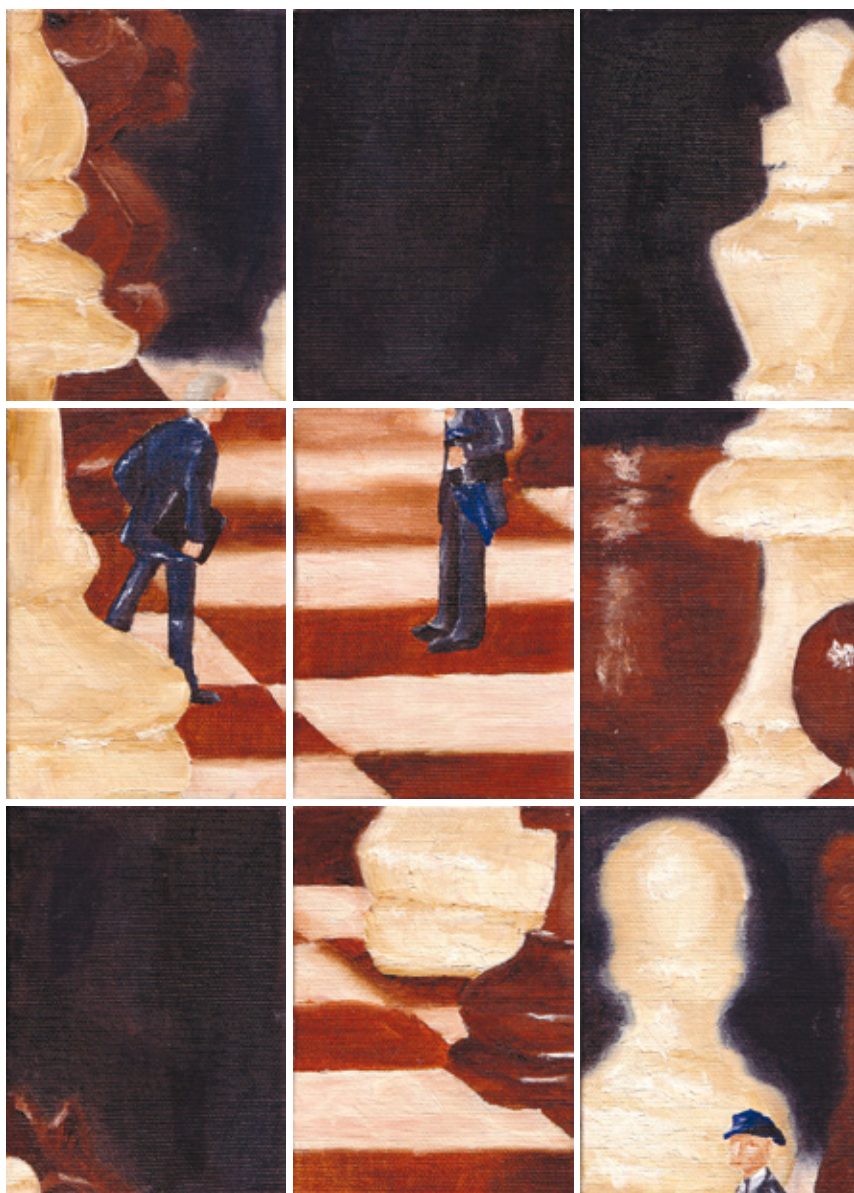
Mejtoft, T., & Viström, M. (2007). *Positioning in the Printing Industry – Differentiation in Terms of Price, Lead Time, Print Quality and Flexibility*. In N. Enlund, & M. Lovreček (Eds.), *Advances in Printing and Media Technology, Vol. 34* (pp. 327-336). Acta Graphica Publishers.

Paper VI

Mejtoft, T., & Viström, M. (2008). *Vertical Integration and Profitability: Experiences from the Commercial Printing Industry*. Submitted for publication.

Contents

1 Introduction	1	5.3 Summary of Paper III	74
1.1 Research Objective	3	Creating Disruption with a Hypercompetitive Behavior	75
1.2 Structure of the Dissertation	3	Moving from Arena to Arena	76
2 The Printing Industry	5	Integration with Non-Printed Solutions	76
2.1 Digital Printing Technology	6	5.4 Summary of Paper IV	77
2.2 Applications of Digital Printing	8	Added Value through Cooperation	77
2.3 Market for Digital Printing	11	Hypercompetitive Behavior and Alliances	78
2.4 The Swedish Printing Industry	13	Cooperation to Gain Advantages	80
Printing Technology	14	5.5 Summary of Paper V	80
Applications	15	Positioning of Printing Houses	80
3 Theoretical Framework	21	Perceived Market Demand and Competition	81
3.1 The Concept of Strategy	21	Strategic Positioning	82
3.2 Industry Value System	22	5.6 Summary of Paper VI	83
3.3 Competitive Strategy and Customer Value	24	Vertical Integration	83
Success Factors	26	Level of Integration	84
Purchasing Orientation and Customer Value	28	Integration and Profitability	85
3.4 Dynamic Competition	31	6 Discussion	87
Resource Based View	32	6.1 Institutional Arrangements	87
Strategic Flexibility	33	Vertical Integration and Competitive Advantage	88
Hypercompetition	34	Cooperation and Resource Flexibility	95
3.5 Institutional Arrangements	41	Institutional Arrangement for High Flexibility and Competitive Advantages	99
Transaction Costs	42	6.2 Implications for the Printing Industry	100
Vertical Integration	44	Value Added Services as a Service Provider	101
Cooperation and Alliances	48	Added Value from New Production Technology	103
4 Methodology	53	Interplay between Producers and Customers	103
4.1 Research Strategy	54	Competition in the Commercial Printing Industry	105
Case Methodology	54	Dynamic Competitive Behavior and Positioning for High Flexibility	106
Grounded Theory	55	Flexible and Competitive Organization	108
Qualitative Interviews	56	7 Conclusions	111
Quantitative Surveys	56	8 Further Research	115
4.2 Research Design	57	Bibliography	117
Case Companies and Respondents	58	Included Papers	
Study Time Frame and Location	60	Paper I	139
Methodology Used in the Included Papers	60	Paper II	161
4.3 General Methodology Criticism	66	Paper III	187
5 Summary of Results	69	Paper IV	209
5.1 Summary of Paper I	69	Paper V	233
Initial Problems on an Undeveloped Market	70	Paper VI	249
Vertical Integration to become Full Service Companies	70		
5.2 Summary of Paper II	72		
Purchasing Orientation	72		
Critical Success Factors	73		
Future Changes	74		



1 Introduction

“What is firmly established cannot be uprooted. What is firmly grasped cannot slip away.”

– Lao Tzu*

Technology is often an essential factor when determining the strategic path for a company. The impact of new production technology can vary and may e.g. change the rules of competition by increasing production speed and lowering production costs or enabling a unique way of producing a product or service[†] (Porter, 1985). In other areas commoditization of certain technologies makes it difficult to gain competitive advantages out of the technologies (e.g. Carr, 2003). During the 20th Century there have been advancements in countless different technological areas. Despite the invention of new and potentially “disruptive technology”[‡], the commercial success for many technologies has failed to take place. Consequently, it is easy to overemphasize the importance of technological factors at the expense of e.g. economical, social and cultural factors and it is important not to forget that there is a complex relationship between technology and strategy. According to Küng (2008, p. 128) *“technological advance arises from the interplay between innovation, government policy, organisational behaviour and social influences”* and Source & Pletka (2006, p. 117) state that *“technology alone cannot deliver good business results”*.

According to Bunch & Gould (1996, p. 3/1), businesses that seek success in the 21st Century have to *“overcome the challenges of very demanding customers seeking high quality, low cost products, responsive to their specific and rapidly changing needs”*. This calls for flexible and dynamic organizations to use technology and create new customer solutions to satisfy customers’ needs. Quick and powerful strategic changes and moves by competitors have made it increasingly hard to sustain competitive advantages and the general competition has become more aggressive and fast paced (e.g. Bourgeois & Eisenhardt, 1988; Brown & Eisenhardt, 1998; D’Aveni, 1994; Dierickx & Cool, 1989; Thomas, 1996; Wiggins & Ruefli, 2005). Regardless of the strong and increasing competition of today, competition has throughout history been described as hard, or even fierce, in many industries (e.g. Scherer, 1970; Schumpeter, 1939/1964; 1942/1975). There are many reasons why competition becomes increasingly tough in an industry, a common reason in mature industries is that production capacity has been overbuilt.

* Quote from *Tao Te Ching* (Tsu, 600BC/1997, ch. 54).

† The word *product* will be used from now on to cover both *products* and *services*.

‡ The term *disruptive technology* is credited as having been introduced by Clayton M. Christensen in 1995 (e.g. Bower & Christensen, 1995; Christensen, 1997).

One reason for the arise of overcapacity is introduction of new or changed production technology. In some cases new production technologies, either focused on a niche* or with a higher production capacity, make their way into the market while an old production technology is still left operating. This may cause overcapacity when there is an unbalance between production capacity and market demands (Porter, 1980). Overcapacity in production and commoditization of products may raise buyers' power and result in price competition among existing competitors in an industry where the products are not differentiated. This often happens in so-called fragmented industries (Porter, 1980). Industry fragmentation occurs when an industry has many players and consists mainly of small- and medium-sized companies. The consolidation level under this condition is generally low and no company or industry group has a significant market share and therefore cannot significantly influence the outcome of the development of the industry (Porter, 1980).

By adding value to the production process that customers appreciate, it may be possible to escape this situation. The value chain was popularized by Porter in the 1980's and usually the value adding process consists of many different activities (Porter, 1985). The competitive situation has created a need for a broad competence and resource base within a company's control to perform these activities. Hence, control over many different resources and competences are important, and this can be achieved either directly by ownership, or indirectly by cooperation (Håkansson & Johansson, 2002). These different approaches to institutional arrangements have different advantages and disadvantages.

Cooperating to perform the activities in the value chain has become increasingly common during the last decades (e.g. Hagedoorn, 1995; 2002; Hergert & Morris, 1988; Mariti & Smiley, 1983). In the US software industry the number of companies engaged in alliances grew from 32% to 95% during the 1990's (Lavie, 2007) and in general the number of alliances grew with 25% annually in the beginning of the 1990's (Bleeke & Ernst, 1995). According to Harrigan (1986a) cooperation has been of great importance in international business since the mid 1970's due to the technological and economical changes and Smith et al. (1995, p. 20) suggest that cooperation between organizations *"continues to be a major topic of interest and relevance in the present organizational world"*. Companies that do not cooperate with others or buy an activity on the market have to perform the activity internally.

To internally integrate the needed value added activities, so-called vertical integration, is advantageous in many situations. According to Harrigan (1984, p. 638) vertical integration can be used to control *"a ready supply of raw materials and services, as well as a ready market for their firms' outputs"*. Vertical integration has been common in many industries for a long time and is a way for a company to lower transaction costs and create competitive advantages. Common examples of early successful vertically integrated company structures are the US steel industry at the end of the 1800's and the automobile manufacturer Ford in the beginning of the

* Niches are *"pockets of demand that possess a unique willingness to pay premium prices for certain product attributes (such as high quality, rapid delivery, or customized designs, for example), and which cannot be served by all comers"* (Harrigan, 1985a, p. 28).

1900's (e.g. Chandler, 1962; 1977; Dennison, 1939; Harrigan, 1984; Nugent & Hamblin, 1996; Schumpeter, 1939/1964; Willoughby, 1901).

1.1 Research Objective

The research objective of this dissertation is to investigate the impact of institutional arrangements, with respect to vertical integration and cooperation, on competitive advantages within the commercial printing industry. Furthermore, this study aims to investigate how different institutional arrangements affect the success of introducing a new production technology in a fragmented, mature and highly competitive industry.


The research has been focused on the following research questions:

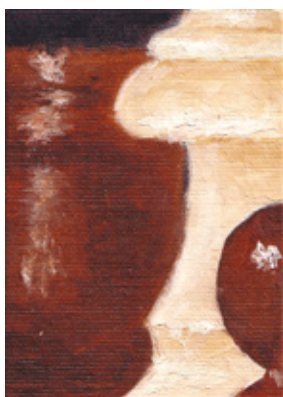
- How can the choice of institutional arrangement affect the success of introducing a new production technology?
- How do different institutional arrangements affect the competitive advantage of a company when working with new production technology?
- How do different institutional arrangements affect resource flexibility?

The studies have been carried out by using the commercial printing industry as a case with a special focus on companies using digital printing technology.

1.2 Structure of the Dissertation

This dissertation consists of six papers included at the end. In Chapters 2 and 3, previous research and a literature review are introduced along with the theoretical framework for the included papers and this dissertation. The background for the methodological framework is presented in Chapter 4. The results from included papers are summarized in Chapter 5. In Chapter 6 the results are discussed Chapter 7 states the conclusions made. The discussion has been divided into two parts, the results being discussed first from a more theoretical point of view (Section 6.1) and later being focused on the implications for the case industry (Section 6.2). Ideas and suggestions for further research have been stated in the last chapter, Chapter 8.





2 The Printing Industry: Technology and Market

“Again, your challenge is not just to improve. It is to break the service paradigm in your industry or market so that customers aren’t just satisfied, they’re so shocked that they tell strangers on the street how good you are.”

– Jack Welch*

Throughout history reproduction of text has been very important. Before the 20th century, printing was the only way of spreading marketing messages and information to customers when referring to non-personal communication channels (Kotler et al., 2005) and the printing houses were in many cases the owners of the content. Printing was first conceived in China between the 6th and 9th century, where images and text were carved into woodblocks and, with use of paint, transferred onto paper. A couple of hundred years later, during the Song dynasty†, Bi Sheng invented the movable type (Romano et al., 1999), but it was not until the middle of the 15th century that printing was invented again in Europe by Johann Gutenberg, as he constructed the first real printing press. Since then many different printing technologies have been invented. Today the predominant printing technology is *offset lithography* or colloquially just *offset*, some other conventional printing techniques are *letterpress* (e.g. *flexography*), *screen printing* and *rotogravure* (Kipphan, 2001). However, until the first *digital printing presses* were introduced in the mid 1990’s, all printing technologies had something in common – the static printing form.

During the beginning of the 20th century, printing became an important channel for delivering mass communication to accompany all mass produced products. This demanded more and more printing (Rossell, 1959). During the later half of the 20th century many new, non-printed, channels for reaching a mass audience have been introduced. Communication mediums like radio, television and Internet have changed the way that information and marketing messages are pushed and pulled to and from customers. The new channels, with the global spreading of the Internet now leading the way, have however made print just an output channel among others and printing houses are no longer the obvious owners of the content. In marketing a company often adopts a channel mix of many different marketing channels. This means that printed material competes for the same budget as for example television, Internet and tele-marketing (Kotler et al., 2005).

* Quote from *Winning* (Welch & Welch, 2005, p. 343).

† The Song Dynasty lasted between 960-1279 AD, but it is said that Bi Sheng invented the movable type somewhere between 1040-1048 AD (Romano et al., 1999).

When professional digital printing was picked up from the lower segment of office and desktop printers with enhancements in print quality and speed, it implied a change in how information could be printed and customized for the target audience. This new “disruptive technology” was adopted as a complement by many printing houses to satisfy their audience. At the same time digital printing technology to some extent was very like ordinary printers, this opened the market to many new actors from close and related areas, such as prepress and distribution.

The printing industry has historically consisted of many privately owned small- and medium sized companies. This fragmentation of the industry is still the general situation today (Gilboa, 2002; Kipphan, 2001), even though the situation is constantly changing with mergers and bankruptcies (e.g. Intergraf, 2007; Smyth, 2006). According to recent studies by Pira International (Smyth, 2006), about 90% of the European printing companies employ less than 15 people. Digital printing companies in the US have a median of 16 employees and an annual \$2 million in sales (Caslon & Company, 2005). Since the technological advancements in printing have been rapid, printing houses have bought new technology with greater capacity at the same time as much of the old printing equipment is left working side by side with new presses. Over time, the total printing capacity has been expanded in Western Europe and the US, and there have been continuous price reductions on print (Birkenshaw, 2004; Smyth, 2006). This has led print to be regarded as a commodity product today. A commodity product is a product that is, in the eyes of the customer, interchangeable with a competitors’ product of the same type. Commodities are often sold primarily on basis of price, which also is the case in the printing industry. This development has been accelerated by the increase in personal computers and the high print quality of home and office printers available today. It is currently possible to create simple print media without professional help.

2.1 Digital Printing Technology

“Any sufficiently advanced technology is indistinguishable from magic.”

– Arthur C. Clarke*

Conventional printing technologies like offset, flexography and gravure printing have all something in common; they need a static master to transfer the image onto the substrate. The master, most often a printing plate, is usually quite expensive to produce, which makes it necessary to print many copies before recovering the fixed cost of the printing plate. As the master is static, it is not possible to print anything else than the image created on the master.

Digital printing technologies are, in contrast to conventional printing, “*printing technologies that do not require a solid printing plate (master) with a fixed image and that can basically produce successive pages with different printed images*” (Kipphan, 2001, p. 677). This means that a computer file can be sent from the computer through the Raster

* Clarke’s Third Law, quoted from the essay *Hazards of Prophecy: The Failure of Imagination in Profiles of the Future* (Clarke, 1973, p. 21).

Image Processor (RIP) to the digital printing equipment and printed directly without any non digital intermediate medium, like a printing plate, in-between the computer file and the printed matter (Figure 1).

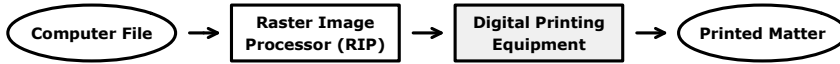


Figure 1. Computer-to-Press workflow of digital printing technologies (After Kipphan, 2001, p. 677).

The two most common digital printing technologies used today are *electrophotography*^{*}, also known as xerography[†], and *inkjet*[‡]. These two technologies differ in many ways as electrophotography is based on toner transfer via a charged drum that carries the image onto the substrate, which is heated to get the image to stick. In inkjet the image is sprayed with ink from nozzles directly onto the substrate. This means that in inkjet no image carrier is needed and that the print can be produced without any contact with the substrate.

In commercial printing at printing houses the most common equipment for printing advertising material etc. is electrophotography. Inkjet is more flexible as it does not need heat and pressure for the image to stick to the substrate. With inkjet it is also possible to print onto many different substrates and already folded boxes and packages. There is a strong trend in the increased use of printing onto substrates that are not fiber based (e.g. plastics, fabrics, metals etc.) to create customer value (PODi, 2003).

Even though digital printing technologies still have much slower printing speeds than conventional printing technologies, there are constant improvements in the speed of the digital printing units. In an investigation done in 2005, it was noticed that the speed of electrophotography ranges from a few pages (A4 or letter) per minute in simpler laser printers to approximately 120 pages per minute for high-end production presses (Mejtoft, 2005). Inkjet on the other hand can be used both for high print quality and high print speed, nevertheless, there is a trade-off between them. At high speed, approximately 120-150 m/min, the suitable applications are e.g. letters, financial statements and transpromo. At lower speeds, inkjet can be used for anything from printing photos to wide format printing like backdrops.

As mentioned earlier digital printing is not one technology but several and looking at electrophotography and inkjet the print quality differs and is somewhat dependent on printing speed. For lower speeds, e.g. high quality desktop inkjet

^{*} The process of electrophotography, which is also used in ordinary laser printers, was invented by Chester Carlson in 1938 (Mizes et al., n.d.) and the first patent (U.S. Patent No. 2,297,691, 1942) was filed in the end of the 1930s.

[†] Chester Carlson coined the word xerography from the Greek words *xeros* (dry) and *graphos* (to write). Carlson used the technology at a small company called Haloid, which later on became known as Xerox.

[‡] In 1879 the principles of a liquid stream breaking up into droplets was described by Lord Rayleigh and in 1951 the patent resulting in the first commercial inkjet printer was issued (Le, 1998; U.S. Patent No. 2,566,443, 1951).

printers, the quality is as good as for photocopies while at higher speeds, like web electrophotography or high-speed inkjet, the quality is not quite as high. Nevertheless, most agree that the print quality is good enough for the applications that digital printing is currently used for (Kipphan, 2001) and is starting to approach the print quality of offset (Johansson et al., 2006; Kipphan, 2008).

For more information about different printing technologies, please refer to the literature (e.g. Kipphan, 2001).

2.2 Applications of Digital Printing

“You can use this technology to do unbelievable creative things.”

– Frank J. Romano*

One of the drawbacks of printed communication before digital printing was the difficulty of achieving cost efficiency in smaller production volumes (e.g. Kipphan, 2001). The setting-up of a print run and the start-up of the printing press before quality copies can be produced have been labor and time intensive. The perspective of printing, as only a mass communication medium, changed in 1993 when the two companies Indigo and Xeikon introduced digital color printing with professional quality at the Ipex exhibition in 1993 (Bennett et al., 2006). Both were based on the principle of electrophotography, but they had different approaches to the technology, spanning from liquid toner and cut-sheet paper to dry toner and web paper. Nevertheless, they both promised inexpensive short runs[†] and possibilities of customization using variable data printing.

In general, digital printing is a more flexible and easy-to-use technology than conventional printing technology, such as offset. In the report *“Best Practices in Digital Print”*, the non-profit digital printing industry consortium Print On Demand Initiative, PODi, (2003) identifies two major economic driving forces for success in digital printing – increased effectiveness and increased efficiency. With increased effectiveness, PODi refers to documents working as effective business tools and increased efficiency is the efficiency of the digital printing workflow and reduced waste. Benefits with digital printing are lowered start-up costs, fast turnaround times, faster lead times and the ability to customize matters by using variable data printing. In 2005 and 2006 PODi reported that there are two fundamental benefits of digital printing and all-digital workflows – increased effectiveness and decreased cost (PODi, 2005; 2006). Among PODi's case studies it is *“projects that offer both increased effectiveness and decreased cost [that] continue to have the highest value”* (PODi, 2006, p. 44). The main applications of digital printing today are based on short runs, customization using variable data printing and distributed printing.

* Quote referring to digital printing technology from the speech *Designing for Digital* (Romano, 2004).

[†] Short print runs are, in general, considered to be fewer than 5000 copies (Bennett et al., 2006).

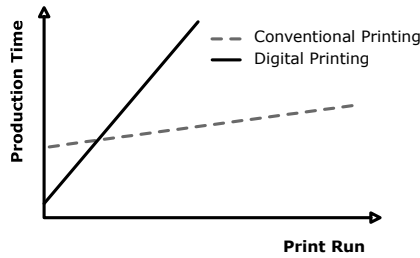


Figure 2. Digital Printing has a shorter make-ready time but a lower print speed than conventional printing technologies (After Kipphan, 2001).

According to Smyth (2003, p. 302), “digital printing has changed a lot of the restraints of delivery times” due to absents of set up times. This allows short times for the first delivery-ready copy to be completed, which makes digital printing suitable when a printing house wants to accomplish fast deliveries (Figure 2). However, the cost for digital printing is considerably higher in larger volumes compared with conventional printing technology. In general, the big difference, when calculating cost per piece, between digital and conventional printing is the very low fixed cost per print run of digital printing since no printing plates have to be produced. This makes the cost of digital printing almost flat in respect to the length of the print run in comparison with the declining cost of conventional printing technologies (Figure 3) (Kipphan, 2001; Mejtoft, 2005). By eliminating a high start-up cost it is possible to print “*what the customer needs, when the customer wants it*” (Gilboa, 2002, p. 134), so-called *print-on-demand*.

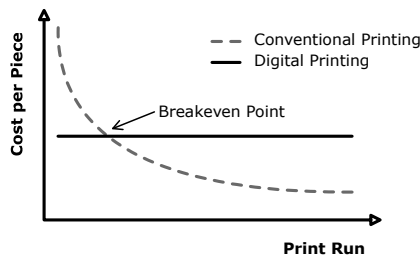


Figure 3. Digital printing has low fixed costs but higher variable costs.

The technological development of both digital and conventional printing has been rapid. New and improved printing equipment and software are introduced continuously with enhancements in speed, print quality and usability. If an ordinary static document is to be printed, a breakeven point between the two printing technologies is possible to distinguish (Figure 3). However, when digital printing is used for customization, it is not possible to discuss breakeven points, since it is not possible to create customized prints using conventional printing technologies. The variable cost of digital printing is constantly decreasing at the same time as the fixed cost of conventional printing has been reduced. This makes it difficult to declare a

definitive breakeven point between the two technologies, but it is normally at a run length between a couple of hundred to a couple of thousand copies*.

Since digital printing technology is based on the concept that *“every copy needs to be imaged in the printing surface, every copy can also be varied on the printing surface”* (Romano et al., 1999, p. 132). This means that it is, in digital printing, possible to customize different copies in a print run to specific individuals based on different input variables, so-called *variable data printing*. Romano et al. (1999, p. 134) states that *“the basis of customized printing is the combination of variable information with output devices that do not require intermediate films or plates”*. This combination can be achieved in many different ways, the most common in professional production is using variable data software. Simplified, software connects a database to a template and inserts different names, images and texts from a post in a database depending on the recipient. This makes it possible to print personalized material for use in e.g. one-to-one marketing (e.g. Peppers & Rogers, 1993), which is a way to enhance customer loyalty (Aaker, 1996).

It is very easy to say that variable data printing is a great way of using the technology. However, one should bare in mind that the complexity is not in the actual printing stage of the value chain but in the design and production of the electronic document to be printed. Bennett et al. (2006, p. 19) state that *“it is also important to understand that the more varying elements there are in a piece, the more complicated it can be to design and print. As the complexity of the piece goes up, so does the overall cost of the project”*. The UK based retail store Tesco is a successful example of a company that has a customer loyalty club card, which is used to collect information about their customers to create customer insight. The collected information is used for creating profiles of purchase patterns of their members to regularly send out customized mailings with offers that suit each member's purchase profile. However, the information is also used for retail decision making, such as evaluating promotions and launches of new products (e.g. Humby et al., 2003).

Using sophisticated systems for collecting information is important to render possible accurate personalized mailings. According to former PODi general manager Carolyn Valiquette (2004), *“relevance is the single largest lever on response in individualized marketing communications”*. Broudy & Romano (1999) have shown the significance of variable data printing in terms of increased response rates when a company is conducting a personalized campaign to a certain customer segment. It is also proposed that customizing information enhances how appealing an advertisement is to a recipient (Gidlund et al., 2008). Customization may thus increase the competitiveness of the company.

Professional variable data software outputs different formats that are readable for the digital printing press. Many of these formats and languages for variable data printing are based on languages that make it possible for the RIP to process each object (e.g. images) just once and reuse these when they are occurring at several

* In a report from 2003 (Smyth, 2003), Pira International suggests that the economic breakeven point between digital printing and offset is approximately 1400 copies. Between digital printing and direct imaging, the breakeven point is around 400 copies.

places in a document. This is in contrary to e.g. Portable Document Format (PDF) (Adobe Systems Incorporated, 2006), where every page is individually processed, making the load on the RIP considerably lower. In 1999 PODi made an effort to create a standard for variable data printing, which resulted in the free to use open specification of Personalized Print Markup Language (PPML) based on Extensible Markup Language (XML). Today many printing press and RIP manufacturers have incorporated support for PPML in their software (PODi, 2003; PODi PPML Working Group, 2002).

Another way of effectively using digital printing as a production technology is *distributed printing*. By sending electronic files to be printed at different locations it is possible to avoid expensive distribution costs and loss of time. One example is the different networks for distributed printing of newspapers. They span from small print stations placed at airports and hotels around the world to large-scale production facilities that print and distribute digitally printed newspapers in ordinary distribution chains (Mejtoft, 2004).

2.3 Market for Digital Printing

“The sales [of digital printing equipment] in the early days were extremely slow.”
 – Frank J. Romano*

The printing industry, in general, is a mature industry[†] and has historically been fragmented (Gilboa, 2002), consisting of many privately owned small- and medium sized companies. This is still the general situation (e.g. Caslon & Company, 2005; Gilboa, 2002; Intergraf, 2007; Smyth, 2006). However, the landscape of the printing industry is constantly changing with mergers and bankruptcies. Furthermore, the commercial printing industry is in general considered as a low margin industry, with declining prices, and the competition within the industry is regarded as strong or even fierce (Birkenshaw, 2004; Smyth, 2006).

The technological advancements in printing have been rapid and old conventional printing technology is often still left operating, either side by side in the same company where digital printing technology has been acquired or it has been sold to another printing house. This has resulted in expanded printing capacities in Western Europe and the US (Birkenshaw, 2004; Smyth, 2006).

According to Pira International (Smyth, 2006) the growth of the printing industry in Europe was 9.3% between 2001-2006 (Table 1). During the same time the growth of digital printing was 195.9% and offset 4.2%. Hence, even though the general printing industry is mature and growing slowly, the sub industry regarding digital printing is a relatively new industry that is still emerging as the revenues in digital

* Quote from the speech *Designing for Digital* (Romano, 2004).

† According to Harrigan (1985a, p. 12) mature industries are characterized by that they “generally grow slowly (less than 10 percent annually in real terms), where demand is frequently inexpandible, and where product traits are generally familiar to consumers or users”.

printing are experiencing a rapid growth. However, the sales of offset were more than seven times the sales of digital printing during this time. The pattern is similar for the Swedish printing industry with a total growth of 4.1%. Digital printing grew with 187.6%, but the offset market was actually decreasing with -1.1%. In 2006, the Swedish printing market was the seventh largest in Europe, with Germany being the largest. The forecast for the digital printing market is that it will continue growing, but not as fast. The European digital printing market is estimated to grow by 26.9% from 2006-2011 and the Swedish digital printing market by about 29.0%. Since capacity expansion is something that usually remains for a long time, it is important to realize the potential consequences of expanding the capacity in an industry. In the printing industry this overcapacity has resulted in continuing price reductions and commoditization of printed products (Birkenshaw, 2004).

Table 1. Size and growth of the European and Swedish printing market 2001-2006 and forecast 2006-2011 (Smyth, 2006).

	2001 [M€]	%	2006 [M€]	%	2011 [M€]
European Market:	141'909.5	9.3%	155'056.3	6.5%	165'184.6
Offset:	78'441.9	4.2%	81'715.4	2.1%	83'460.4
Digital:	4'012.2	195.9%	11'872.1	26.9%	15'060.3
Swedish Market:	4'736.0	4.1%	4'929.1	4.0%	5'126.8
Offset:	3'263.8	-1.1%	3'227.5	-1.0%	3'195.9
Digital:	91.0	187.6%	261.6	29.0%	337.6

The fast technological development is not only a fact in the printing industry but also in many parts of the graphic arts industry, which now uses digital workflows. This has introduced new possibilities in managing the value chain to cut costs and make workflows more effective. New technology may change the current rules of competition by e.g. increasing speed and lowering production costs or enabling a unique way of producing a product (Porter, 1985). This is what happened after the introduction of digital printing technology. Although the speed is far lower than for conventional printing technologies, digital printing has resulted in the possibility to produce small series or even one unique copy at a reasonable cost.

Digital printing affects several segments of the media industry by offering the possibility to output small editions at a competitive cost. This can be done for obvious applications like advertisements and direct mail, but also for traditionally large edition items like newspapers and books*. Amazon.com's system with print-on-demand is a way to avoid costly stock-keeping of low selling volumes and still be able to offer these volumes to potential customers (Anderson, 2004; 2006). In his article *The Long Tail*, Chris Anderson (2004) addresses the issue of books printed

* A book is a typical printed product and the acceptance of electronic books is expected to take some time. According to a survey of 164 European experts (Friedewald et al., 2007), about 20% of all books will be purchased electronically in the year 2017. Around this time it is also to be expected that reading devices for electronic books will be comparable to reading magazines.

on-demand: “By divorcing bookselling from geography, these networks create a liquid market at low volume, dramatically increasing both their own business and the overall demand for used books. Combine that with the rapidly dropping costs of print-on-demand technologies and it’s clear why any book should always be available. Indeed, it is a fair bet that children today will grow up never knowing the meaning of out of print”.

Customization with a customer’s name in direct mailing is an application that has been around for a long time. The development of new advanced Customer Relationship Management (CRM) systems and efficient workflows has made it possible to create more advanced personalized campaigns. Lately, differentiating and adding value to the printed product and becoming a service provider have become widely discussed issues in the printing industry (e.g. PODi, 2003; PODi, 2006; Romano, 2004). As has been discussed by Broudy & Romano (1999) and Gidlund et al. (2008) customization may increase the competitiveness of a company by making their market offers more attractive. PODi (2003) also has identified direct mail as a medium that has advantages over electronic media in both reach and acceptance among recipients.

2.4 The Swedish Printing Industry

“In real life, strategy is actually very straightforward. You pick a general direction and implement like hell.”

– Jack Welch*

This chapter is mainly based on data and conclusions presented in the papers “*Delivery Times and Closeness to Geographic Market: A Comparison between Digital and Conventional Printing Houses*”[†] (Mejtoft & Viström, 2008) and “*Importance of Short Production Runs, Variable Data Printing and Web Interfaces – A Comparison of Digital and Conventional Printing Houses*”[‡] (Viström & Mejtoft, 2007). Some additional data in the section *Printing Technology* is previously unpublished, but originates from the same survey study (Mejtoft & Viström, 2006).

* Quote from *Winning* by Jack Welch, former CEO and Chairman of General Electric (Welch & Welch, 2005, p. 165).

† Paper originally presented at iarigai’s 35th International Research Conference in Valencia, Spain, September 2008. Paper to be published in *Advances in Printing and Media Technology*, Vol. 35.

‡ Paper originally presented at iarigai’s 34th International Research Conference in Grenoble, France, September 2007. Paper published in *Advances in Printing and Media Technology*, Vol. 34.

Printing Technology

"We will continue to live as we do today in an age of creative destruction -- technologically induced creative destruction."

– Paul Saffo*

The most common printing technology at Swedish commercial printing houses is offset (Figure 4). 57.4% of the printing houses have digital printing (and it contributes to 10% or more of the production). However, only 11.0% have exclusively digital printing and 44.9% have both offset and digital printing at the printing house.

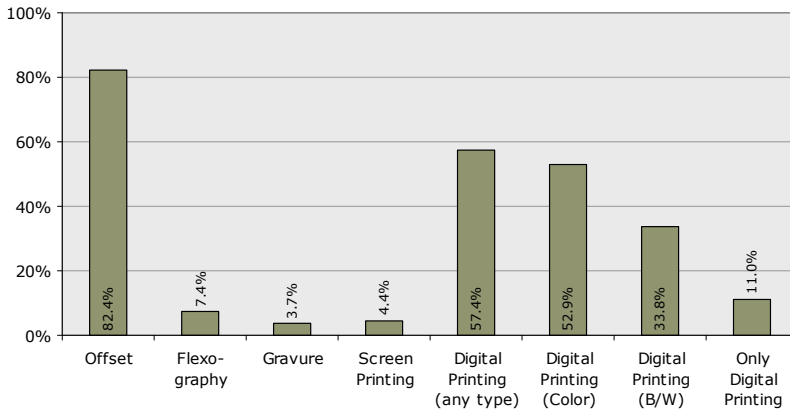


Figure 4. Percentage of Swedish printing houses having a certain printing technology.

In respect to the number of digital presses present at each company, most companies have one to two presses, whilst it is uncommon to have more than two presses (Figure 5).

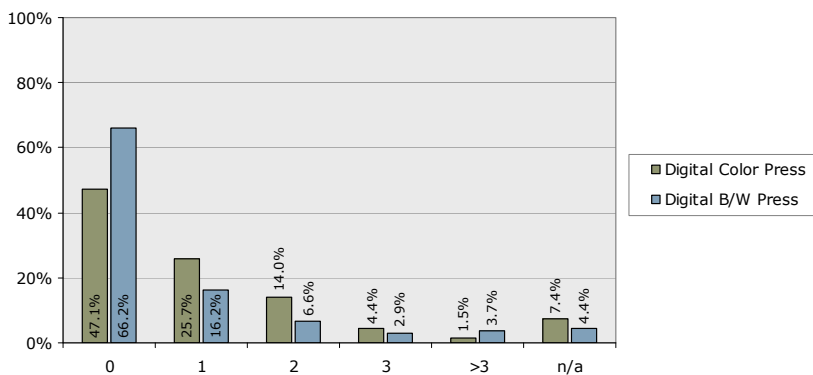


Figure 5. Percentage of Swedish printing houses having a certain number of digital printing presses.

* Quote regarding the *long-term technology trends and their influence on society* (Oakes, 2000).

Applications

"Strategic positioning means performing different activities from rivals' or performing similar activities in different ways."

– Michael Porter*

Digital printing has an advantage over conventional printing technologies in meeting the need for short production runs at a reasonable cost and providing short delivery lead times. Furthermore, digital printing technologies have the ability to produce customized prints using variable data printing.

Short Production Runs

"Since bits are turned into atoms only when an order comes in, the costs scale perfectly with the revenues."

– Chris Anderson †

The general trend in printing is that editions are becoming shorter, this makes it important to offer short production runs. Both conventional and digital printing houses rank this application high (Figure 6).

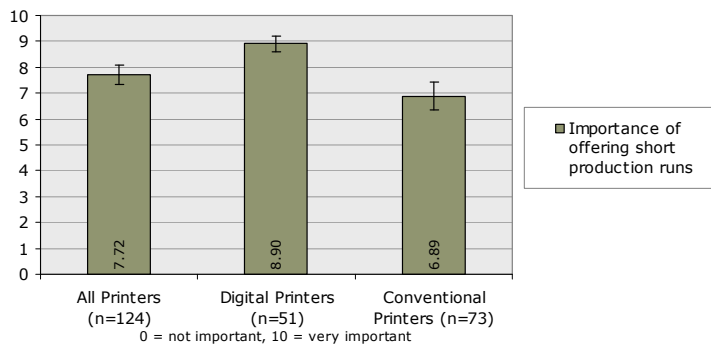


Figure 6. Importance of offering short production runs (mean values with a 95% confidence interval).

However, it should be noted that there is a significant difference between digital and conventional printing houses ($p\text{-value} = .000$), where digital printing houses believe that short production runs are even more important to offer. This is not surprising since short production runs are one main argument for using digital printing and both conventional and digital printing houses rank the potential of meeting the demand for short runs by using digital printing high (Figure 7). Hence, it seems like there is a reliance on the digital printing technology even among conventional printing houses, even though their ranking is significantly lower ($p\text{-value} = .004$).

* Quote from *What is Strategy?* (Porter, 1996, p. 62).

† Quote from *The Long Tail* (Anderson, 2006, p. 95).

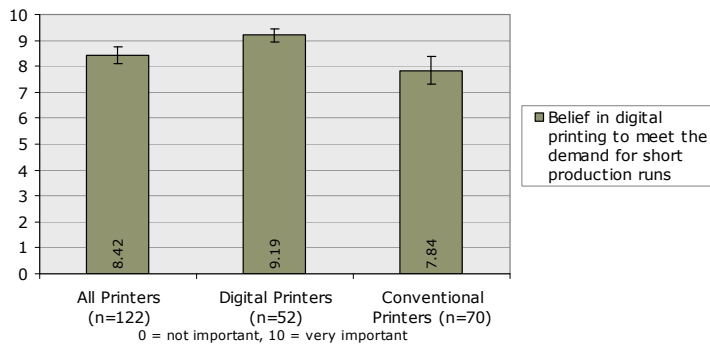


Figure 7. Belief in that digital printing meets the demand for short production runs (mean values with a 95% confidence interval).

Delivery Lead Times

“On-time delivery requires that operations, outbound logistics, and service activities such as installation should function smoothly... good coordination allows on-time delivery without the need for costly inventory.”

– Michael Porter*

The grading of the importance of providing short delivery times is in general high and there are just small differences between conventional and digital printing houses (Figure 8). Even though no significant differences can be detected, digital printing houses tend to grade the importance of short delivery times slightly higher than conventional printing houses do.

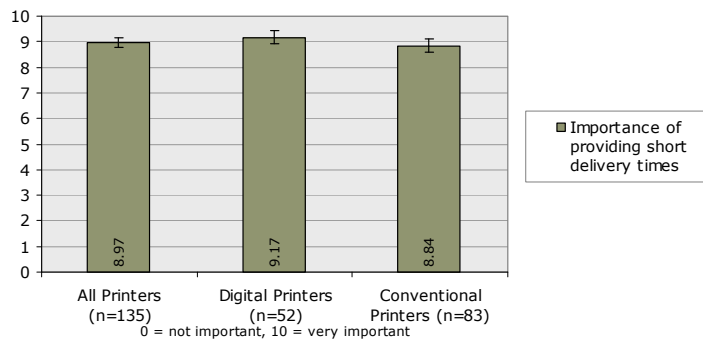


Figure 8. Importance of and perceived customer satisfaction with delivery times (mean values with a 95% confidence interval).

* Quote from *The Competitive Advantage of Nations* (Porter, 1990, p. 42).

Digital printing houses provide significantly ($p\text{-value} = .000$ for both) shorter delivery times both in terms of mean delivery time and shortest delivery time* (Figure 9). The shortest delivery time for digital printing houses was on average 0.82 days, while conventional printing houses used twice the time, 1.69 days, on average. A similar pattern can be noticed regarding mean delivery times.

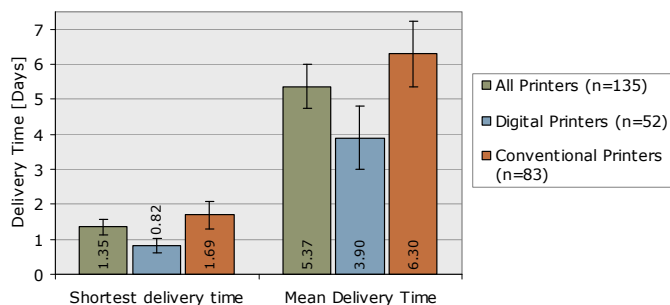


Figure 9. Shortest and mean delivery times (mean values with a 95% confidence interval).

Digital printing is regarded as important for achieving short delivery times (Figure 10). However, there was a significant ($p\text{-value} = .000$) difference between digital and conventional printing houses, and digital printing houses are more confident in digital printing being the solution for providing short delivery times.

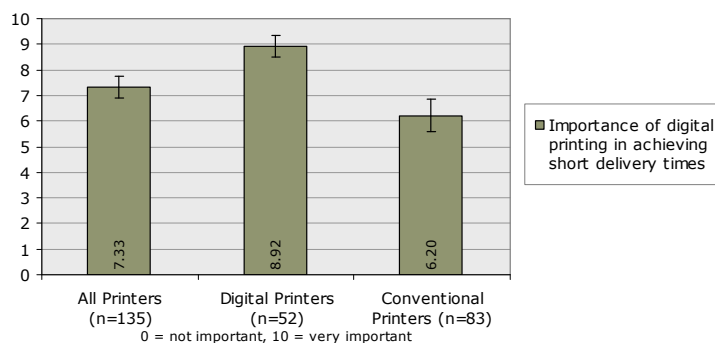


Figure 10. Importance of digital printing in achieving short delivery times and high delivery reliability (mean values with a 95% confidence interval).

* Lead time from finished original to delivery ready prints.

Variable Data Printing

“Use relevance, not just personalization.”

– Carolyn Valiquette *

The sales and use of variable data printing was one of the features that were predicted to grow and have a great importance in the use and success of digital printing. However, this expected growth has failed to appear and still today the use of variable data printing is very low.[†] In the Swedish printing industry 77.4% of the digital printing houses offer variable data printing. In relation to the complexity of a variable data production the number of printing houses providing the service declines with more complex personalization (Figure 11).

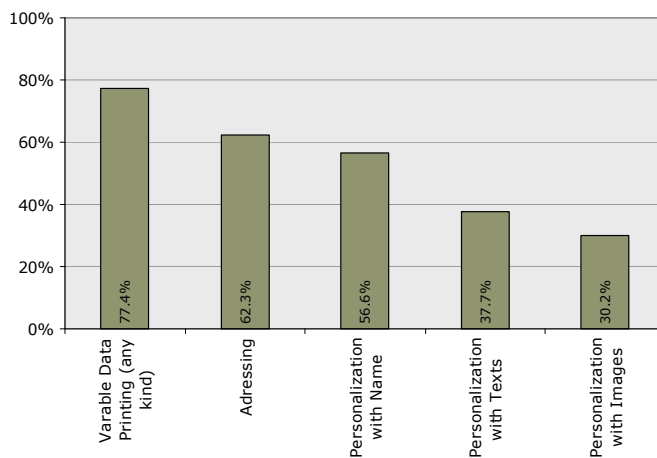


Figure 11. Different levels of variable data printing offered by digital printing houses in Sweden.

Regarding the importance of offering variable data printing it seems like digital printing houses to a greater extent have realized the value of providing this service (Figure 12) as there is a significant difference ($p\text{-value} = .000$) between conventional and digital printing houses with respect to importance of providing variable data printing.

* Quote on *common traits of successful digital printing projects* by Carolyn Valiquette, former PODi general manager (Valiquette, 2004).

[†] A contact at a US based digital printing house stated the frustration of trying to market and sell variable data printing: *“We have been explaining and showing ROI possibilities but we are still sidestepped by traditional telemarketing strategies”*.

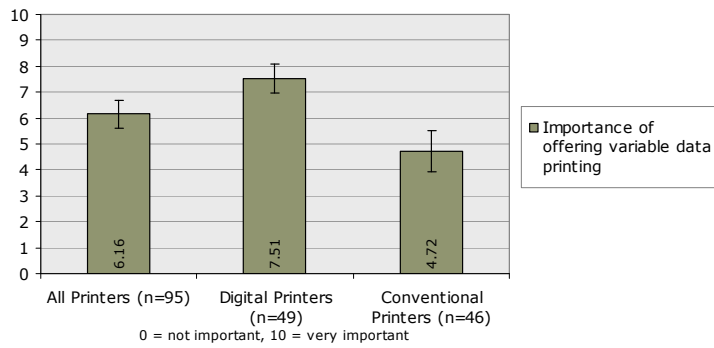
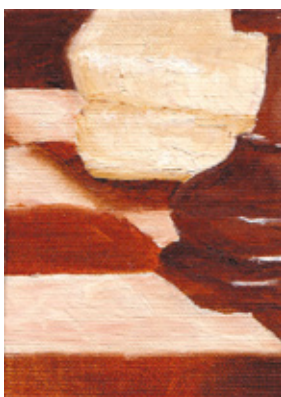


Figure 12. Mean values of the importance of offering variable data printing (mean values with a 95% confidence interval).



3 Theoretical Framework

"If human life were long enough to find the ultimate theory, everything would have been solved by previous generations. Nothing would be left to be discovered."

– Stephen Hawking*

Almost all research areas can take advantage of other scientists' work. In the book *The Metalogicon* from 1159, John of Salisbury (1159/1955, p. 167) made a remark about his mentor Bernard of Chartres as he stated that "*Bernard of Chartres used to compare us to [puny] dwarfs perched on the shoulders of giants. He pointed out that we see more and farther than our predecessors, not because we have keener vision or greater height, but because we are lifted up and borne aloft on their gigantic stature*"[†]. This doctoral dissertation is no exception to this and takes advantage of what others have contributed to the research community. This chapter describes the framework that constitutes the theoretical basis of the dissertation. To illustrate the impacts on the printing industry, some practical examples have been incorporated in the theoretical framework. These are indicated by indented paragraphs.

3.1 The Concept of Strategy

"I just don't know what I'm supposed to be."

– Charlotte‡

There are many different definitions and meaning of *strategy* and the word originates from ancient Greece and military command.[§] The tradition of scholarship in strategy dates back to the writings of the legendary Chinese general Sun Tsu, who lived around 500BC during the warring years of the late Zhou dynasty^{**}. Sun Tsu wrote one of the first and most famous books about strategy – *The Art of War*. Strategy is basically about making choices that affect outcome and regarding business, Chandler (1962, p. 13) defines strategy as "*the determination of the long-term*

* Quote from an interview with Stephen Hawking in *The Guardian* (Jha, 2005).

† Further information is available in *On the Shoulders of Giants, A Shandean Postscript* (Merton, 1965).

‡ Quote from *Lost in Translation* (Coppola, 2003).

§ The word strategy originates from the Greek word *stratēgos*, which is composed of the two words for *army* and *to lead* (Soanes & Stevenson, 2005a; 2005b).

** The Zhou dynasty in ancient China lasted between 1027-221 BC. In 221 BC China was unified under the first Emperor Qin, which marked the beginning of imperial China.

goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out these goals". Strategy differs from tactics that are the means that are used to achieve the goals set up in the strategic plan.

In business, as well as many other disciplines, it is very important to have a strategic plan to be able to gain, destroy and regain competitive advantage and to handle different actions and reactions. According to Brandenburger & Nalebuff (1996, p. 4) business is *"cooperation when it comes to creating a pie and competition when it comes to dividing it up"*. Drawing upon the similarities between Gause's Competitive Exclusion Principle in nature (Gause, 1934/2003) with business, Henderson (1989, p. 140) suggests that *"competitors that make their living in the same way cannot coexist – no more in business than in nature. Each must be different enough to have a unique advantage. The continued existence of a number of competitors is proof per se that their advantages over each other are mutually exclusive. They may look alike, but they are different species"*. Business strategy is indeed a complicated area where different companies, markets, products, services, actions etc. are interdependent and it is about making all the right moves. There have been many attempts to theorize the complexity and power between all the "players" of the game of business. This chapter will introduce some of these theories, which will also constitute a theoretical framework for this dissertation.

A good example on how different actions can have unexpected reactions is Epson's move into the laser printer market in the late 1980's (adapted from Brandenburger & Nalebuff, 1996). Epson was world leader in dot matrix printers and Hewlett Packard (HP) was dominant in the laser printer and inkjet segment in the 1980's. However, the price level of laser printers was approximately four times as high for laser printers as for dot matrix printers and with a much higher profit margin. This caused Epson to launch their cheap EPL-6000 laser printer in August 1989 to cut themselves a piece of the laser printer market.

The reaction from HP, just one week later, was the LaserJet IIP, priced lower than the Epson printer and with the more recognizable HP brand. This resulted in a price war in the industry and caused prices on laser and inkjet printers to drop and the price of inkjet printers became comparable to the price of dot matrix printers. What happened was that, even though Epson took a small share of the laser printer market, they lost a bigger piece of their core business, the dot matrix market, to inkjet printers.

3.2 Industry Value System

"Nothing can have value unless it has utility. If it is useless, the labour embodied in it has been useless; such labour cannot be counted as labour, and therefore cannot produce value."

– Karl Marx*

In the beginning of the 1980's the concept of added value in industry production became popular and Porter (1985, p. 39) defines added value as *"selling price less the*

* Quote from *Capital, Volume 1* (Marx, 1867/1930, p. 10).

cost of raw materials". Brandenburger & Stuart (1996, p. 8) similarly states that "*value created = willingness-to-pay – opportunity cost*". A company performs different types of activities that contribute and add value to their products. The added value measures how much a specific company or activity contributes to the value of a product, and basically "*it's hard to get more from a game than your added value*" (Brandenburger & Nalebuff, 1996, p. 45). The activities performed can be divided into primary and support activities, each important for what is called a value chain. A value chain can be used to understand the behavior of cost and the potential sources that can be used to gain competitive advantage. Porter (1985, p. 36) also points out the importance of constructing the value chain on a company level and stresses that "*an industry- or sector wide value chain is too broad, because it may obscure important sources of competitive advantage*". Nevertheless, to be able to produce a product, a company usually takes part of larger stream of activities, a so-called *value system* (Porter, 1985).

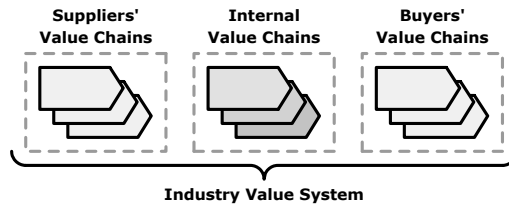


Figure 13. A value system consists of many value chains.

A value system (Figure 13) includes the value chains of a company's suppliers (and their suppliers, and so on), the company itself, the company's distribution channels, and the company's buyers (and presumably extended to the buyers of their products, and so on). In Figure 13 the hypothetical construction of a value system is shown. Even though Porter (1985, p. 34) emphasizes the importance of constructing value chains on company level, the importance of considering the value system is also recognized since "*gaining and sustaining competitive advantages depends on understanding not only a firm's value chain but how the firm fits in the overall value system*". Day & Wensley (1988) state that a competitor-centered focus together with just looking at internal activities and costs may obscure opportunities gained by vertical linkages with other value chains in the industry value system. A value system can then describe how activities in different companies can interact to create value to a product (Porter, 1985).

The principal value system for print media (e.g. Kipphan, 2001) constitutes a good basis for understanding the different activities that are carried out to create, print and distribute print media. By analyzing the value system, it is possible to investigate the strategic path the printing companies have entered and to study their use of the value system to work with differentiation as a competitive strategy. In this dissertation, a slightly altered and, for the purpose, simplified value system (Figure 14), which has been developed during Paper 1 and Paper 2, will be used to be able to understand the general strategic changes in the printing industry.

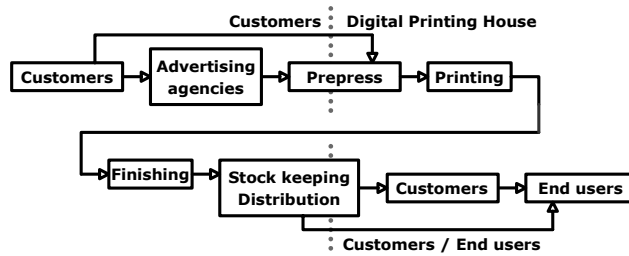


Figure 14. The value system for the digital printing industry.

In the digital printing aspect, Birkenshaw (2003, p. 12) states that “*print-on-demand can result in savings in the overall supply chain offsetting the higher production costs in production*”. Since the cost model for digital printing technology is mainly based on low total cost on short runs (Kipphan, 2001), it is possible to more or less eliminate the stock keeping of printed material since the basic idea is to print only necessary copies and to print them on-demand (Gilboa, 2002). This also eliminates or lowers the volume of a printed material that has to be discarded due to information that has become out of date before the material has been used (Romano et al., 1999). However, since in reality products are kept in stock, the activity regarding stock keeping in the value system for digital printing will still be kept to illustrate a more general value system of the printing industry.

In the value system, each individual activity has its own value chain but in order to understand how to gain competitive advantage it is necessary to see how every part fits into the industry’s overall value system (Porter, 1985). The linkage in this system is in other words a so-called vertical linkage that links different companies’ or different divisions’ value chains together. Consequently when a company makes a strategic decision to integrate forward and/or backward activities in the value system, *vertical integration* occurs. If an activity is not performed in-house, it has to be either purchased on the market or carried out by a cooperative partner. For a more detailed descriptions and definitions of vertical integration and cooperation, see the section *Institutional Arrangements*.

3.3 Competitive Strategy and Customer Value

“Those who win every battle are not really skilful – Those who render others’ armies helpless without fighting are the best of all.”

– Sun Tzu*

Regarding competitive strategy, it is important to determine a company’s position within its industry. Porter (1980) argues that three generic strategies (Figure 15) can be adopted to gain sustainable competitive advantages and outperform other companies in the industry – *cost minimization leadership*, *product differentiation* and *market*

* Quote from *The Art of War* (Tsu, 500BC/1998, p. 90).

focus. A company should follow either cost leadership or differentiation in a broad or narrow scope, which is in a particular focus.

		Competitive Advantage	
		Lower Cost	Differentiation
Competitive Scope	Broad Target	Cost Leadership	Differentiation
	Narrow Target	Cost Focus	Differentiation Focus

Figure 15. Porter’s three generic strategies (After Porter, 1980, p. 39).

A company which has efficient scale production advantages and is able to produce at a lower cost than its competitors will be given cost leadership. This often means that there is a need to minimize costs in e.g. research, service, and sales and focus solely on production costs. Companies that adopt a strategic position by differentiation have, on the other hand, created a product or offer that is, industry wide, considered to be unique. The uniqueness in the differentiation strategy makes it possible to sell at a higher price and consequently to produce at a higher cost. The third generic strategy, focus, is not as cost leadership and differentiation an industry wide strategy but a more narrow strategy that for example focuses on a particular customer segment, geographical area or product line by serving this target well.

It is said that a company that cannot develop its business in one of the above-mentioned directions is “*stuck in the middle*” and is in a strategically disadvantaged situation. But a company that is able to position itself right within the industry may earn profitability even though the average rate of return for the industry in general is modest (Porter, 1980, p. 41).

In achieving the strategy of cost leadership, a competitor-centered approach is often adopted, since benchmarking competitors is an important factor. Differentiation and focus strategies often come from a customer-centered approach where the customers’ needs are in focus when creating the appropriate services and activities and a non-price competition is possible since competition is mainly performed by product quality and perception of benefit to the customer (Day & Wensley, 1988). Differentiation most often implies a narrow product line that could become a problem for the company if the buyers need for the differentiating factor decreases (Porter, 1980).

According to Porter (1996), best practices follow something called the production frontier that states the relationship between the delivered non-price customer value and the cost position of the production. By adopting a strategy based on differentiation or focus, it is possible to maintain a cost position that is relatively high and still be able to gain a customer base because the delivered customer value is higher than for the cost leaders’ products (Figure 16).

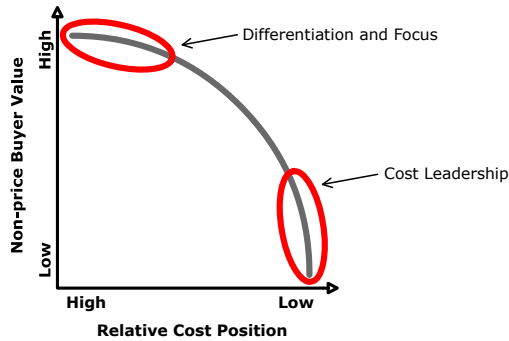


Figure 16. The production frontier which shows the difference between differentiation and cost leadership (After Porter, 1996, p. 62).

As mentioned before, a company can differentiate itself from its competitors by being unique at creating something that is of value for the customer. This uniqueness does not necessarily come from creating a product that is unique but can come from anywhere in the value chain. Consequently, a successful differentiation can arise from other primary or support activities than the core activities in the company. Therefore, even though the actual product is a commodity product, support activities can make the final product differ substantially from its competitors (Porter, 1985).

Within the printing industry the cost leadership approach is most successfully used by printing houses with conventional printing technology. This technology has a lower printing cost per piece for longer runs and is advantageously used in large-scale production (Kipphan, 2001).

When printing long print runs, digital printing is more costly per print than conventional printing techniques (cf. Figure 3) since the cost per print more or less remains the same throughout a print run. This fact makes it hard today for a digital printer to pursue cost leadership in the printing industry. However, digital printing with its ability to serve customer segments with value added services is better off used in differentiation or focus strategy. In Figure 16 it is possible to notice the successful strategic positions of digital printing (differentiation) and conventional printing (cost leadership).

Success Factors

"Successful 21st Century businesses will have to overcome the challenges of very demanding customers seeking high quality, low cost products, responsive to their specific and rapidly changing needs."

– Peter Bunch*

A success factor is something that is essential for a company to have to fulfill its strategy in a successful way. The concept of success factors was introduced in

* Quote from *From Lean to Agile Manufacturing* (Bunch & Gould, 1996, p. 3/1).

business in the 1960's (Daniel, 1961) and according to Rockart (1979, p. 85) critical success factors are *"the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where 'things must go right' for the business to flourish. If results in these areas are not adequate, the organization's efforts for the period will be less than desired."*

To be successful in a changing industry environment, a producing company has to consider the critical success factors – *price, quality* and *time* (Blocher et al., 1999; Tan, 1998). Cooper (1995) introduces the role of the survival triplet – cost, quality, and functionality, which is crucial for survival using a confrontation strategy. A company must compete effectively in all these three to succeed. Furthermore companies need flexibility in order to adopt to changing customer needs (Sharifi & Zhang, 1999). Therefore, the four factors *price/cost, time, quality* and *functionality/flexibility*, are all important when discussing a supplier-customer relationship.

Reducing lead times is important in many logistic systems, and is also a source of competitive advantages (e.g. Tan, 1998). In accordance with Aitken et al. (2002, p. 62), lead time is defined as *"the time taken from a customer raising a request for a product or service until it is delivered"*. Having short lead times has been deemed as a major order winner and a way of creating short term competitive advantages (Stalk & Webber, 1993).

Customization of products is becoming increasingly common, both consumer products, like computers, and industry products, e.g. heavy trucks, are today assembled to meet customers' specifications after an order has been submitted. Reduced lead times are important in these *Just-in-Time* manufacturing systems (JIT), which is a crucial aspect of lean manufacturing*, where *"only the necessary products, at the necessary time, in necessary quantity"* are manufactured or ordered (Sugimori et al., 1977, p. 553). Postponement strategies were first proposed in the early 1950's (Alderson, 1950; Bucklin, 1965) and Stern & El-Ansary (1992, p. 22) states that *"postponement promotes efficiency by moving differentiation nearer to the time of purchase when demand is more certain, thus reducing risk and uncertainty costs"*. In Just-in-Time models, relationships with suppliers are important and Mohr & Spekman (1994, p. 138) propose that *"without high levels of coordination, Just-in-Time processes fail, production stops, and any planned mutual advantage cannot be achieved"*. Because of fast product development and fast decrease in prices of parts, in e.g. the PC industry, short delivery lead times are crucial. By adopting Just-in-Time delivery models it has been possible for Dell to e.g. limit the amount of value that got wasted in the assembly process between purchasing and sales (Selling PCs, 1996).

With Just-in-Time and postponement in mind, digital printing is a good option for e.g. printing instruction manuals or advertising material, since it will be possible to postpone the printing of the message and customize the printed material to the customer or produced product, just as everything else in the production. By postponing the printing of e.g. an instruction manual,

* The lean manufacturing approach derives from the *Toyota Production System* (TPS) (e.g. Liker, 2004; Liker & Morgan, 2006).

it would be possible to create customized manuals to the customized products produced.

Viström (2004; 2008) shows that it is possible to increase customer value, better fulfill market demands and reduce cost by using postponement strategies involving digital printing in so-called hybrid printing. Hybrid printing is a combination between conventional and digital printing technology (Kipphan, 2001), where digitally printed texts, images etc. are applied on conventionally pre-printed matters.

The quality of a product is important in almost every industry (e.g. Normann, 2002), which has been highlighted by the many different concepts that have evolved for improving quality, such as e.g. *Total Quality Management (TQM)* and *ISO9000* (e.g. Conti, 1999; Zhu & Scheuermann, 1999). Even though these concepts are organization wide and do not in detail guarantee the quality of the end product, they can be used to ensure that high quality business processes have been used. Regarding quality, the most noticeable experience for the end user is the actual product quality, and Cooper (1995) emphasizes the strategic importance of high quality products. Day (1999, p. 173) states that *"boosting quality is now seen as the surest route to creating superior customer value"* and further suggests that high quality is profitable.

Nevertheless, in a production company there, usually, exist a trade-off between the level of service and the price the customer has to pay. According to Porter (1996, p. 69), *"positioning trade-offs are pervasive in competition and essential to strategy. They create the need for choice and purposefully limit what a company offers"*. There also exists a trade-off between cost and service/quality (e.g. Brandenburger & Nalebuff, 1996; Herer et al., 2002; Porter, 1980) in a supply chain and Stigler (1939) and Rudberg & Wikner (2004, p. 446) propose that a high level of flexibility can only be achieved at the expense of a higher cost, *"customers have to choose one before the other; low price (productivity) or specific needs (flexibility)"*.

Purchasing Orientation and Customer Value

"Success in manufacture is based solely upon an ability to serve that consumer to his liking. He may be served by quality or he may be served by price. He is best served by the highest quality at the lowest price, and any man who can give to the consumer the highest quality at the lowest price is bound to be a leader in business."

– Henry Ford*

A purchasing situation arises when a company or a person acquires resources of a different kind from another company. According to Lyson (2000, p. 1), purchasing in an organizational perspective can be defined as *"the function responsible for obtaining by purchase, lease or other legal means, equipment, materials, components, suppliers and services required by an undertaking for use in production or resale"*. Depending on the broadness of the purchasing orientation, purchasing can be classified into three orientations –

* Quote from *My Life and Work* (Ford & Crowther, 1922, p. 136).

buying, procurement and supply management. The buying orientation is when a customer strives first and foremost for the best deal in terms of minimizing the price of a product and secondly maximizing quality and availability. Procurement is when the customer focuses on improving quality by cooperating with the supplier and reducing the total cost, and not just the price, of a product. With supply management the goal is to obtain the greatest total value of a product. This is usually achieved by close cooperation with suppliers to build supply networks that complete whole business processes of products (Anderson & Narus, 2004; Dobler & Burt, 1996).

In a fragmented, commoditized and over established market, the buyers' power is generally high. The buyers and the power they have over the suppliers is a competitive force that affects an industry. In the late 1970's, Porter (1979; 1980) constructed the *Five Forces Framework* (Figure 17) to illustrate some fundamental forces that determine the level of competition in an industry* – *internal industry competition, bargaining power of buyers, bargaining power of suppliers, threats from new entrants and threats from substitutes.*

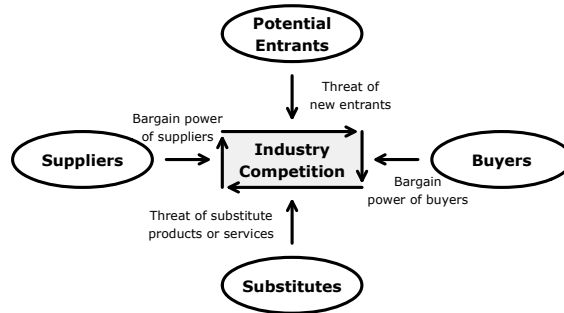


Figure 17. Porter's Five Forces Framework (Porter, 1979, p. 141; 1980, p. 4).

This framework is presented to illustrate the importance of the customers in the competitive situation for a company, as the bargaining power of the customer is one of the five forces. The other parts of this framework will not be further presented in detail, for a more thorough presentation of the Five Forces Framework, see Porter (1980).

If an industry, such as the printing industry, consists of many small actors (Gilboa, 2002; Kipphan, 2001), the products are considered a commodity, the total production capacity is far greater than demand (Birkenshaw, 2003) and switching costs are low, the customers are most likely to be powerful. This situation has been caused by printing being, in general, undifferentiated (cf. Porter, 1980). When buying products that have been around for a long

* Even though the widely use of Porter's Five Forces Framework, there are shortage of this framework in capturing dynamics and changes in an industry. Roos & Krogh (1996, p. 8) illustrates this by comparing it to a snapshot of a car in motion: "We can see what kind of car it is, the colour and so forth, but we cannot tell its direction, its speed, its acceleration and so on. Furthermore, since we cannot tell which direction the car is coming from, we are unable to estimate in which direction it is going".

time, and are more or less considered commodities, the knowledge among the customers increases which makes their bargaining power even stronger. This generally results in near-zero margin profits in the printing industry (PODi, 2003).

A derivative, on a company level, of the Five Forces Framework, that illustrates the players of the game of business* is the *Value Net* (Figure 18) proposed by Brandenburger & Nalebuff (1996). In this framework the company and its competitors have been extracted from the internal industry competition in Porter's Five Forces Framework (Figure 17) and substitutes and potential entrants have been substituted by complementors, a category of companies that provide complementary products and, thus, affect the companies' competitive situation.

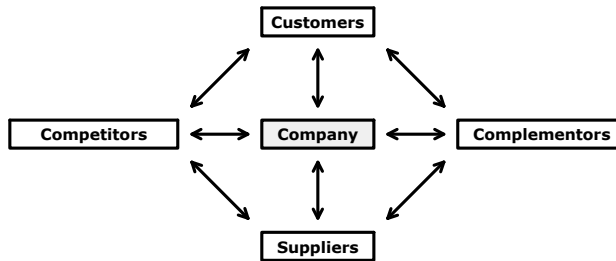


Figure 18. *The Value Net* (Brandenburger & Nalebuff, 1996, p. 17).

The Value Net exemplifies the interdependence between the company and its *customers*, *competitors*, *complementors* and *suppliers* as well as the connection between the latter four. The importance of allying with companies producing complementary products are described by Andersson & Nareus (1990, p. 42) as working alliances and is the “*mutual recognition and understanding that the success of each firm depends in part on the other firm*” (e.g. Bucklin & Sengupta, 1993).

The speed, richness and reach of the Internet today, provide customers with information and makes it easy to identify good offers of commodity products (Evans & Wurster, 2000; Porter, 1980). Accessibility to information is crucial and more information about products, prices, quality etc., has a positive effect on the customers' bargaining power. In theory, a company would always make the right decisions and choose the supplier that could provide the best available offer. However this is not the case in reality since there always exists switching costs (Porter, 1980; 1985; 2001) even though the Internet has lowered them.

Since the bargaining power of customers is high in many mature industries, it is important to decide how to satisfy customers, raise switching costs and reduce their

* A way of trying to theorize the complexity of the power between different “players” of the “game” (in this case the game of business) is the so-called *Game Theory* (e.g. von Neumann & Morgenstern, 1944/1953). This theoretical approach to game theory will not be further discussed in this dissertation; nevertheless many of the theories regarding more dynamic approaches to business strategy are based on ideas originating from game theory. An easy introduction to game theory is available in e.g. Brandenburger & Nalebuff (1996) or a more theoretical approach in von Neumann & Morgenstern (1944/1953).

bargaining power. This can be done by increasing the *customer value*. Porter (1985) defines two basic mechanisms that are important when trying to increase customer value – *lowering customers' costs* and *increasing customers' performance*.

When e.g. a new technology is introduced, customers often lack knowledge about what opportunities it can offer, it is important for suppliers to help their customers to take advantage of and value the differentiation in the technology. This may also be a way for a supplier to increase the switching cost of a product for the customer by offering training and education on a specific solution (Porter, 1985).

The development of human resources at a digital printing house is vital, since it is important that employees at printing houses “*explain to the customers the added value of digitally printed documents*” (Politis, 2001, p. 390). The digital printing industry can both lower costs and increase performance of those buying digitally printed material. On-demand printing may decrease the cost for stock keeping, discarded volumes and distribution costs (Romano et al., 1999). On the other hand when discussing variable data printing the increase in customer value is supposed to come from making a campaign more efficient by e.g. increasing the response rate (Broudy & Romano, 1999; Gidlund et al., 2008).

3.4 Dynamic Competition

“Life is conflict, survival, and conquest.”

– Colonel John R. Boyd*

The goal of the generic strategies defined by Porter (1980), and discussed above, is first to obtain and then to sustain competitive advantages over the company's competitors. In theory, sustainability of differentiation depends on continued perceived customer value and lack of imitation from competitors (Porter, 1985). However, the generic strategies may work well until competitors have launched their counter attacks and outmaneuvered the competitive advantages (D'Aveni, 1994). To be able to continuously deliver value that the customer appreciates, it becomes important to focus on Schumpeterian competition. Schumpeter (1942/1975) regarded capitalism as an economic system in continuous change that would die if it became stagnant. According to Schumpeter (1942/1975), *creative destruction* is the essence of capitalism and profit is “*the premium put upon successful innovation in capitalist society and is temporary by nature: it will vanish in the subsequent process of competition and adaptation*” (Schumpeter, 1939/1964, pp. 79-80). Collis & Montgomery (1995, p. 124) describes it as “*in a world of continuous change, companies need to maintain pressure constantly at the frontiers – building for the next round of competition*”, and eventually every advantage will be eroded. Once a company has created competitive advantages, it is possible to maintain and prolong these advantages by strategic acquisition of resources and capabilities. Schumpeter (1942/1975, p. 84) states that

* Quote from *Patterns of Conflict* (Boyd, 1986, p. 10).

this type of competition “strikes not at the margins of the profits and the output of the existing firms but at their foundations and their very lives”.

Resource Based View

“Strictly speaking, it is never resources themselves that are the ‘inputs’ in the production process, but only the services that the resources can render.”

– Edith Penrose*

In the end of the 1950’s Edith Penrose (1959, p. 24) perceived the firm as a “collection of productive resources”, which in an extension became known as the *Resource Based View* of the firm (RBV) (e.g. Collis & Montgomery, 1995; Wernerfelt, 1984). This was a natural extension of the Porter framework (1979; 1980) and became dominant in the 1990’s, and marked a shift away from the predominant market based models, like Porter’s generic strategies. RBV combines the internal (resources) and the external (industry structure) perspectives on strategy.

Resources are something that can come in many forms but basically they are physical (e.g. production facilities or raw material), intangible (e.g. brand or knowledge) or organizational capabilities (e.g. routines or a combination of assets, co-workers etc.) (Collis & Montgomery, 2005). According to Barney (1991, p. 101), a company’s resource “include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness”.

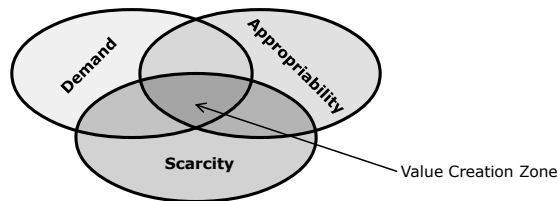


Figure 19. Demand, Scarcity and Appropriability determine the value creation zone (Collis & Montgomery, 1995, p. 120).

Resources cannot be valued alone, but have to be put into a market context. Collis & Montgomery (1995) describe three important market forces – *demand*, *scarcity* and *appropriability* – necessary to consider in order to determine the value of a resource or product (Figure 19). It is within the intersection of these three forces that the *value creation zone* occurs. To constitute a real value all these fundamental market forces should be well represented, but “resources are only valuable if they meet customers’ needs better than those of their competitors” (Collis & Montgomery, 2005, p. 35). By providing value based on resources that are hard to copy it is easier to sustain a competitive advantage. This is however becoming harder and harder to accomplish (e.g. Dierickx & Cool, 1989; Thomas, 1996; Wiggins & Ruefli, 2005) since the value

* Quote from *The theory of the growth of the firm* (Penrose, 1959, p. 25).

creation zone is not static over time as the demand, scarcity and appropriability of a resource are changing factors.

Although creating competitive resources, traditionally, has been an internal struggle within a company and an industry, substitution and imitation are the two most common external factors in industry that threaten the value of a company's resources (Collis & Montgomery, 2005). Furthermore, it is important to remember that resources cannot only be controlled directly by ownership, but also indirectly through relationship (Håkansson & Johansson, 2002). Indirect control can be achieved by a relationship with an actor with direct control over the resource, in other words through cooperation. Gulati et al. (2000) state that the RBV has not given much attention to finding the source of value creating resources outside a company. Actors' knowledge about and experience of resources is also of great importance, and Håkansson & Johansson (2002, pp. 147-148) suggest that resources are heterogeneous and "*there are always further possibilities to use the resources in a different way or in a different setting*". Cooperation can give access to resources not currently present within the company and by combining different resources and knowledge in an alliance, the network structure itself may become a valuable resource (Gulati et al., 2000). The impact of cooperation will be further discussed in the section *Cooperation and Alliances*.

Strategic Flexibility

"Therefore the stiff and unbending is the discipline of death. The gentle and yielding is the discipline of life."

– Lao Tzu*

When Sir Isaac Newton (1687/1848) declared his third law of motion[†], he stated that the reaction to an action is opposite and equal. However, when rational and irrational human behavior are involved, it is not as simple to determine the reaction of competitors, customers or partners and there is no law of the motion of business. Nevertheless, keeping informed about the business environment, being flexible and continuously adjusting the competitive strategy can increase a company's possibility to gain success.

Strategic flexibility[‡] (e.g. Aaker & Mascarenhas, 1984; Evans, 1991; Goldhar et al., 1991; Harrigan, 1985a; Johnson et al., 2003; Sanchez, 1995) is a concept with multiple dimensions and can be defined as "*the capability of the firm to proact or respond quickly to changing competitive conditions and thereby develop and/or maintain competitive advantage*" (Hitt et al., 1998, p. 26). In order to have high strategic flexibility, when

* Quote from *Tao Te Ching* (Tsu, 600BC/1997, ch. 76).

† Newton's Third Law from *Newton's Principia - The Mathematical Principles of Natural Philosophy*, states that "*to every action there is always opposed an equal reaction: or the mutual actions of two bodies upon each other are always equal, and directed to contrary parts*" (Newton 1687/1848, p. 83).

‡ For an extensive overview of conceptualizations and definitions of Strategic flexibility, see Johnson et al. (2003, p. 76).

acting in a dynamic market, it is essential to have dynamic capabilities within a company's control. Dynamic capabilities are *"the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments"* (Teece et al., 1997, p. 516) and Eisenhardt & Martin (2000, p. 1106) suggest that *"dynamic capabilities are necessary, but not sufficient, conditions for competitive advantage"*. The organization and its capabilities are interlinked and Volberda (1996) proposes that being able to have dynamic capabilities is dependent on other factors such as having a flexible organization form.

Two main aspects of strategic flexibility are stressed in the literature – *resource deployment* and *competitive actions* (D'Aveni, 1994; Eisenhardt and Martin, 2000; Fombrun and Ginsberg, 1990; Miller et al., 1996; Williams, 1994). High flexibility in strategic actions and internal and external capabilities that are dynamic are, as been described, essential for a company that wants (or needs) to act on a dynamic market. However, strategic flexibility has to be put into a context of producing value in a product for a company's customers (e.g. Porter, 1985). Sanchez (1995) and Slack (1983) emphasize the importance of flexibility in production, to increase the possibility to produce products that customers really want. Sanchez (1995, p. 143) further suggests that product flexibility is *"more relevant to product competition in dynamic markets"*. This is also stressed by Chang (1993) who proposes that flexibility in manufacturing is a way of protecting a company against uncertainty in future market conditions and fluctuations in customers' taste. The importance of flexibility in manufacturing can be exemplified in the success of the Sony Walkman during the 1980's. Sony created a system to support small design and fast technological changes, making it possible to launch a large variety of different products in rapid succession. This was possible due to understanding customers' needs and a *"system of flexible manufacturing so that it could make money on small production runs"* (Sanderson and Uzumeri, 1995, p. 779).

Strategic flexibility is important to have because the *"ability of the organization to adapt [by changing current strategies] to substantial, uncertain, and fast-occurring (relative to required reaction time) environmental changes that have a meaningful impact on organization's performance"* (Aaker & Mascarenhas, 1984, p. 74), is crucial when competing in highly competitive environments.

Hypercompetition

"He who can handle the quickest rate of change survives."

– Colonel John R. Boyd*

Hypercompetition is competition in a *"high velocity environment"* (Bourgeois & Eisenhardt, 1988, p. 816; see also Brown & Eisenhardt, 1998) and is characterized by *"intense and rapid competitive moves"* (D'Aveni, 1994, p. 217). In industries today it is becoming increasingly hard to sustain competitive advantages for long (e.g. Dierickx & Cool, 1989; Thomas, 1996; Wiggins & Ruefli, 2005), and a hypercompetitive

* Quote from *New Concepts for Air-to-Air Combat* (Boyd, 1976).

behavior becomes crucial. The aim of this more dynamic approach to strategy is to disrupt the status quo and *“move quickly to build advantages and erode the advantages of their rivals”* (D’Aveni, 1994, pp. 217-218) thus creating an endless series of small competitive advantages. This makes it important even for companies that currently have obtained competitive advantages in the industry to challenge them before their competitors undermine those already achieved. It is important for a company to *“realize that control of the evolution of competition in the market is more important than earning current profits”* (D’Aveni, 1994, p. 238).

This has become a popular way of thinking, especially in the age of information that has been a fact since the mid 1990’s. Evans & Wurster (1997) discusses the importance of information and how richness and reach of information shifts power from the producer to the customers and increases hypercompetition. As switching costs decrease, it is important to find new ways of generating customer loyalty (Evans & Wurster, 1997). Relationship with customers becomes important since *“the process of developing new advantages or undermining those of competitor begins with an understanding of how to satisfy customers”* (D’Aveni, 1995b, p. 240). In other words, good disruption creates a temporary possibility to serve customers in a superior way.

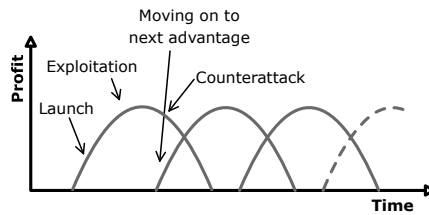


Figure 20. Moving on to the next advantage before competitors launch their counterattack is important to survive in a hypercompetitive environment (After D’Aveni, 1994).

Companies acting in a dynamic hypercompetitive business environment have to be agile in spotting new opportunities, developing short cycle strategies, abandoning old cash cows and meeting customers’ current and future needs. A company is therefore forced to destroy their own competitive advantages and create new ones before the full course of the traditional product cycle (Figure 20). This means that they may have to cannibalize on their own product and brands before their competitors do so (e.g. Conner, 1988). This way of taking opportunities makes the trust between partners important. Damaging trust and engaging in opportunistic behavior may have a severe impact on partnerships (e.g. Child et al., 2005; Gulati et al., 2000; Morgan & Hunt, 1994). The concept and importance of trust are further developed in the section *Trust, Commitment and Control*.

Simplified, competition occurs on four different arenas; *cost and quality, timing and know-how, entry barriers* and *deep pockets*. Companies move between these arenas once the competitive environment has escalated and competitive options have been exhausted in the current arena (D’Aveni, 1994). This means that instead of only playing the game, it is better to change the rules, scope and players in the game.

An actor in a hypercompetitive environment makes progress by trying to modify the world to their own needs by disrupting advantages made by others and changing

the rules of competition. Nevertheless, Brandenburger & Nalebuff (1996, p. 195) emphasis that *“the freedom to change the rules [of the game] is a double-edged sword. ... Just as you can change the rules or make new ones, so, too, can others”*. D’Aveni (1994; 1995a) defines seven key elements of a dynamic approach to strategy in the *new 7S’s* theoretical framework (Figure 21) – *superior stakeholder satisfaction, strategic soothsaying, positioning for speed, positioning for surprise, shifting the rules of the game, signaling strategic intent, and simultaneous and sequential strategic thrusts*. This framework is based on the 7S’s framework, presented in the beginning of the 1980’s by McKinsey & Co (Waterman et al., 1980).

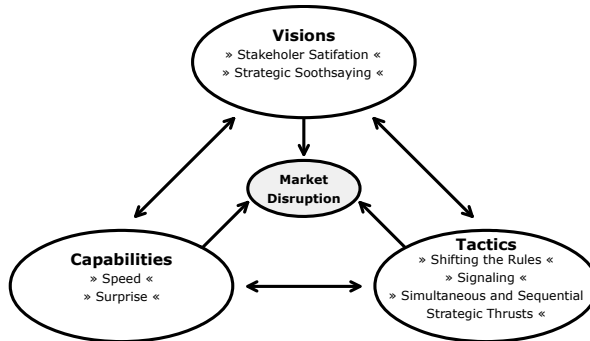


Figure 21. The new 7S’s Framework (D’Aveni, 1994, p. 248).

The new 7S’s framework is based around disrupting the market, and the seven elements in the framework represent how to have *vision*, *capabilities* and *tactics* to create disruption of the status quo on market elements in a dynamic strategy. Companies that act successfully in a hypercompetitive environment build a series of temporary advantages instead of trying to sustain the advantages already gained. *“It is this series of advantages, this constant seizing of the initiative, that is the true source of sustained advantage”* (D’Aveni, 1995b, p. 172).

Nevertheless, whether hypercompetition is a *“self-inflicted wound”* (Porter, 1996) or phenomenon that eventually happens in almost every industry as an inevitable outcome (D’Aveni, 1994) is a debated area. Even though many researchers (e.g. D’Aveni, 1999; Thomas, 1996; Wiggins & Ruefli, 2002) have presented empirical data to support a hypercompetitive shift, other researchers are skeptical. Makadok (1998) claims that it is not possible to find evidence of hypercompetition in a studied emerging industry with low entry barriers, which should be a typical hypercompetitive industry. Other researchers, such as Bogner & Barr (2000), Gimeno & Woo (1996) and McNamara et al. (2003), claim that hypercompetition is not a state but occurs in cycles. It is, however, apparent that the general dynamics of competition have changed and become faster, more intense and the available time to enjoy each competitive advantage has become shorter (Wiggins & Ruefli, 2005).

Vision for Disruption

"The one who figures on victory at the headquarters before even doing battle is the one who has the most strategic factors on his side. The one who figures on inability to prevail at the headquarters before doing battle is the one who has the least strategic factors on his side. The one with many strategic factors in his favor wins, the one with few strategic factors in his favor loses – how much the more so for one with no strategic factors in his favor. Observing the matter in this way, I can see who will win and who will lose."

– Sun Tsu*

The visions for creating market disruptions are based on *superior stakeholder satisfaction* and *strategic soothsaying*. Stakeholders[†] are, according to Freeman & Reed (1983, p. 91), "*any identifiable group of individual who can affect the achievement of an organization's objectives or who is affected by the achievement of an organization's objective*". Among the stakeholders of a company, the shareholders should, in general, be prioritized (e.g. Freeman & Reed, 1983; Rappaport, 1998). However, in a hypercompetitive environment putting the customer and employees before the shareholder can be the solution for surviving since understanding the customer may create advantages against competitors (D'Aveni, 1994). All needs that a customer knows that they have are easy to identify, because they will probably tell a seller since they want to have these needs satisfied. Customers are in general a very interested, capable and inexpensive business developer (Magnusson, 2003). Through close customer contact and involvement of customers in the development of new products, it is possible to better identify the needs that a customer cannot articulate for. Hence, having close relations with customers can be a source of competitive advantages (e.g. Langlois, 1992). Schumpeter (1939/1964, pp. 47-48) describes this as "*consumers' satisfaction supplies the social meaning for all economic activity, or by the fact that new and unfamiliar commodities have ultimately to be 'taken up', or ratified, by the consumers and may be said to have been produced with a view to latent consumers' wishes, or on indications other than effective demand*". This is, in other words, a way of creating new demands and to predicting and understanding future evolution of the market and the technology before it really happens (D'Aveni, 1995a). Anderson & Narus (1998, p. 9) further suggests that it is possible to better sustain customer relationships by documenting the company's "*delivery of superior customer value over time and by discovering new ways to update and reinvigorate those relationships*".

Employees are important for building superior customer satisfaction since they are the ones that have customer contact and may understand both current and future needs. It is important to be able to serve the customers extremely well without neglecting the needs of employees and investors (D'Aveni, 1994).

* Quote from *The Art of War* (Tsu, 500BC/1998, p. 75).

† According to Freeman & Reed (1983, p. 89), the word stakeholder originates from an internal PM in 1963 at the Stanford Research Institute and refers to "*those groups without whose support the organization would cease to exist*". Shareholders, employees, customers, suppliers, lenders, and society originally were included in the list of stakeholders.

It is important to understand the future evolution of the market and the technology and how these can be used to serve both existing and new customers. This strategic soothsaying should form the basis of where a company should focus the future disruption of the market (D'Aveni, 1994). Eisenhardt (1989) suggests the use of real-time information as important for strategic decision making in high velocity industry environments. The Internet can be used to obtain such information about the company's products by engaging customers more broadly, richly and speedily than traditional market research (Sawhney et al., 2005). Furthermore, lead-users are important to predict future customer value and a close relation with these customers is a very valuable source for product innovations (e.g. Thomke & von Hippel, 2002; von Hippel, 1986).

For example, in the late 1960's Japanese companies such as Seiko and Citizen started to manufacture watches based on quartz technology instead of mechanical clock works, which were the dominant watches from the Swiss manufacturers. The Japanese manufacturers were convinced that the customer was more interested in accurate time and not in genuine mechanical handcraft. This *strategic soothsaying* and *superior stakeholder satisfaction* ended up in Japan gaining a large share of the world market during the 1970's and the total dominance of quartz technology. The impact on the Swiss manufacturers was profound and the world market share dropped from 40% in 1974 to just 10% ten years later. This happened even though the Swiss were first with the quartz technology, but did not have the *vision* to see the potential in this new technology (adapted from Day, 1990; Glasmeier, 1991).

Capabilities for Disruption

"Most of the managerial challenges at Dell Computer have to do with what we call velocity – speeding the pace of every element of our business. Life cycles in our business are measured in months, not years, and if you don't move fast, you're out of the game."

– Kevin Rollins*

According to the new 7S's framework (D'Aveni, 1994; 1995a), there are two basic capabilities for successful disruption of the status quo and creating temporary advantages – *speed* and *surprise*. Speed is necessary to create one advantage after another and it becomes very important for staying ahead of competitors. This is not referring to the rate of production but rather "*speeding up their ability to move and to change*" (D'Aveni, 1994, p. 271). Surprise on the other hand is a way for a company to extend the period in which a certain advantage is unique by "*catching the competitors off guard through an unexpected action*" (D'Aveni, 1994, p. 274). Nevertheless, once an advantage is recognized, competitors usually start to duplicate and to create even better advantages to serve customers. However, the time it takes for competitors to undermine an advantage and take away its uniqueness becomes longer if they are taken by surprise (D'Aveni, 1995a). Bettis & Hill (1995) and Pisano (1990, p. 173) believe that introduction of new production technology changes the competitive

* Quote from *Using information to speed execution* by Kevin Rollins, former CEO and vice chairman of Dell Computer Corporation (in Magretta, 1998, p. 81).

landscape and may create “*gusts of ‘creative destruction’*”. Dynamic capabilities are important to ensure long-term competitiveness (Teece et al., 1997), and by investing in more general resources that can be utilized on a wider arena it is possible to catch competitors by surprise and off guard (D’Aveni, 1994). The microprocessor manufacturer Intel is an example of a company that has built its success on speed. During the 1990’s, Intel was able to launch a new generation of processors before their competitors even have been able to imitate their current products (e.g. Brown & Eisenhardt, 1998; Kirkpatrick, 1997).

Tactics for Disruption

“Philosophers have hitherto only interpreted the world in various ways; the point is to change it.”

– Karl Marx*

Almost every industry has unwritten rules of how to behave and how to compete conventionally (DiMaggio & Powell, 1983). The tactics of disruption are to attack these conventions and *shifting the rules* of the market to undermine the advantages of competitors and make it possible to create temporary advantages for oneself (D’Aveni, 1994). This can e.g. be Dell’s shift from using retail stores in computer sales to mail order and later to Internet sales.† This attacked the conventional knowledge that consumers needed personal service in retail stores to purchase personal computers (Christensen, 2001; Serwer, 1997). Dell’s shift also helped them forecast future customer demand because customers used Dell’s customer support. Direct customer contact made them gauge trends more quickly than indirect contact through retail. (Selling PCs, 1996). Southwest Airlines is another company that successfully pursued a low cost strategy that lowered the prices in the short-haul point-to-point flight industry and became the most profitable airline company in the US.‡ This resulted in loss of advantages for former industry leaders like American Airlines as Southwest Airlines changed the rules of competition by carrying passengers at a price much lower than the unit cost of the rest of the airline industry in the US (Brown & Eisenhardt, 1998; Creaton, 2004; Smith, 2004).

It is possible to notice how Canon shifted the rules of the game in the photocopier business in the 1970’s to attack Xerox’s dominant position and competitive advantages. Both these companies evolved to become dominant players in today’s digital printing business.

* Quote from the essay *Eleventh Thesis on Feuerbach* (Marx, 1845/2002).

† This strategy helped Dell, founded in 1984, to become the world’s largest manufacturer of personal computers. However, in the end of 2006 they lost this position to HP (Kirdahy, 2006), partly due to the merger between HP and Compaq in 2002 and HP’s successful strategy with retail sales in the US. Further, in May 2007, Dell announced that they would start to sell their computers through retail via Wal-Mart (Finkle & Dobbyn, 2007) to attack HP’s leading position.

‡ In Europe the Irish airline Ryanair was an early and successful adaptor of the same low cost/low price strategy on short-haul routes. This has forced the large European airlines to adjust their cost position and strategy (e.g. Creaton, 2004).

In the 1970's Xerox had 95% of the world market for photocopiers. By relying on patents and an extensive service organization, Xerox had built up huge entry barriers and created a brand and products that were hard to copy. Since Xerox had built strongholds around their industry, Canon found a way around the patents with low cost copiers for distributed printing. Canon did not produce high volume copiers for copy shops but smaller copiers for office use. (Aaker, 1996; Govindarajan & Gupta, 2001; Snull, 1999; van der Heijden et al., 2002).

This attack from Canon was not head-to-head but rather from the flank by redefining the customer base and changing the rules of the game, and it took Xerox by surprise. Xerox ignored this attack for a long time even though the joint venture partnership Fuji Xerox in 1978 offered to produce and sell low cost copiers to Xerox, to make a counterattack on Canon possible. (Govindarajan & Gupta, 2001; van der Heijden et al., 2002).*

By *signaling strategic intent* in a dynamic and fast moving business environment, it is possible to “*forestall moves from competitors and encourage customers to wait for their products rather than buy competing products that make it to the market sooner*” (D’Aveni, 1994, p. 278). Companies like Microsoft and Intel, who continuously announce their next technology, have used this tactic very successfully. As mentioned, this is about signaling strategic intent and not the tactics used to get to the strategic position, meaning that the competitors know where the company is moving but not how and when.

During May and June 2008 the printing industry exhibition Drupa took place in Düsseldorf with all major and minor players in the printing industry at place. By displaying future printing technology in the research stage, the leading manufacturers of digital printing equipment quite clearly tried to signal their strategic intent to both customers and competitors. This was most evident in the area of high speed inkjet.

By having a *simultaneous and sequential strategic thrust*, a company should be able to move on to the next move at the same time as the competitors respond to their first attack on the market (D’Aveni, 1994). Instead of having a linear strategic intention as following one of the generic strategies (cf. Porter, 1980) a company acting on a dynamic market should be able to attack on several fronts with a series of thrusts against competitors.

* Xerox extensive fight with the Japanese manufacturers also distracted focus from the soon to begin battle for shares of the personal computer market, of which the Xerox PARC was the inventor of several pioneering technologies (Snull, 1999).

3.5 Institutional Arrangements

"When we see any structure highly perfected for any particular habit, as the wings of a bird for flight, we should bear in mind that animals displaying early transitional grades of the structure will seldom have survived to the present day, for they will have been supplanted by their successors, which were gradually rendered more perfect through natural selection."

– Charles Darwin*

Behind all decisions regarding value adding activities, that have to be performed in the value system to produce the end products, managers basically have to ask themselves whether the activities should be (1) purchased on the market, (2) performed by a partner in a cooperation or (3) performed internally within the company (e.g. Child et al., 2005; Faulkner 1995; Gulati, 2007; Harrigan, 1983b; Williamson, 1975; 1985). Specialization is in many cases successful, especially when there are cost advantages from large scale production (e.g. Faulkner, 1995). However, when specializing on a certain activity, it is most often necessary to interact with other companies to be able to produce the end product. Simplified, this can be done either by buying on the market, i.e. a *market transaction*, or by tying a closer relationship with another company by some form of *cooperation* (e.g. Child et al., 2005; Faulkner, 1995; Gulati et al., 2000; Jarillo, 1988). Vertical integration, on the other hand, is an important part of corporate strategy since it is one of the most frequently adopted growth strategies (Chandler, 1977) and one of the first diversification strategies considered (Harrigan, 1985b). According to Porter (1980, p. 307) *"vertical integration can improve the ability of the firm to differentiate itself from others by offering a wider slice of value added under the control of management"*. Decisions regarding whether a company should make (integrate) or buy (cooperate or buy over the market) usually remain for a long time once made (Hill, 2000). Because of the strategic importance of these decisions, the choice of strategy regarding vertical structure is most often a reflection of long-term visions made by the company's founder or chief executive officer (CEO) (Beal & Yasai-Ardekani, 2000; Harrigan, 1985b; Schein, 1983).

Faulkner (1995) has developed a simple matrix framework illustrating when each of the different strategies regarding institutional arrangements are most successful. Depending on an activity's strategic importance and the company's skill in performing the activity, the choice is to buy over the market, make (integrate) or cooperate through an alliance (Figure 22).

* Quote from *The origin of species* (Darwin, 1872, p. 140).

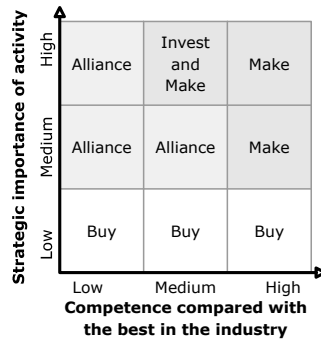


Figure 22. Buy, cooperate or make, depends on the competence and strategic importance of the activity
(After Faulkner, 1995, p. 15).

There has been a great deal of research on these different strategies over a long period of time and at the end of the day there are two major factors to take into account when deciding on strategy for a company's institutional arrangement; *transaction costs* and *competitive posture* (e.g. Coase, 1937; Gulati, 2007; Harrigan, 1983a; Jarillo, 1993; Porter, 1980; 1985; Williamson, 1985).

Transaction Costs

"In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on."

– Ronald H. Coase*

The Transaction Cost Theory is a neoclassical theory expounding the efficiency oriented static framework (Nooteboom, 1993) and belongs to a family of organizational theories called New Institutional Theories (Williamson, 1985). These theories concentrate on a macro level on institutional arrangements and their rules *"that define the appropriate ways to manage organizations and to structure relations"* (McAuley et al., 2007, p. 450). The concept of transaction costs was introduced in the literature by Ronald H. Coase[†] (1937) in his seminal work *The Nature of the Firm* and has further been developed in the literature since then by e.g. Williamson (1971; 1975; 1985; 1991a; 1996). However, Transaction costs have been implicitly considered before in other organizational theories, such as Taylorism. Taylor proposes the distinction between production and administration by introducing blue and white collar employees (McAuley et al., 2007).

* Quote from *The Problem of Social Cost* (Coase, 1960, p. 15).

[†] Ronald H. Coase was rewarded the Bank of Sweden's Prize in Economic Science in Memory of Alfred Nobel in 1991 for his *"discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy"* (The Royal Swedish Academy of Science, 1991).

Strong efforts are usually made by companies to be more efficient regarding production costs, but having efficient institutional arrangements are an important part in maximizing a company's profitability. As long as a company does not produce everything internally, there are costs associated with the interaction with other companies, that is so-called transaction costs (TAC). Cheung (1992, p. 51) broadly suggest that *"transaction costs comprise all those costs that cannot be conceived to exist in a Robinson Crusoe (one-man) economy"*^{*}, that is, very generally, costs for information, initiation, agreement, processing, control and adjustment of contracts both before and after they are signed (Williamson, 1985). Depending on the degree of integration the transaction costs differ and it is important for a company, independent of institutional arrangement, to try to lower the transaction costs.

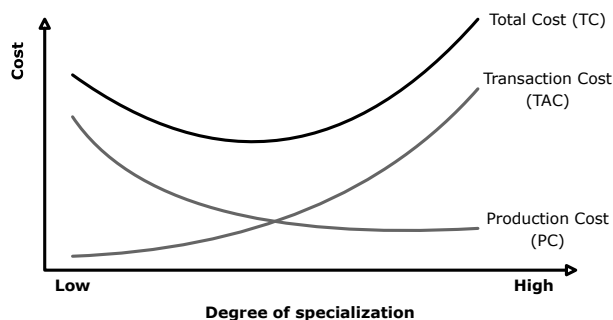


Figure 23. The total cost curve is u-shaped (after Picot et al., 1998, p. 213).

When integrating activities, companies are facing production costs (PC) for these activities. The production costs could be lowered if a company specializes on a few tasks, because of learning curve effects. On the other hand transaction costs will increase the greater the degree of specialization is, because of the necessity to contract external partners for additional activities. Because of this trade-off, the aggregated overall cost curve ($TC = PC + TAC$) is u-shaped and has a minimum which represents the companies optimal degree of specialization (Figure 23) (Picot et al., 1998).

Using the possibilities for contracting a wider range of activities e.g. via different forms of partnerships or alliances, companies usually lower their transaction costs compared to market transactions. This makes it possible to focus even more on specific core activities or in other words can choose higher degrees of specialization. Consequently, the lower transaction costs are one way of explaining why companies chose to work with cooperative partners instead of buying on the market. Transaction costs are not static over time and shifts may occur with the

^{*} Coase (1992, p. 73) comments on this definition by stating that: *"If I were asked to imagine an economic system in which transaction costs did not exist, it would be a completely communist society in which individuals would be assigned to their jobs by a central government authority, which would direct them in what they did, with what was produced being allocated to consumers and enterprises by the same authority"*.

Williamson (1985) very illustratively compares transaction costs to friction in physical systems, something that often is neglected, but makes many assumptions unrealistic.

introduction of e.g. integrated ICT-systems (information and communication technology), which make it easier to cooperate and observe actions of partners. A shift in transaction costs will also have impact on the minimum of the TC curve and therefore on the degree of specialization companies choose (Picot et al., 1998). The problem is of course to measure the exact shifts and the exact optimal point.

Jarillo (1993) suggests that transaction costs determine when different strategies regarding institutional arrangements should be used. If the cost for internally performing an activity (IC) is higher than the sum of the cost for buying from an external producer (EP) and the transaction cost (TAC), the activity should be purchased from an external company instead of being integrated in-house (i.e. $IC > EP + TAC$) and vice versa. Specialization usually renders a company's cost for a certain activity to be low, due to learning and large scale advantages. Therefore, it is, in many cases, likely that an external producer can provide certain activities, that are needed in a value chain, less expensively than the cost for producing internally ($EP < IC$). The probability for having this situation is particularly high when the competition is strong (e.g. Balakrishnan & Wernerfelt, 1986; Harrigan, 1985b). Consequently, buying from the market can improve the technical efficiency as it lowers the cost of production. In contrary vertical integration improves the agency efficiency as it lowers the transaction costs. Hence, the level of the transaction cost is important to consider (Jarillo, 1993); if transaction cost is high, vertical integration should be considered, and if transaction cost is low, buying might be a successful strategy. However, when one or a few companies can offer low transaction costs, then strategic alliances arise.

Vertical Integration

"If we think of streams of goods subjected to successive processes, and handed on from one firm to another as they move from the earth toward the ultimate consumer, the question is whether the tasks of co-ordination and synchronization, for a given product at a given time and place, are better accomplished by the market process or by integration."

– M. A. Adelman *

There are many definitions of vertical integration and whether a company is to be regarded as vertically integrated or not. An early definition by Adelman (1949a, p. 27) states that a company is vertically integrated whenever it *"transmits from one of its departments to another a good or service which could, without major adaptation, be sold in the market"*. A more strict definition is suggested by Perry (1989, p. 185) as he states that *"a firm can be described as vertically integrated if it encompasses two single-output production processes in which either (1) the entire output of the 'upstream' process is employed as part or all of the quantity of one intermediate input into the 'downstream' process, or (2) the entire quantity of one intermediate input into the 'downstream' process is obtained from part or all of the output of the 'upstream' process"*. Consequently, vertical integration arises when a company integrates activities to produce its own inputs and/or take care of its own outputs,

* Quote from *Integration and Antitrust Policy* (Adelman, 1949a, p. 28-29).

in order to increase that company's power in the marketplace (e.g. Adelman, 1949a; 1955; D'Aveni & Ilinitch, 1992; Harrigan, 1983b; Hirsch, 1950; Jarillo, 1993; Mahoney, 1992; Perry, 1989; Porter, 1985).

The vertical integration between activities plays a major role in strengthening a company's position to obtain competitive advantages and makes it possible to exploit some of the benefits gained by performing more value added services and broadening the specific company's value chain (Porter, 1985). As identified by Harrigan (1984), a company may benefit from reduced costs by avoiding time-consuming tasks, improving coordination between activities, differentiation of products and assuring supply. Gaining access to the end-user by integration is a way for new products to penetrate a mature market since it is possible, for a producer, to show the products' superiority (Harrigan, 1985b). There are also many possible negative consequences that may strike companies that choose a strategic path of vertical integration, common consequences suggested in the literature are; (1) increased internal and fixed costs which raise the exit barriers, and (2) decreased flexibility (e.g. D'Aveni & Ravenscraft, 1994; Harrigan, 1985b; Porter, 1980). How costs and profits are allocated along the value chain might also become unclear when vertical integration becomes more common in an industry (Gadiesh & Gilbert, 1998). Williamson (1991b, p. 83) suggests a conservative approach to vertical integration as this is the *"organization form not of first but of last resort – to be adopted when all else fails. Try markets, try long-term contracts and other hybrid modes, and revert to hierarchy only for compelling reasons"*.

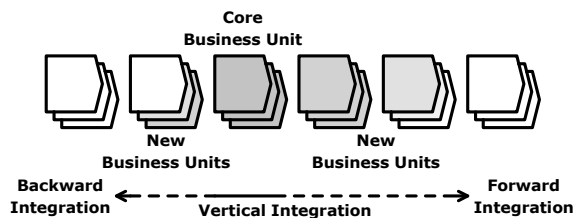


Figure 24. Backward and forward vertical integration into neighboring activities in the value system.

As has been suggested by Perry (1989), a company can engage in backward and/or forward vertical integration into neighboring activities in the value system (Figure 24) and turn these activities into new business units. Nevertheless, being vertically integrated does not necessary mean a total transfer between all integrated stages in the value chain (Harrigan, 1983a; 1984; 1985b; MacDonald, 1985; Perry, 1989). There can be differences in both the number of integrated stages and the degree of internal transfer in each stage.

The dimension of vertical integration can differ depending on conscious or unconscious strategic decisions made by the company. Harrigan (1983a; 1984; 1985b) defines four dimensions of vertical integration; stages, breadth, degree and form. These represent the number of integrated *stages* (or activities) in the value chain, the *breadth* (number of sub activities) of each integrated activity, the *degree* of internal transfer between different activities in the value chain and the different *form* of ownership or control that is applied to the different activities.

When companies are “backward or forward integrated but rely on outsiders for a portion of their supplies or distribution” (Harrigan, 1984, p 643), they are adopting an approach denoted *tapered integration* (e.g. Kessler & Stern, 1959; Porter, 1980; Harrigan, 1983a; 1985b). According to Porter (1980, p. 319) tapered integration can “yield many of the benefits of integration... while reducing some of the costs”. Parmigiani (2007) and Rothaermel et al. (2006) have found indications of positive effects on companies when combining vertical integration with outsourcing and cooperation with partners. The major benefits are due to synergy effects when combining complementary resources from an external partner with internal resources at the company. This illustrates that combining and weighting the positive effects of several different strategies may create successful company structures (e.g. Sirmon, et al., 2007).

Furthermore, to benefit from vertical integration it is important to take advantage of existing knowledge and at the same time let new knowledge in the company evolve (Kazanjan & Drazin, 1987). Since the learning of new knowledge will be more complicated when new markets and process technology are introduced in the company, the success of integration will be less likely the further away from the core business the vertical integration takes a company (cf. Figure 24) (Peyrefitte et al., 2002).

Advantages of Vertical Integration

“While the law [of competition] may be sometimes hard for the individual, it is best for the race, because it insures the survival of the fittest in every department.”

– Andrew Carnegie*

Harrigan (1983b, p. 3) suggests that vertical integration gives companies superior control over the business environment and gives companies “improved ability to forecast cost or demand changes”. Early research in vertical integration by e.g. Malmgren (1961) and Williamson (1971; 1975) indicate that market uncertainties can create incentives for a company to integrate in the value system. According to Malmgren (1961, pp. 402-403) “activities which tended to fluctuate, causing fluctuations in prices and outputs in the market, could be integrated and balanced against one another and thus reduce the fluctuations in required information”. Accordingly, Arrow (1975) suggests that vertically integrated companies may reduce their uncertainty regarding information on input supply compared to non-integrated companies.

Consequently, vertical integration has often, historically, been a necessity in emerging industries to be able to assure input into the production process since it can be hard to convince external suppliers to share the risk in the industry (Chandler, 1962; 1977; Harrigan, 1984; Stigler, 1951). One example is the automobile industry in the beginning of the 1900’s, in those days the automobile manufacturer Ford developed their own components to build and sell low priced and reliable automobiles to the greater public (Langlois & Robertson, 1989; Nugent & Hamblin, 1996). However, over time the automobile industry matured and the

* Quote from *Wealth* (Carnegie, 1889, p. 655).

initial uncertainties decreased. This caused external suppliers to increase their interest in delivering parts to the industry, which turned institutional arrangement away from vertical integration (Harrigan, 1984). Another classic example of successful vertical integration is the US steel industry in the late 1800's. The Carnegie Steel Company, later US Steel, was founded by Andrew Carnegie* in the 1870's. Carnegie Steel, which first consisted only of one steel mill, became more or less immune against competition and industry dominant in almost all areas connected to steel manufacturing. They choose to integrate backward to control e.g. iron mines and railways for transportation. Carnegie Steel also engaged into forward integration and, whenever possible, sold their products directly to the end user without any increase in price by intermediaries (e.g. Dennison, 1939; Schumpeter, 1939/1964; Willoughby, 1901; WQED, n.d.). It should be noted that many other steel companies at that time, such as Illinois Steel, had created similar structures of vertical integration. The steel industry is also a good example of an industry actually reducing production costs by vertical integration, since it is possible to eliminate reheating steps in production if several activities are performed in the same production plant (Scherer, 1970). Notable is that many of these industries today are much less vertically integrated. Even though Porter (1980) proposes that mature businesses tend to be more vertically integrated, a common suggestion in the early research of vertical integration is that the natural development when industries mature is vertical disintegration and specialization of separate companies (e.g. Stigler, 1951; Young, 1928).

Just as for the automobile industry in the beginning of the 1900's, the printing industry has gone through different stages of vertical disintegration since the early stages of the industry. Young (1928) exemplifies the value chain from wood to e.g. a printed newspaper. Not only the modern printing industry has developed from the early printing industry but also producers of ink, paper, special machines etc.

Wide spread vertical integration may create entry barriers and excess profits for established firms (e.g. Bain, 1956; Higgins, 1999; Nalebuff, 2004; Porter, 1980; Williamson, 1975). By integrating and controlling supply of inputs needed in production it is possible for established firms to raise the capital needed for new entrants, since it only will be possible to enter the industry by investing in more than one step in the value chain. In the same way vertical mergers may change the competition in an industry and make it less attractive to be nonintegrated. On the other hand, in a study of companies in the forest product industry, D'Aveni & Ilinitch (1992) found that companies that were vertically integrated had a higher risk of bankruptcy than nonintegrated companies.

The conditions of the industry are important for vertical integration to be advantageous or not (e.g. Chandler, 1962; Livesay & Porter, 1969) and the choice of integration should be adjusted to changing conditions in the industry environment (Harrigan, 1986b). When looking at forward activities from production such as sales

* In 1901 Andrew Carnegie retired and sold the Carnegie Steel Company to US Steel. Carnegie became a dedicated and famous philanthropist and toward the end of the 19th century he wrote several articles on the subject.

and distribution, cooperation with external partners usually has a cost advantage as long as there are competing companies to choose from (Day, 1999). Strong competition makes it, in general, strategically advantageous to rely less on vertical integration and shift the risk to outsiders (e.g. Balakrishnan & Wernerfelt, 1986; Harrigan, 1985b). One example is the highly competitive pharmaceutical industry where companies have gained superior performance using strategic alliances (Rothaermel, 2001). In the same way it is unlikely that companies possessing bargaining power over their suppliers should integrate, since bargaining power can be used to shift risk in ownership to external companies, which can be used as low cost suppliers (Harrigan, 1985b; Porter, 1974). On the other hand, a steady increase in demand does often imply more activities and stages that are integrated (Harrigan, 1985a). Nevertheless, the approach on how to structure a company in an industry is often similar between companies and DiMaggio & Powell (1983) show that a successful strategy may become legitimate in an industry and thereby adopted by other companies in the same field (cf. the discussion of the steel industry in the late 1800's above). In general a successful business strategy is often copied by other in the industry, which to a certain extent is a problem. If a company develops a new strategy, which proves to be successful, others will copy it. Then it will no longer be as effective since it becomes common practice in the industry (cf. the discussion about Gause's Competitive Exclusion Principle in the section *The Concept of Strategy*).

The actual profit gained from being vertically integrated is in general hard to measure (e.g. Bowman, 1978; Maddigan & Zaima, 1985; Nugent & Hamblin, 1996). Research done by e.g. Bowman (1978) and Buzzell (1983) conclude that a plot of vertical integration against profitability creates a u-shaped curve, where the least profitable area is between highly vertically integrated and highly specialized. In general, previous research on the profitability of vertical integration provides inconclusive results, by supporting vertical integration being profitable (e.g. Bowman, 1978; Buzzell, 1983), being non-profitable (e.g. Rumelt, 1974) and having no effect on performance (e.g. Reed & Fronmueller, 1990). Concurrently, Maddigan & Zaima (1985) conclude that the results regarding the profitability of vertical integration are largely dependent on how the measurements are done.

Cooperation and Alliances

"So if you do not know the plans of your competitors, you cannot make informed alliances."

– Sun Tsu*

Fombrun (1993, p. 186) states that the competitive landscape is getting more clustered and *"in many product groups where firms once competed in isolation, they now compete as allies in business communities"*. Acquiring necessary resources and knowledge to a company can be both costly and time consuming. As mentioned, cooperation is an opportunity to gain control of resources and knowledge without direct ownership, and thus, increasing the flexibility and dynamics in resource control.

* Quote from *The Art of War* (Tsu, 500BC/1998, p. 151).

Global airlines have formed extensive strategic alliances for competing on international markets. These airline alliances* make it possible for an individual traveler to travel with different airlines within the alliance from e.g. Umeå in the north of Sweden to Fortaleza in the northern part of Brazil. Such travel could go through SAS's hub at Arlanda Airport, through Lufthansa's hub in Frankfurt and further through Varig's hub in Sao Paulo, using three different airlines in the Star Alliance. Benefits for the traveler with airline alliances are, among others, that more international (and national) destinations may be easily reached with optimized transfer time and baggage check-in.

According to the literature, a strategic alliance can be described as a long-term, purposeful work between legally independent players to create and/or preserve competitive advantages against the surrounding world (Gulati, 1998; Gulati et al., 2000; Jarillo, 1988; Todeva & Knocke, 2005). According to Jarillo (1988, p. 38), *"the critical component that makes a relationship take the shape of a 'typical market' is the high degree of (perceived) 'opportunity for joint value creation' between the two organizations"*. Decreasing transaction cost (compared to market transactions) and increasing competitive advantage are two main reasons why alliances are formed (e.g. Child et al., 2005; Faulkner, 1995; Gulati et al., 2000; Jarillo, 1988; Levin, 1998). The literature discusses whether the lowered transaction cost or gaining access to complementary resources is the most important factor. Jarillo (1988) states that an alliance must be efficient in lowering transaction costs, while Gulati (2007) and Faulkner (1995) consider transaction costs to be subordinate to gaining control over resources. Other internal motives mentioned for forming alliances are spreading of financial risk (Faulkner, 1995) and speed to market (Lee, 2007).

Compatible corporate cultures and synergies between companies are also important for a cooperation to arise (Faulkner, 1995; Whipple & Frankel, 2000). When being part of an alliance, gaining access to complementary resources makes it possible to focus on a small part of the total value system (Porter, 1985) and Gulati (2007, p. 196) suggests that participation in an alliance can make a company *"expand the periphery" of their value proposition to customers*. Consequently, a company can keep the organization at an optimal size and focus on core activities while other activities and resources can be obtained through cooperation (Levin, 1998). Even though cooperation is one strategy of gaining access to resources needed for adding value to a product, combining several different strategies may create an even further flexible company structure. Parmigiani (2007) and Rothaermel et al. (2006) found indications that combining a strategy focused on vertical integration with outsourcing and cooperation has a positive effect on a company.

Anderson et al. (1994) and Sjöberg (1991, in Anderson et al., 1994) illustrate a case of a Danish printer that, due to discontinued paper from their current local paper manufacturer, needed someone else to produce a special paper to be able to keep an important soft drink producer as a customer. By forming a cooperation with another foreign paper producer, the printer was able to convince the new paper manufacturer to produce a paper with similar properties as the old paper manufacturer did. Furthermore, by cooperating

* The three major airline alliances, as of 2008, are Star Alliance, SkyTeam and OneWorld.

with an ink producer, the printer was able to test and show to the customer that the labels printed in the new paper worked fine in the customers' packaging line.

The knowledge gained from the printer's new relationships strengthen the printer's position as a buyer on the paper market and this was later on used to persuade different paper manufacturers to produce this new paper in competition with each other. In the end the printer's relationship with their customer was strengthened, since they showed themselves as capable of providing their product to the customer. Moreover, Anderson et al. (1994) believes that, since the old paper manufacturer in the end got a part of the contract of the new paper, their relationship had also become stronger by the relationship and development of the new product with the foreign paper manufacturer.

Partnerships are usually formed for a reason and Faulkner (1995) suggests seven common external forces that describe why alliances are formed; *turbulence in markets, economies of scale and/or scope, globalization of the industry, regionalization of the industry, fast technological change leading to ever-increasing investment requirements, shortening product life-cycles and high economic uncertainty*. As seen previously, many of these forces touch upon those conditions that a dynamic and hypercompetitive environment (e.g. Bourgeois & Eisenhardt, 1988; D'Aveni, 1994) deals with. Having dynamic capabilities is essential when acting in high-velocity markets (Teece et al., 1997), and these "*rely extensively on new knowledge created for specific situations*" (Eisenhardt & Martin, 2000, p. 1116). Volberda (1996) argues that dynamic capabilities are dependent on a flexible organization form. An opportunity with alliances and cooperation is to gain control of resources and knowledge without direct ownership (Håkansson & Johansson, 2002), and thus, increasing the flexibility and dynamics in resource control. The flexibility in the alliance structure is important and Lorange (1990, p. 27) proposes that joint ventures "*are always in a state of evolutionary development*". Bleeke & Ernst (1991) conclude that nearly 40% of the alliances in their study gradually broadened the scope of collaboration after the alliance was formed. This flexibility to change an alliance also made the success rate higher. Alliances can be seen as an enabler that provides dynamic resources and capabilities to foster a hypercompetitive behavior. On the other hand this behavior can damage the possibilities of maintaining long-term alliances. Strategic alliances can, consequently, both function as a barrier for entering an industry or market, but at the same time they can be a shortcut in to an industry or market for the companies who are a part in them (Gulati et al., 2000).

Bleeke & Ernst (1995) suggest, based on the relationship between partners engaged in cooperation, that six different types of alliances exists – *collisions between competitors, alliances of weak companies, disguised sales, bootstrap alliances, evolutions to a sale and alliances of complementary equals*. They claim that the first two almost always fail, while only the last, alliances of complementary equals, is expected to be a success. The others are likely to end up in mergers or sales. Nevertheless, this situation may not be regarded as a failure since a merger or sale could benefit involved partners. Even though different kinds of partnerships are, without a doubt, important for achieving competitive advantages in many businesses, it should be noted that many alliances are unstable and the success rate of alliances are not particularly high (Bleeke &

Ernst, 1991; Chowdhury, 1992; Das & Teng, 2000; Kogut, 1988; Sherman & Sookdeo, 1992). Bleeke & Ernst (1991) report that only about half of the strategic alliances could be regarded as successful after two years.

Tan & Teo (1997) illustrate how a printing company based in Singapore has formed strategic alliances with companies being able to provide complementary services and knowledge. One alliance is with another printing company that provides much of the prepress services, and even though they are to be considered as competitors, mutual interests and differentiation made the alliance a success. Furthermore, to be able to focus on core competence, the printing company allied itself with a distribution company to be able to provide fast deliveries of time sensitive jobs.

Regarding participation in strategic alliances, Håkansson & Johansson (2002, p. 146) suggest that actors in an alliance have “*differential knowledge about activities, resources and other actors in the network*”. Even if they have experience from similar areas, their experience is not the same. This causes different actors to have dissimilar and sometimes conflicting interests, thus, trust, or rather lack of trust, may have an impact on cooperation between actors.

Trust, Commitment and Control

“I think the easiest way to lose something is to want it too badly.”
– John “J.D.” Dorian*

Even though there has to be a perceived opportunity for all parts in an alliance, there are other factors that are important, and Sherman & Sookdeo (1992, p. 78) suggest that “*perhaps the biggest stumbling block to the success of alliances is the lack of trust*”. Moorman et al. (1992, p. 315) define trust as “*a willingness to rely on an exchange partner in whom one has confidence*” and for long-term alliances, both trust and commitment are important (e.g. Lynch, 1990; Morgan & Hunt, 1994).


The actual human resources involved in an alliance are important for the long-term success (e.g. Child et al., 2005; Narayandas & Rangan, 2004; Zaheer et al., 1998) and Child et al. (2005, p. 60) stress that “*the growing ability of each partner’s staff to understand and predict the thinking and actions of the other’s can provide a further basis for trust between them*”. Interpersonal trust is a key factor to build trust between partners in an alliance and failure to build such trust often results in failure to achieve a close cooperation. One foundation for fostering trust and commitment is timely and correct information and communication (Moorman et al., 1993; Morgan & Hunt, 1994; Young-Ybarra & Wiersema, 1999) and use of real-time information has been suggested as important for strategic decision making in high velocity industry environments (Eisenhardt, 1989).

The risk of deceit in an alliance is the major obstacle for developing confidence between partners (Das, 2005). Different kinds of control are also essential (Child et al., 2005; Das & Teng, 1998; Geringer & Herbert, 1989; Medcof, 1997), this can be achieved through e.g. agreements to divide risks between partners in an alliance

* Quote from the TV show *Scrubs, My Last Chance* (Schwartz & Braff, 2004).

(Jarillo, 1988). Nevertheless, apprehension towards risk and lack of trust are factors that change over time (Ring & van de Ven, 1992) and engaging in opportunistic behavior may have a severe impact on the alliance and be *“costly because the damage to one’s reputation can influence not just the specific alliance in which one behaved opportunistically, but all other current and potential alliance partners”* (Gulati et al., 2000, p. 209). Das & Teng (1998, p. 495) emphasize the importance of control and suggests that trust and control can be separated, as *“even with minimum trust the partners still can develop a fairly high level of confidence, if adequate control mechanisms are in place”*. Opportunism (e.g. Williamson, 1975; 1985) is a function of uncertainties in transactions and accordingly opportunistic behavior refers to *“a lack of candor or honesty in transactions, to include self-interest seeking with guile”* (Williamson, 1975, p. 9). Opportunistic behavior can have different impacts on cooperation and is dependent on the time span (Das, 2004) and Gnyawali & Madhavan (2001) point out that in a strong cooperation a partner taking a competitive action against another is most likely to experience an immediate response.

Gulati et al. (2000) indicate that if one part in an alliance believes that they could produce a better return by working outside the alliance, they may be caught in a race to learn and exploit as much as possible from partners, and later on exit the alliance (so-called learning races). Accordingly, Jarillo (1988) describes how opportunistic behavior from one part affects the alliance in a negative way. In these cases the trust between partners decline, and consequently the commitment to the alliance fails. A dissolution of an alliance should, however, not automatically be regarded as a failure as the learning experience may have been the goal (Hamel, 1991).



4 Methodology

"Though this be madness, yet there is a method in't."

– Polonius*

Just as in everyday life, research is based on a series of choices that influence outcome. To ensure high quality results and provide a good basis for future research, using a suitable methodology is crucial. This is a basic premise in science and *"scientific knowledge is proven knowledge. Scientific theories are derived in some rigorous way from the facts of experience acquired by observation and experiment. Science is based on what we can see and hear and touch, etc."* (Chandler, 1982, p. 1). The word *Science*[†] derives from the Latin word *Scientia* meaning knowledge (Morwood, 1994) and after the introduction of the word into the English language in the Middle Ages, *"it soon gained the connotation of accurate and systematized knowledge"* (Ross, 1962, p. 66). Research is consequently a *"systematic, controlled, empirical, amoral, public, and critical investigation"* undertaken to increase the understanding of a phenomenon (Kerlinger & Lee, 2000, p. 14; Walliman, 2005). To render possible systematized knowledge, it is very important to work methodically. Methodology is, according to Sliverman (2000, p. 77) *"a general approach to studying research topics"* and should include e.g. choices regarding cases, data collection and data analysis. This chapter will explain the methodological choices made in the different studies in this dissertation.

The concept of strategy is a complex issue, which makes it important to carefully chose and follow a suitable methodological approach in the research. According to Harrigan (1985a, p. 6) business strategy is a *"difficult-to-measure construct that can differ from competitor to competitor within the same industry"*. Due to limitations in both quantitative and qualitative research methodology (see the section *General Methodology Criticism*), a hybrid research strategy is often preferred which allows for capturing the dynamics of business strategy. Eisenhardt (1989, pp. 534-535) state that *"case studies typically combine data collection methods such as archives, interviews, questionnaires, and observations. The evidence may be qualitative (e.g., words), quantitative (e.g., numbers), or both"*. The studies in this dissertation are based mainly on four different sources – *interviews, surveys, official financial data and official company information*, and are gathered using both qualitative and quantitative methodologies.

* Quote from *Hamlet, Prince of Denmark* (Shakespeare, 1958/1604, p. 956).

† The word *Scientist*, however, is according to Ross (1962, p. 74) *"a Latin-Greek hybrid or, at best, a formation from incorrect Latin"* since -ist suffix originally derives from Greek words.

4.1 Research Strategy

“Getting the science right in the first place will prevent you from having to come up with some highly implausible science at a later date.”

– Brett Booth*

When conducting research on complex phenomena like strategy case studies are a suitable methodology. This dissertation has an exploratory character and strives to analyze what is really happening and to seek new insights and solutions to the studied problem. Saunders et al. (2007) define three principal ways of conducting exploratory research: a search of literature, talking to experts in the field and conducting focus group interviews. The research studies that form the basis for this dissertation have been done mainly using literature and interviews with industry representatives.

Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings and research memos. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them (Denzin & Lincoln, 2005).

Case Methodology

“The essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions: why they were taken, how they were implemented, and with what results.”

– Wilbur Schramm†

A case study (e.g. Stake, 2005; Yin, 2003, p. 13) is an “*empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*”. Qualitative case studies make it possible to gain deeper knowledge of the behavior behind the strategy used in the industry. According to Yin (2003, p. 9) a case study should be considered when “*a ‘how’ and ‘why’ question is being asked about a contemporary set of events, over which the investigator has little or no control*”. When working with case studies, four stages in the methodology are recommended (Yin, 2003):

- Designing case studies.
- Conducting case studies.
- Analyzing case study evidence.
- Reporting case studies.

* Quote from *The Science of Superheroes* (Gresh & Weinberg, 2002, p. 175).

† Quote from *Notes on case studies of instructional media projects* (quoted in Yin, 2003, p. 12).

A case study can be designed to be either a single or a multiple case design (Yin, 2003). A single case has to be carefully selected to represent a *critical, unique, representative, revelatory* or *longitudinal* case depending on the purpose of the case study. A critical case is selected when the objective is to test or extend a theory, a unique case when the goal is to document something unusual and a representative case when capturing the typical circumstances. A revelatory case is used when having the opportunity to observe something new and a longitudinal when observing the same case at different points of time. A weakness with a single case design is that it is based on a single case and that this case may not turn out as expected (Yin, 2003).

In a multiple case design or a comparative case study, many cases are used in the same study. These are however chosen and considered as individual cases just as in a single case design (Yin, 2003). In a multiple case design, it is typically only possible to find enough cases to characterize *representative* or *longitudinal* cases. This since the other types of cases involves some sort of rare or unique circumstances, which is usually not consistent with multiple cases.

To keep an explorative view of the interviews the concept with focused interviews was used. This means that at the interviews a couple of general questions were listed in advance to keep focus on some main topics and to be able to get comparable results from all of the respondents. Follow-up questions were adjusted to the situation and the respondent to get a more comprehensive and explorative data material from the interviews (Robson, 2002).

A common criticism of case study methodology is that a case study does not provide a good basis to form generalized conclusions. In a case study, whether it is a single or multiple case study, Stake (2005, p. 460) states that "*the purpose of a case report is not to represent the world, but to represent the case*". This means that "*case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes*" (Yin, 2003, p. 10).

Grounded Theory

"Just because I cannot see it, doesn't mean I can't believe it!"
– Jack Skellington*

To understand how respondents experience a situation, an approach in accordance with *grounded theory* (e.g. Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998) can be used. Grounded Theory was developed in the 1960's by Glaser and Strauss and is described in their book *The Discovery of Grounded Theory* (Glaser & Strauss, 1967). Grounded theory is based on that the material from e.g. interviews and field studies are coded and conceptual constructs are formed.

When the first thoughts behind grounded theory were initiated in the 1960's (Glaser & Strauss, 1967), the idea was to study the literature after all the empirical studies had been conducted. In this way, it is possible to be uninfluenced and increase the

* Quote from the movie *The Nightmare Before Christmas* (Burton et al., 1993).

chance of new findings and insights. However, opinions since the 1960's have become divided about this approach to the literature (e.g. Allan, 2003; Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998; Thomas & James, 2006) and initial theoretical knowledge before the empirical studies, may be vital to enhance the theoretical sensitivity (Allan, 2003).

Qualitative Interviews

"The interviewer should just tell me the words he wants me to say and I'll repeat them after him."

– Andy Warhol*

The actual interviews are important when conducting qualitative research. Therefore careful preparations are necessary. According to Robson (2002, pp. 272-273), *"face-to-face interviews offer the possibility of modifying one's line of enquiry, following up interesting responses and investigating underlying motives in a way that postal and other self-administrative questionnaires cannot"*.

There are several types of interviews and the most common in the literature distinguish between *structured*, *semi-structured* and *unstructured interviews* (e.g. Fontana & Frey, 2005; Robson, 2002). These differ, as can be understood by their name, by the degree of structural approach and the less structured, the greater the possible depth is in the respondent's answers. In this dissertation, semi-structured interviews have been used. By using semi-structures interviews, it has been possible to both adjust follow-up questions to the respondent's answer and still get results that are comparable between different interviews. This degree of structure has been chosen to enable dept in the respondents answer as well as having an exploratory approach and both semi-structured and unstructured interviews are *"widely used in flexible, qualitative designs"* (Robson, 2002, p. 271).

Quantitative Surveys

"Humans use common sense, intuition, humor, and a wide range of emotions to arrive at conclusions. Love, passion, greed, anger: How do you code these into if-then statements?"

– Lois H. Gresh & Robert Weinberg†

According to Creswell (2003), *"a survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population"*. Quantitative surveys are widely used in research, due to its ability to provide large sets of data, which may make it possible to test statistical significance. A survey can be carried out in many different ways, but the most common ways to conduct

* Quote from the book published on the occasion of the Andy Warhol exhibition at Moderna Museet in Stockholm February-March 1968 (Warhol et al., 1968).

† Quote from *The Science of Supervillains* (Gresh & Weinberg, 2005, p. 33).

surveys are, by *telephone*, via a *postal/e-mail/web questionnaire* or by doing *face-to-face interviews* (Robson, 2002). Nevertheless, this section will only address the self-administrative types, which are postal, e-mail or Internet surveys conducted by sending out a questionnaire to the respondent. Sampling aside (see the section *Case Companies and Respondents* for a specific description of the sample and population in the survey study conducted in this dissertation), there are many other issues to address to ensure high validity of the results from a self-administrative survey. Web based surveys are becoming increasingly popular (e.g. Solomon, 2001), however, to be able to ensure a high quality material, it is important that the sample and security regarding such a survey follows the normal proceedings. This means that the sample has to be selected and controlled for the purpose of the study and it has to be ensured that no others than the intended answer the survey. Since web based surveys tend to have a lower response rate than e.g. a postal survey (Solomon, 2001), a combination of several different sampling techniques can be used to increase response.

During a survey investigation it is quite common that a number of respondents in the sample appear not to fit into the predefined population and, hence, are ineligible. Due to this the customary way of calculating the response rate of a survey investigation, in accordance with the Council of American Survey Research Organizations (CASRO, 1982; Wiseman & Billington, 1984) is:

$$\text{Total response rate} = \frac{\text{Total number of responses}}{\text{Total number in sample} - \text{Ineligible}}$$

According to Armstrong & Overton (1977) people who respond late are assumed comparable with non respondents. Consequently, it is possible to get a hint of the impact of the non respondents by comparing the results of the respondents that responded without reminder and those that responded after a reminder.

4.2 Research Design

"Facts are meaningless. You can use facts to prove anything that's even remotely true!"

– Homer J. Simpson*

All choices made during a research process are important when the quality of the results is to be determined. This dissertation is based on case studies of commercial printing houses and customers to commercial printing houses. This section introduces the choices made regarding case companies, data collection and data analysis in the studies in this dissertation.

* Quote from the TV show *The Simpsons*, *Lisa the Skeptic* (Cohen & Affleck, 1997).

Case Companies and Respondents

"The leadership of kings and lords prevents the downfall of the country."

– Lao 'Tsu*

The companies and respondents in all research projects in this dissertation have been selected to be as representative as possible for the case. In Paper 1, a multiple case design was used and the case companies came from different stages in the print media value system. They were also selected to represent the following groups – companies who have been *active in digital printing only*, those with *both digital and conventional printing technology* and companies that had *both digital and conventional printing technology but choose to discontinue their investment in the conventional printing technology*. The business strategy and organizational culture in a company are often a direct reflection of the founder and the CEO, which are the persons responsible for the business development in the organization (Beal & Yasai-Ardekani, 2000; Harrigan, 1985b; Porter, 1996; Schein, 1983). Collins and Montgomery (2005, p. 3) suggest that *"because the impact of corporate strategy is so pervasive and long lasting, it has more important consequences than most other managerial decisions. Setting corporate strategy, therefore, is a critical task and responsibility of the CEO"* and the former CEO and Chairman of General Electric, Jack Welch, states that *"setting the mission is top management's responsibility. A mission cannot, and must not, be delegated to anyone except the people ultimately held accountable for it"* (Welch & Welch, 2005, p. 17). Consequently, either the CEO or the founder was interviewed at each company, as they are the ones responsible for incorporating the business strategy among co-workers.

The study presented in Paper 2 was designed as a multiple case study and the respondent companies were customers to digital printing houses in Sweden. The case companies were chosen to represent both advertising agencies and direct customers to printing houses. A direct customer is defined as a customer whose core business is not connected to print or media production in contrast to e.g. advertising agencies. At all these case companies the respondents were persons responsible for contact with printing houses.

In Paper 3, the two case companies were chosen to illustrate the shift into a more dynamic business environment. The study in Paper 3 was constructed as a single case design using a critical case to describe the shift into a more dynamic business environment, where the printing houses have to act faster and more hypercompetitively to be able to capture temporary above average profits. To avoid this problem the case has to be investigated and chosen carefully. This is the situation in Paper 3 since several potential cases were investigated and considered and the customer company was chosen from those investigated in Paper 2. The respondents in this study were chosen from the same prerequisites as in Paper 1 and Paper 2.

Paper 4 reports on a comparable case study with two case companies. The two case companies were chosen to be similar regarding size and company structure and the CEO's of both companies were interviewed.

* Quote from *Tao Te Ching* (Tsu, 600BC/1997, ch. 39).

With three exceptions, none of the case companies and respondents in Paper 1-4 were the same. Since Paper 3 is based on a critical case, the case was found in Paper 2 and Customer 3 in Paper 2 also constituted the Customer in Paper 3. However, the focuses in these two papers are different and the Service Provider in Paper 3 is not the same company as any previously interviewed printing house. The Service Provider in Paper 3 is the same printing house as Company A in Paper 4.

Paper 5 and Paper 6 are based on a survey study of 136 randomly selected Swedish commercial printing houses. The questionnaire was sent out by letter to 300 companies, which were randomly selected Swedish commercial printing houses from the members' list of the Swedish Graphic Companies' Federation (GFF). The survey was sent to the CEO at each company and this person was the intended respondent. However, due to the nature of a questionnaire sent out by mail, it is impossible to know who answered the survey. Nevertheless, a question was included in the survey with the purpose of clarifying this situation. The results from the study showed that 82% of the respondents were CEO's or vice managing directors at the case companies. The remaining 18% of the respondents were employees with responsibility for marketing, production or logistics at the case companies.

Out of the population a sample of 300 companies was randomly selected. However, while collecting data from the sample, it was found that some of the companies did not meet the research requirements of this study, and they were subsequently omitted. The response rate was calculated in accordance with the principles of the Council of American Survey Research Organizations (CASRO, 1982; Wiseman & Billington, 1984). Out of the total sample of 300 companies, 46 were found to be ineligible and 136 eligible companies responded, which constituted a total response rate of 54%. Out of all companies, only six were not possible to reach by personal communication (i.e. telephone or e-mail), implying that practically all ineligible companies in the sample have been identified. The reason for having so many as 46 ineligible companies was that the database contained some companies that went into bankruptcy, sold their printing equipment or did not currently own any printing equipment, but were interested in the Commercial Printing Business. In most cases the latter companies were working with activities closely related to this business, such as prepress, finishing or sales of printing equipment.

It should be noted that the list used as the population is not a complete list of all commercial printing houses in Sweden, which limits the possibility of generalizing the results toward the whole Swedish commercial printing industry. Other potential sources of Swedish printing houses could be e.g. extracted from the telephone directory or a financial information database. However, after investigating these options, it was concluded that these alternatives did not provide a list with sufficient accuracy for this investigation. Consequently, the members' list of the Swedish Graphic Companies' Federation (GFF) is believed to be the best directory to constitute the basis for a survey investigation of Swedish printing houses. According to GFF, the members' list includes companies covering at least 80% of the volume of invoiced sales of printed commercial products in Sweden (K. Flick, GFF, personal communication, January 25, 2007). Hence, the results should give a good indication of the situation in the Swedish commercial printing industry.

Paper 5 and Paper 6 are based on the same quantitative survey study, and consequently the respondents in these studies are the same.

Study Time Frame and Location

"Time may change me. But I can't trace time."

– David Bowie*

The five studies that constitute the basis of the six papers included in this dissertation were carried out during a time period from the spring of 2004 to the fall of 2006. For Paper 1, the interviews were performed during the summer and autumn of 2004 at the printing house of each respondent. The interviews in Paper 2 were all conducted either at the customer's company or at a place of their choice during the late spring of 2005. In Paper 3, the interviews were performed, at the respondents company, during the period from the summer of 2005 to the spring of 2006. The interviews with the case companies in Paper 4 were conducted from the spring of 2005 until the spring of 2006 at each of the participating printing houses.

To ensure high validity and reliability all interviews have been conducted under relaxed conditions without any time pressure and always at a place chosen by the respondents. All interviews have been conducted face-to-face and only introduction and follow up questions have been conducted over the telephone or by e-mail.

The quantitative data used in Paper 5 and Paper 6 was collected using a postal mail and an online web survey during the late spring of 2006 and the fall of 2006.

Methodology Used in the Included Papers

"Personal opinion or preferences and speculative imaginings have no place in science. Science is objective. Scientific knowledge is reliable knowledge because it is objectively proven knowledge."

– A. F. Chandler†

As mentioned earlier, this doctoral dissertation is based on a hybrid methodology of both qualitative and quantitative studies. Paper 1-4 are based on qualitative interviews conducted either at the respondents' companies or at a place chosen by the respondents. Additional information has been collected by telephone, e-mail, and from the companies' websites, annual financial reports etc. Paper 5 and Paper 6 are both based on the quantitative survey study described above. Specific methodological issues for some of the included papers will be presented below and for a complete description of each papers methodology, please refer to each paper.

* Quote from the song *Changes* (Bowie, 1971).

† Quote from *What is this thing called science?* (Chandler, 1982, p. 1).

Paper I

This exploratory qualitative case study is based on focused interviews. A literature review has been performed and interviews have been conducted with respondents at a selected number of digital printing houses in Sweden. A couple of general questions were listed in advance to keep focus on some main topics and to be able to receive comparable results from all of the respondents. This allowed for the answers from the interviews to be more comprehensive and follow-up questions could be adjusted to the situation.

Paper II and Paper III

To understand how the respondents experience the situation, an approach inspired by Grounded Theory (e.g. Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998) has been used in Paper 2 and Paper 3. The interviews in the different case studies have been conducted in parallel, then the material has been coded and conceptual constructs have been formed. In both Paper 2 and Paper 3, literature reviews were conducted both before and after the empirical studies were carried out (in accordance with e.g. Allan, 2003).

Paper II

Furthermore, in Paper 2, the respondents were requested to grade, from low to high, their general demands on printed material and their satisfaction with digital printing according to some defined Critical Success Factors (CSF). In the section *Success Factors* the CSFs Cost, Time, Functionality, and Quality, were presented. Since these factors are studied externally from the customer's point of view, the term price will be used instead of cost to be consistent with Cooper (1995). Accordingly, the functionality of the technology is also the possibility for the customer to use the printing technology to order unique products. The factor Functionality/Possibilities has thus been used. The CSFs graded were *price*, *time*, *functionality/possibilities*, and (print) *quality*. The respondents' attitudes were captured on a 10-point numeric rating scale and the end categories were labeled (Saunders et al., 2007).

To be able to easily compare both a specific customer's satisfaction in relation to their needs and the results between the respondents, the sum of the demands has been mean-centered. This implies that by using an average mean centered value of the results from the survey, the result from all respondents adds up to a specific value. However, their satisfaction level does not necessarily add up to the same sum, but to a value that is proportional to their actual level of satisfaction compared to their demands. The CSFs have been presented in graphs where they represent two areas that show the customers' demand on printed material and their satisfaction with digital printing (Figure 25).

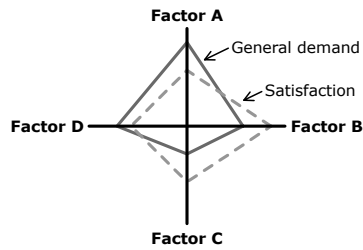


Figure 25. A model of how the different factors are illustrated.

In addition to these graphs, score points were calculated for each CSF to establish how the different customer companies rank the factors among each other. The basis for calculation is that each company contributes equally to the total score, independently of how they have ranked the CSF, the least important CSF was given a score of 1 and the second least a score of 2 etc. If two or more CSFs have the same rank, they share the sum of their points and each of them were given an average of the summarized scores. This makes it possible not only to determine the total rank of the CSF but also how they are distributed along the “score axis”.

Paper V and Paper VI

The data in Paper 5 and Paper 6 came from the same survey study carried out during 2006. The total questionnaire was extensive and designed to obtain information about the respondents’ opinion and ranking of certain factors and situation in their reality. The questionnaire was based on closed questions and the data was collected using either multiple choice questions or numeric rating scales where the end categories were labeled with appropriate options (Saunders et al., 2007). Two different scales were used, a 10-point numeric rating scale from 1 to 10 when rating opinions about e.g. perceived pressure. When rating opinions about e.g. differentiation, an 11-point ratio scale from -5 to +5 (including 0) was used to capture how the companies had chosen to differentiate themselves in relation to, their perceived, market average.

The data in the study has been separated and analyzed in different categories depending on the printing technology used at each company. The companies were distributed among different production technologies as illustrated in Figure 26.

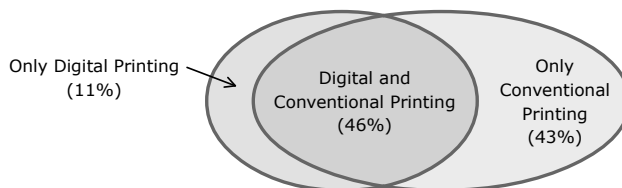


Figure 26. Relative share of printing houses in the survey study according to printing technology used.

Because the survey was answered by Swedish companies, all questions were formulated in Swedish and, thus, have been translated here. To ensure the validity

of the questionnaire, an initial pilot testing (Saunders et al., 2007) was performed with three printing houses. Some questions were changed and new questions were formulated according to comments made by the respondents in this pilot test.

The survey was constructed as a self-administrated survey with an enclosed covering letter, explaining the survey to each respondent (Saunders et al., 2007). To raise the response rate, the respondents had the choice of responding either by post or through a web interface. The companies that did not respond to the initial survey were reminded by e-mail and/or telephone. About half of the answering respondents posted their answers without any reminder, whereas the other half sent their response after being given a reminder. In general, no major differences between the two groups were found, thus giving an indication of no significant differences between respondents and non-respondents (cf. Armstrong & Overton, 1977).

The sample (136 companies) was large (>30) and approximately normally distributed (Keller, 2005), whereby the t-distribution was used to calculate confidence intervals and p-values. Since the sample also covered a large portion of the studied population (428 companies) a Finite Population Correction Factor (FPCF) was used when calculating the standard deviations for the mean values (e.g. Andersson et al., 2002, p. 257; Keller, 2005, p. 399).

$$\text{Finite Population Correction Factor (FPCF)} = \sqrt{\frac{N-n}{N-1}} \quad \begin{array}{l} N = \text{Population size} \\ n = \text{Sample size} \end{array}$$

Paper V

The questions from the survey study used in Paper 5 were designed to obtain information about the respondents' ranking of *price*, *lead time*, *quality* and *flexibility* with respect to how the printing houses perceive the demand from the customers and how they have differentiated their offer. However, the companies' ranking of how they had chosen to differentiate themselves does not necessarily reflect on how they actually performed in relation to the market average, because the respondents may have different perceptions about numerical values (Churchill and Brown, 2004). Furthermore they may tend to set high values when they are evaluating their own performance (Robson, 2002), which was indicated in this study by respondents having a better performance on all factors (besides price) compared to the perceived market average. However, since the purpose was to evaluate the different factors against each other the problem identified by Robson (2002) was not an issue in this case.

Furthermore, the significance of the mean difference between different categories in the dataset has been analyzed using an independent sample t-test using a 95% confidence level. The significance of differences between the factors price, lead time, quality and flexibility were determined using a paired sample t-test. Since six comparisons had to be made to find possible significance in the difference between the four mean values, the confidence level was adjusted using the Bonferroni adjustment method (e.g. Abdi, 2007; Keller, 2005). The Bonferroni adjustment method defines that if a number of independent hypothesis are tested on a set of

data, then the true significance level (α_E) has to be adjusted with the number of pairwise comparisons, which makes the significant level used in the tests (α) to be calculated as:

$$\alpha = \frac{\alpha_E}{C} \quad C = \text{Number of pairwise comparisons}$$

Since six pairwise comparisons have to be done, the Bonferroni adjustment states that the confidence level must be set to 99.17% for each t-test, in order to avoid Type I errors (falsely receiving a significant difference) and implied a 95% confidence level in total. However, using the Bonferroni adjustment might increase the risk for Type II errors* (not observing a significant difference) (Abdi, 2007; Keller, 2005). Due to this, the p-values for factors not showing any significant differences were also investigated without the Bonferroni adjustment, and in this case none showed any significant difference either.

Paper VI

The data from the survey study was coupled with companies' financial data from the years 2003-2006. The financial data was obtained from a national database, Affärsdata (2008), containing data published in the annual reports posted by the companies. Two profitability key figures†; profit margin and profit margin before depreciation have been used to investigate the profitability of the printing industry in relation to vertical integration.

$$\text{Profit margin} = \frac{\text{Profit or loss before appropriation of profits and taxes}}{\text{Net sales revenues}}$$

$$\text{Profit margin before depreciation} = \frac{\text{Profit or loss before depreciation}}{\text{Net sales revenues}}$$

To avoid the effects of extraordinary fluctuations, a four year average (2003-2006) of the key figures has been used. The use of a four year average could however affect the results since some of the companies could have acquired (or sold) their digital printing equipment during this period, this has not been taken into account in this study. In the Swedish printing industry the major movement into the digital printing market was during 2000, which makes the effect of this problem less significant. However, using only the data for 2006 does not change the result of the study.

Integration of activities in the value system can take many different forms (Figure 27), and do not necessarily have to be sequential. This study utilizes two sources of information; the number of integrated steps in the value system from the survey investigation and financial key figures from the companies' annual financial statements. Although Harrigan (1984; 1985b) suggests several different dimensions

* The Bonferroni adjustment is based on that $\alpha_E \leq C\alpha$.

† For a more extensive overview of the key figures, see e.g. FAR SRS (2008a; 2008b).

of vertical integration, this study takes its point of departure in the number of integrated steps in the value system. If the activity is not integrated, it has, by definition, to be carried out externally. Consequently, this study has a prerequisite in the strategic importance of having an activity internally. The form of ownership used to control the integrated activities is frequently discussed in the literature (e.g. Grossman & Hart, 1986; Harrigan, 1983a; 1984; 1985b). Harrigan, for example, states that an activity could be under control even without ownership and should consequently be regarded as vertically integrated. Nevertheless, ownership is important to exercise control over resources and this study uses the term integrated for activities that are under internal majority ownership control. Activities under other types of control, such as strategic alliances, are not considered to be integrated, since they are not under direct company control.

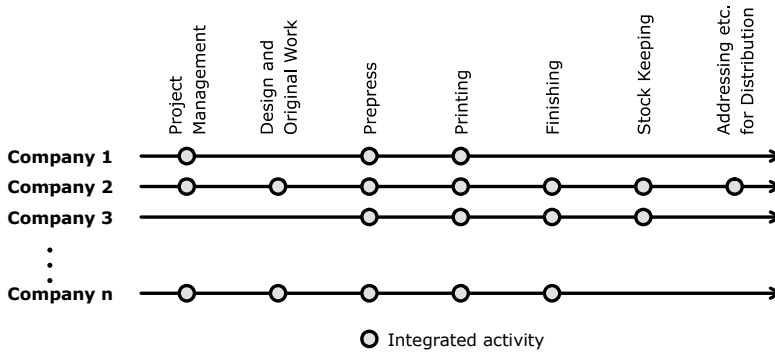


Figure 27. Integration in the Printing Industry.

Paper 6 proposes a simple framework to determine the level of integration in the value system by calculating the *Vertical Integration Level (VIL)* as:

$$VIL = \frac{\sum_{i=1}^n (Activity_i)}{n} \quad Activity_i = \begin{cases} 1, & \text{Activity integrated} \\ 0, & \text{Activity not integrated} \end{cases}$$

n = Number of integrated activities

In the framework, $Activity_i$ represents the additional activities in the value system, excluding the core activity (in this study, the printing activity). Hence, the Vertical Integration Level can yield a number from 0 (not integrated) to 1 (fully integrated). The Vertical Integration Level can thereafter be matched with other conditions or key figures such as company specific profitability data or other industries. The calculated Vertical Integration Level key figure gives an indication on the use of integration as a strategy in production. It does not, however, describe a company's structure or workflow.

4.3 General Methodology Criticism

"There will always be an element of disbelief, but if proper science can be used to give the book a more realistic feel, then go for it."

– Brett Booth*

Since almost all studies are performed with certain assumptions or limitations, there is criticism against both qualitative and quantitative research methodology. According to Silverman (2000, p. 5), *"qualitative researchers often assume that a dependence on purely quantitative methods may neglect the social and cultural construction of the 'variables' which quantitative researchers seek to correlate"*. On the other hand qualitative research is often regarded as a methodology that *"should only be contemplated at early or 'exploratory' stages of a study"* (p. 9). The lack of standardization of interviews may also influence reliability, which makes it important to work professionally with interviews (Robson, 2002). All interviews carried out during the studies included in this dissertation have been conducted under relaxed conditions and always at a place chosen by the respondent. No matter what research approach chosen, it is important to ensure a high validity and reliability of the research results.

There are many ways of testing the reliability and validity of the research results and one way that is often used is triangulation. Denzin (1989, p. 234), broadly, defines triangulation as *"the combination of methodologies in the study of the same phenomena"*. There exist two forms of methodological triangulation – within-method and between-method and Jick (1979, p. 603) states that *"within-method" triangulation essentially involves cross-checking for internal consistency or reliability while 'between-method' triangulation tests the degree of external validity"*. In this dissertation triangulation has been used on the studied phenomenon as independent studies involving both qualitative and quantitative studies have been carried out. This hybrid methodology has been used to ensure a high validity of the results in this dissertation.

Even though the results in this study are based on several different studies and methodologies, it is important to remember that there are limitations. In the qualitative studies the case companies have not been chosen randomly. They have been chosen to conform to certain predefined criteria. Furthermore, the time frame for this dissertation limits the possibilities for longitudinal studies, and consequently, the results reflect the time period 2004-2006. Studies have only been carried out in Sweden† and many of the impressions that are presented regarding the studied industry and phenomenon are based on qualitative methodology and thus one should bare in mind the statement of Stake (2005, p. 460): *"The purpose of a case report is not to represent the world, but to represent the case"*. In other words, the purpose of this dissertation has never been to generalize the results to the whole

* Quote from *The Science of Superheroes* (Gresh & Weinberg, 2002, p. 175).

† The studies in this dissertation have been carried out in Sweden. Even though the choice of using Swedish case companies is obvious, it should be noted that Sweden has of late been very highly ranked over all and especially in technological readiness (e.g. Lopez-Claros et al., 2005; 2006; Porter et al., 2007). According to the *Global Competitiveness Report 2007-2008*, Sweden was ranked first in technological readiness and forth over all in the Global Competitiveness Index (Porter et al., 2007).

world or even the industry. Nevertheless, it is the author's most certain belief that the results give hints on and reflect the complex reality in the printing industry in Sweden and that the studies included in this dissertation provides data of high quality.





5 Summary of Results

“There is nothing like looking, if you want to find something. You certainly usually find something, if you look, but it is not always quite the something you were after.”

– Thorin Oakenshield*

The first paper deals with questions regarding strategic changes in companies that have chosen to invest in new production technology. The second paper regards how customers in the digital printing value system experience the value they get from purchasing goods produced with digital printing technology. In the third paper it is illustrated how a successful producer – customer relationship can create value for both parts in a dynamic and changing business environment. The fourth paper further discusses how strategic alliances can provide some of the flexibility and dynamics necessary to maintain customer contact. The fifth paper is an industry wide survey investigating how the commercial printing industry is differentiating their business and how they perceive the demand from customers regarding the critical success factors price, delivery lead time, print quality and flexibility. The sixth, and final, paper investigates vertical integration and profitability within the printing industry.

This chapter presents a brief summary of the results presented in each of these six papers. For a more thorough presentation of the results please refer to the complete papers appended at end of the dissertation.

5.1 Summary of Paper I: Strategies for Successful Digital Printing

In this paper, corporate strategy owing to the introduction of digital printing technology is studied. The focus in this case study is on printing houses that made investments in digital printing technology. The paper mainly addresses questions regarding how the digital printing houses have changed their strategies to be able to successfully utilize digital printing to compete on the market. Respondents from six different printing houses were interviewed during the study.

In the larger media perspective, digital printing has strengthened the competitiveness of print by providing a more flexible output than material printed with conventional printing technology. Historically, printing has been an output

* Quote from *The Hobbit* (Tolkien, 1937/1999, p. 55).

option only for mass production. With digital printing this condition has changed and it has become possible to create and publish smaller and customized editions.

Even though digital printing offers this flexibility and can easily be used as an on-demand output channel, it still has a cost disadvantage in the printing and distribution activities over electronic media that can use the Internet as an inexpensive way of distributing information. On the other hand, digitally printed matters have to be assessed from other values, not least the tangible ones compared to the intangible that electronic media offers.

Initial Problems on an Undeveloped Market

The study concludes that opportunities for variable data printing were one of the main reasons why the respondents choose the digital printing business, but conscious and unconscious strategic decisions have changed the way they are performing their business. Although they worked intensely with trying to sell the variable printing in the early stages of their business development, they all were forced to base their business model on producing small series and time critical jobs, since the market for variable data printing was not yet ready. However, despite the major initial problems with sales and technological issues, they are confident that the digital printing investments are good for their businesses.

The market for the value-added products that digital printing can offer and the volume of digital print media is still very small. The respondents believe that one main reason is the customers' and advertising agencies' lack of knowledge about the possibilities of the technology. As has been mentioned, technology change may result in uncertainty about customer needs, and this has happened in digital printing. The lack of input jobs suitable for digital printing has forced the digital printing houses to more and more create their own input to be able to take advantage of their production technology. All companies steadily increase their share of direct customers and to some extent work as an advertising agency. By working directly with the customers and not via advertising agencies, it is possible to create jobs that are suitable and economical for digital printing. This weak market also raised the need for educating customers, the education is necessary to stimulate the market and the needed inputs for the digital printing equipment.

Despite the problems of finding suitable input jobs, most of the respondents mentioned overcapacity and price-cutting among the conventional printing houses as the greatest threat against their business. This has created a need to exploit the opportunity with the technology of digital printing in order to offer a differentiated service that does not compete with conventional printing houses.

Vertical Integration to become Full Service Companies

One major problem for digital printing houses has been that they have not been able to take advantage of the opportunities in the technology since companies that work upstream and downstream in the value system have not provided the appropriate input and have not been able to handle the output in a suitable way.

There is no doubt that digital printing has changed the way profits and costs are distributed along the industry value system. The cost of printing has become higher but the cost of stock keeping, distribution and discarded copies has become lower. This has made it necessary to vertically integrate in the value system to make the core business unit, digital printing, profitable. By offering a complete solution from customer to end-user, it is possible to profit on the other activities in the value system.

By vertical integration in the value system (Figure 28) the digital printing companies in this study have chosen to remake themselves into full service companies that can offer a digital printing service and not only the production of digitally printed material. They can offer a service where they can act as a supplier of print media at a low total cost and not only at a low print cost. When working with larger parts of the value system it is possible to change the behavior of the customer and help them identify the true cost of print media production.

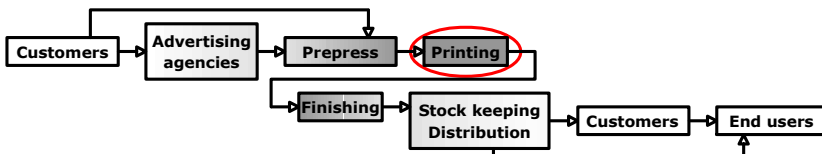


Figure 28. Backward and forward integration from the printing SBU in the value system for digital printing.

The companies in this study have lowered the risk in the integration by making the capacity of the integrated business units smaller than for the core business unit. Then the major risk is still in the core business unit (that is in all cases but one, the printing unit) since it is the one with the largest capacity. One example of this phenomenon is the internal finishing business unit that takes care of smaller amounts of output for fast delivery, but for larger volumes or more advanced finishing, external partners are used as suppliers of finishing services. This does also conclude with the theory of integration close to the company's core business unit and the integration has pretty much involved smaller steps in the value system. Depending on the origin of the company, the value chain has expanded to include neighboring activities in the value system. This is consistent with previous research that shows that the further away from the core business the vertical integration goes, the less likely it is to succeed (cf. Peyrefitte et al., 2002).

Digital printing business differs from conventional printing business since it is not based on long run lengths in the way the general printing business is. Volumes, however, are important. The respondents are unanimous about this fact and it is important to have a full order stack on the digital printing equipment. Nevertheless, the problem in digital printing is that the volumes rarely come from a single job but from a large number of jobs. When the number of jobs is high, the workflow becomes important and by vertical integration the closeness between the different activities increases. This makes the workflow run smoother and the knowledge of the possibilities and limitations of the technology increases.

By working with a customer focus and creating added value, it is possible to increase the revenue from both the printing business unit but also from other activities in the value system as additional services may be added. Although differentiation is one key to success and may be accomplished by vertical integration, the integration accomplished in the industry is both conscious and unconscious. Some changes were strategic, while some were just something done to survive in the business.

5.2 Summary of Paper II:

Perceived Satisfaction by Customers in the Digital Printing Value System

The objective of this paper is to study how customers to digital printing houses experience the value received from digital printed matters and from their supplier(s) of digital printing. The focus of the study is to investigate how the customers implemented internal and external changes to profit from the advantages of digital printing. Both professional customers, i.e. advertising agencies, and non-professional customers, i.e. direct customers, to digital printing houses have participated in the study.

In this qualitative case study, 12 companies have been investigated, and out of them 8 have been selected for interviews to gain deeper knowledge of the behavior behind the strategy in the studied companies. A survey was also carried out involving all 12 participating companies. In this survey, the respondents graded their general demands on printed material and their satisfaction with digital printing according to the success factors – *price*, *time*, *functionality*, and *quality*. Based on the assumption that it is not possible to, realistically, have high demands on all critical success factors and that there has to be some trade-off between them, the factors have been summarized and compared using mean-centered values.

Purchasing Orientation

The study concludes that both advertising agencies and direct customers strive towards having a long-term relation with their digital printing houses. The direct customers were more interested in procurement or supply management than the advertising agencies, and this is consistent with the results presented in Paper 1 that show that vertical integrated digital printing houses strive towards increasing their share of direct customers. This has its basis in the fact that the knowledge among advertising agencies of handling every activity in the digital printing values system is higher than for the direct customers. It may also be possible to lower the cost by separately buying every single service.

The use of applications like print-on-demand was one of the main reasons why customers engaged in digital printing in the first place. This application is still today what customers make most use of in digital printing, even though some customers believe that they benefit from solutions involving variable data printing.

Critical Success Factors

Both categories of customers were not fully satisfied with digital printing as a service for their printed material when examining the success factors – *price*, *time*, *functionality*, and *quality*. When studying the average value of the success factors measured in the survey, it is possible to discern that the general demands from advertising agencies were higher than from the direct customers. The advertising agencies were also much more dissatisfied with digital printing in comparison with their demand.

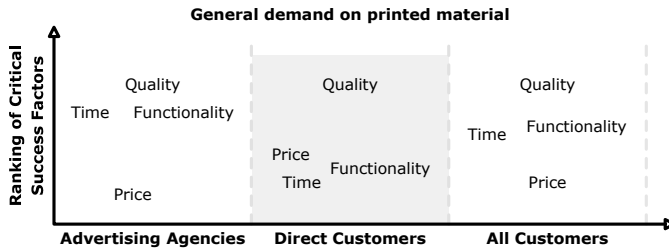


Figure 29. Ranking of success factors for the demand on printed material.

Quality was the factor that customers deemed most important (Figure 29), but also the factor that they were least satisfied with in relation to their needs (Figure 30). *Time* was the only factor that the customers were more than satisfied with. The customers in general were quite insensitive to the *price*, which is a result of the fierce price competition in the printing industry that keeps the general price level low. Customers that utilized more complex applications like variable data printing and web-to-print were more satisfied with the price than those using basic applications like print-on-demand. Regarding the *functionality* of digital printing, the respondents were divided in different groups. The advertising agencies did not feel that the functionality met their needs, while direct customers were satisfied with the functionality.

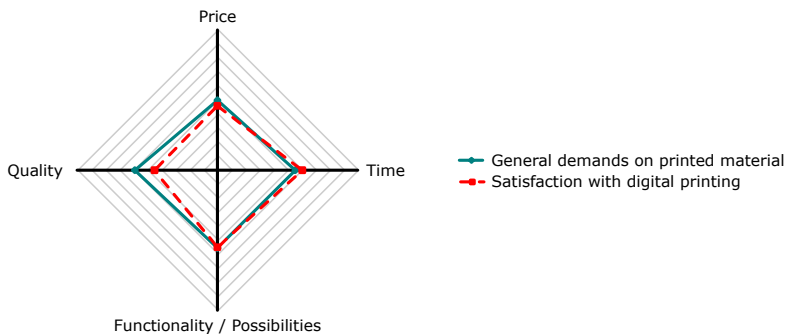


Figure 30. Mean-centered average demands on printed material and satisfaction of all customers in the study.

In respect to all four critical success factors, it was concluded that digital printing does not fully fulfill the demands that customers put on their printed material. But it

was also indicated that digital printing is becoming an increasingly important production technology for the respondent's printed matters.

Future Changes

Many of the customers strive towards a non-printed solution for the material that is printed today. This may include both building more intelligence into industry products and handling more campaigns through other cheaper and faster mediums such as the Internet. Substituting printed material for electronic material may not have the same negative effect on digital printing as it has on offset. Digital printing will, according to the respondents, be the natural channel for printed output of material that is otherwise spread electronically, as such material most often is printed on-demand or an output channel for material customized on the Internet by web-to-print solutions.

5.3 Summary of Paper III: Creation of Customer Value Using Digital Printing in a Dynamic Business Environment

This qualitative case study of a customer – supplier relationship aims to identify and analyze how digital printing can be utilized as a business tool in the relationship between a service provider and a customer in a dynamic environment. The paper addresses the question how digital printing can be used to generate value for both suppliers and customers.

Two companies have been studied, the customer company (referred to as *the Customer*) and the service provider of print services (referred to as *the Service Provider*). As a commercial printing house in Sweden, the Service Provider is a part of the dynamic media environment. The Service Provider has offered a deal to the Customer where the main advantages for the Customer are lower print volumes and lower discard volumes as most of their publications will be printed on-demand. This case was chosen to illustrate the shift into a more dynamic business environment, where the printing houses have to act faster and more hypercompetitive to be able to capture temporary above average profits.

The printing industry is today influenced by a heterogeneous group of competitors with a much broader base of experiences. This since the competitors are not only in-industry, i.e. other printing houses, but rather companies that are changing customer behavior to make customers less in-need for print. The competitive environment in the printing industry is, in other words, becoming increasingly dynamic and a hypercompetitive behavior is becoming crucial to be able to ensure future survival in this industry. It is possible to notice the shift from the cost-quality to the timing and know-how arena for the hypercompetitive companies in the digital printing industry. By moving to the next arena it is possible to control the future of the industry in a more successful manner.

Creating Disruption with a Hypercompetitive Behavior

While trying to ensure future survival for the Service Provider on this dynamic changing business market, it becomes increasingly important to focus on creating market disruption.

The Service Provider has during the last couple of years changed how they prioritize among their stakeholders. The traditional way of prioritizing the stakeholder is to put the shareholder at the top. However, deep pockets have given them the opportunity to change from shareholder to customer focus and shortsighted to long-sighted shareholder value. Today the Service Provider believes the company to be much more oriented towards customers and offers. By working closer with their customers the Service Provider has been able to, quickly, develop more accurate services for their customers.

Speed in product development is indeed important. Basically, many of the companies in the customer segment that the Service Provider is currently working with are in a state of hypercompetition, which in turn influence how the Service Provider works. It may be even more important to understand the environment the customers are facing to meet their demands than understanding the rivalry among the existing companies in the industry.

The Service Provider does not currently own any production equipment for digital printing, but only for conventional printing. Networking was a way of gaining control over resources to be able to offer a complete line of offers to the customers. But in the case of the Service Provider that comes from a core business unit of conventional printing, networking into digital printing and the product development of products based on digital printing or electronic distribution cannibalizes on their original core SBU. By networking the necessary resources it is possible for a service provider to focus on creating activities that can increase customer value. This way of moving from the cost-quality to the timing and know-how arena is a necessary step for future survival. If you are not capable of cannibalizing on your own business to gain new temporary advantages, someone else will be able to do it.

In this case a strategic alliance was the fastest way of gaining the necessary resources to be able to increase customer satisfaction and to be able to escape the fierce competition on the cost-quality arena. Digital printing became a success factor for the Service Provider and enabled them to offer a solution that strives towards an all-electronic solution.

The Service Provider is strategically changing the focus of the company from a production company, with focus on the production equipment, to a service company with focus on customer contact. A conventional printing press is not constructed for short print runs and by offering the opportunity with digital printing, customers' behavior will start to change. By shifting focus of the company, the Service Provider will become less dependent on large print volumes, but on the other hand they do themselves contribute to the changed behavior among customers. On the other hand customers in general strive to reach low costs. By offering a multi-channel opportunity involving both electronic and printed channels customers will probably not settle for an all non-printed solution in the end.

Even though the Service Provider had an advantage on the market, they chose to create disruption since they realized that they could not sustain this advantage forever on their dynamic market. This was done even though it meant cannibalizing on their former core business. By changing the path of their products they can control the evolution of the market. The way that the Service Provider is acting is hypercompetitive-like and is crucial to be able to control the development of the printing industry and ensure survival for the company.

Moving from Arena to Arena

Today, the competition in the cost and quality arena in the printing industry is fierce, that is why the Service Provider has chosen to move into the timing and know-how arena. This is not an easy step since it means building additional resources that connect new knowledge to the printing industry. The Service Provider has used the deep pockets of the communication group that the Service Provider is a part of, to be able to successfully change the rules of competition when moving from cost and quality competition to timing and know-how.

By working with know-how instead of cost-quality it is possible to capture a larger amount of the profits connected to digital printing since it expands the value creation zone (Figure 19), when appropriability and scarcity increase. By gaining customer contact it is also possible to increase the customer demand for digital printing, which should increase the value creation zone even further.

Regarding entry barriers, the Service Provider has chosen a specific customer segment that they are trying to satisfy. By specialization on this particular segment they are trying to build knowledge regarding working with these customers and thereby build entry barriers to scare away new competitors.

Noteworthy about this way of competing is that they do not compete statically but are in constant movement between the different arenas and act dynamically on each and every one of them to control their competitive environment and create new competitive advantages.

Integration with Non-Printed Solutions

By adopting a hypercompetitive behavior it has been possible for the Service Provider to create cost saving solutions for their customers. The main cost saving in this case comes from reducing discarded volumes of outdated publications and reports. This is a result of a change in the way the Customer publishes their reports. The change has been made possible due to the widely spread use of the Internet, which makes electronic distribution an easy-to-use cheap solution. This philosophy makes digital printing a natural and efficient way of producing tangible copies and the on-demand features of digital printing makes it possible to rely on electronic stock keeping.

The conclusion of this study is that digital printing is used most successfully when the main objective of the customer is not to print at all. When striving towards a

paperless business the most natural, convenient and profitable way of producing a non-electronic output is digital printing. Printed material will probably not disappear in the foreseeable future and therefore digital printing will most certainly increase its importance as a production technology. In the strive towards a paperless office, digital printing is a natural, convenient and profitable way of producing a non-electronic output.

5.4 Summary of Paper IV: Strategic Alliances in the Digital Printing Industry

The fast technological development and the convergence of the media industry have made competition in the printing industry harder and not only in-industry any longer. This puts great pressure on individual companies, and in a climate of rapid change, companies need to respond quickly to external forces in order to remain competitive. To accomplish that many different competitive resources and competences need to be managed. This can be achieved either directly through ownership or indirectly through cooperation. This qualitative multiple case study with two case companies sets out to investigate how alliances are used in the dynamic business environment of the printing industry, with a focus on cooperation in connection with digital printing.

This paper provides two examples of how strategic alliances are used in the printing industry to create competitive advantage for its actors. The case companies were chosen for their obvious similarities, such as size and company structure. However, during the study more similarities became clear such as strategic goals, how they handle the market and to some extent how they are positioning for the future. Even though these similarities, the way they internally and externally are strategically structuring to meet future demands are to some extent different. The major difference between the two companies was their way to acquire resources for digital printing. Company B has purchased digital printing technologies. Company A, on the other hand, has, until recently, only had access to digital printing through an alliance with another printing house.

Added Value through Cooperation

According to theory, alliances are created when actors believe that they can get an added value by being a part of the alliance. This is also the case for the investigated companies in this study, as they believe that by cooperating and engaging in different types of alliances, they can achieve a better result than working on their own. It should be noted that even though the cooperations illustrated in this paper have different purposes, both companies have retained contact with their customers.

It was the intention to enhance customer satisfaction that convinced the two case companies to engage in alliances. Either by extending their business to offer a wider array of complete services (Company A), or by being able to ensure additional

capacity, whenever needed, of resources already present in the company (Company B). The main reason for cooperation, in both cases, was gaining access to different kind resources. The major difference between the cooperations of the two companies can partly be described by the degree of dependence between the companies and their partners. Company B has digital printing equipment, but also cooperations that ensure them (and their partners) additional production capacity whenever needed. Since they have digital printing in-house, they are not totally dependent on their cooperations to ensure delivery to their customers. Company A, on the other hand, was more dependent on their cooperation in digital printing than Company B, as they have developed services for their partners printing equipment. The results also confirm this difference in dependence since Company A more clearly states the importance of long-term trust and commitment in the alliances.

The level of risk in these cases are different, and so are the ways they try to handle it. Company A focused a lot of effort on creating trust and commitment in their alliances. This is done both by dedicating human resources and by formal agreements between the partners. To lower the risk in an alliance the respondent always tries to formulate their intention in written agreements between the different parts. The agreements should cover all aspects of the cooperation, especially the economic issues, and even include how the partnership should be ended if one part wants to contract out of the alliance. Company B on the other hand has strategically chosen to limit their capacity of e.g. production equipment to a reasonable capacity, and cooperate to increase this capacity when needed. This limits the risk in ownership. Theoretically it should be easier to cooperate to gain access to new resources when the resources are plentiful in supply. This is the case in the printing industry, which, in this case, limits the risk for Company A.

Even though cooperation with other companies that can provide resources for production and render it possible to enhance customer satisfaction, both companies in this study emphasize the importance of cooperations with customers. Working close to lead-users is a way for these companies to try to predict future customer value.

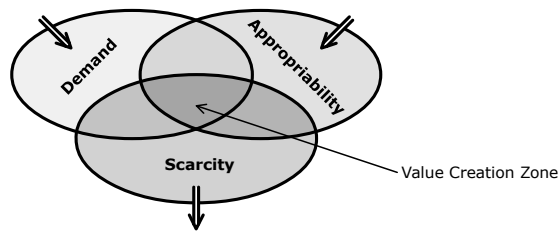
Hypercompetitive Behavior and Alliances

Both companies tend to work in a hypercompetitive manor, since they are striving to work broader than just the printing sector and thereby change the rules of competition in the industry by for example offering non-printed solutions to their customers. Further on, they are focused on always maintaining customer contact and trying to deliver a high customer value by working close to their customers. Although the two case companies are quite similar, their strategic directions with respect to printing resources do diverge. While Company B believes that the actual control over the printing resources are crucial for their future survival, Company A has deemed the future to be in providing services where the actual output can be indirectly controlled through alliances in order to move more quickly between different services. Consequently, the vision of Company B is clearer set on outputs that can be produced in the traditional printing industry and preferably at the companies own production facilities. Company A on the other hand has set a more

customer centric focus, which, according to the respondent, might lead the company to exit the traditional printing industry in the future. Although Company B has a more traditional vision, they emphasize the importance of long-term cooperation with their customers, which, according to respondent, might lead them to reevaluate their strategic path in the future depending on customers needs.

Having dynamic capabilities is important when acting in a hypercompetitive environment. In the case of Company A, alliances created an opportunity to act more hypercompetitively by offering them the ability to move faster to market, maintaining customer contact and gaining control of resources and knowledge without direct ownership of digital printing equipment. This makes it possible to better catch the opportunities of the market.

Judging from the respondents words, Company A's digital printing cooperation took an unexpected turn when they recently decided to invest in digital printing production equipment at one of their subsidiaries companies. This decision resulted in their alliance partner to cancel any further cooperation between the two companies. Having direct control is quite a traditional way of working in the printing industry, and basically it is a step "backwards" to a more static way of competing that often made cooperation end in dissolution. Nevertheless, when the value creation zone changed, owning digital printing equipment became a great opportunity for Company A. Even though scarcity of digital printing has decreased due to more companies acquiring the technology, appropriability and demand increased for Company A (Figure 31). Appropriability mainly owing to decreased costs from the printing press manufacturers and demand due to applications and smart solutions developed during cooperation.



*Figure 31. Changes of the value creation zone of digital printing Company A
(After Collis & Montgomery, 1995, p. 120).*

Even though purchasing digital printing equipment, in this case, can be seen as a less dynamic way of competing, it may also be regarded as opportunistic behavior by Company A, which leads trust to fail and commitment to the alliance to decline. Although not purposely, this behavior leads the alliance to fail, as Company A used the alliance to learn from the partner, a so-called learning race. An alliance that consists of equally strong companies with complementary resources is the type of alliance most probable to be successful. However, when Company A procured digital printing equipment the status quo shifted and became an alliance between competitors, which is an alliance likely to end in dissolution.

Cooperation to Gain Advantages

The case companies' primary reason to cooperate was to gain access to resources that could enhance customer satisfaction and to retain customer contact, which is important to be competitive in a dynamic business environment. The competitive situation in the industry has made it important to offer full service solutions to customers including digital and conventional printing as well as complementary services in the value chain and additional services such as Internet solutions. Strategic alliances can offer the means to obtain advantages of a vertically integrated company without the need of investing in additional resources and competence, and the risk associated with such a strategy.

5.5 Summary of Paper V:

Positioning in the Printing Industry

– Differentiation in Terms of Price, Lead Time, Print Quality and Flexibility

Differentiation and adding value to the printed product is regarded as important in the low margin, highly competitive commercial printing industry of today. However, there exists a trade-off between the service level and the price the customer has to pay. This quantitative survey study of 136 randomly selected Swedish commercial printing houses sets out to investigate how these companies are positioning themselves and how they perceive the demand from customers with respect to *price*, *lead time*, *print quality* and *flexibility*. Further this study aims to explore the perceived level of competition in the printing industry.

Positioning of Printing Houses

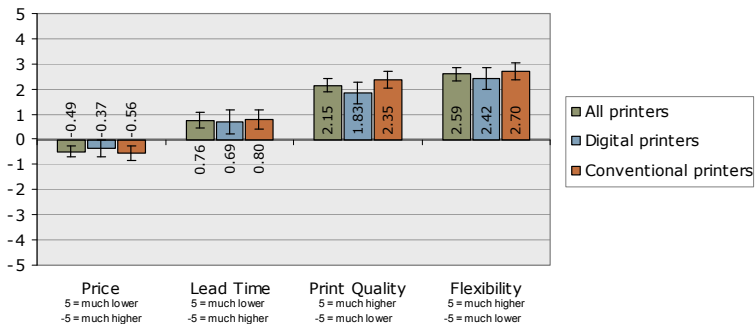


Figure 32. Positioning of the printing houses compared to the industry in general (mean values with a 95% confidence interval).

The results show that the printing houses have differentiated their business towards service related factors, such as having a high level of flexibility, good print quality and short lead times (Figure 32). Thus they have primarily focused on giving their

customers a high level of service and enhancing customer satisfaction. This increased level of service has been accomplished at the expense of higher prices to their customers. The results in Paper 1, Paper 3 and Paper 4 show that dynamic strategies and a focus on delivering a high customer value are important to be successful, especially for digital printing houses. However, it should be noted that there were no significant differences at the 95% confidence level between companies with and without digital printing in their positioning with respect to flexibility, which is the factor ranked the highest by the printing houses in this study (Figure 32). Neither was there any difference regarding the other factors, which means that their positions on the market, in respect to these factors, are quite similar.

There were no differences in position for lead times between digital printing houses (digital printers) and conventional printing houses (conventional printers). This is interesting since fast deliveries are something that many digital printing houses regard as important for their business. Further, the difference in position regarding quality was very close to showing significance ($p\text{-value} = .052$) at a 95% confidence level. This result illustrates that digital printing houses tended to regard their own position in quality lower than the conventional printing houses and vice versa. This result was expected because the print quality of conventional printing technology (in this case mostly offset) is today generally regarded as a “norm”.

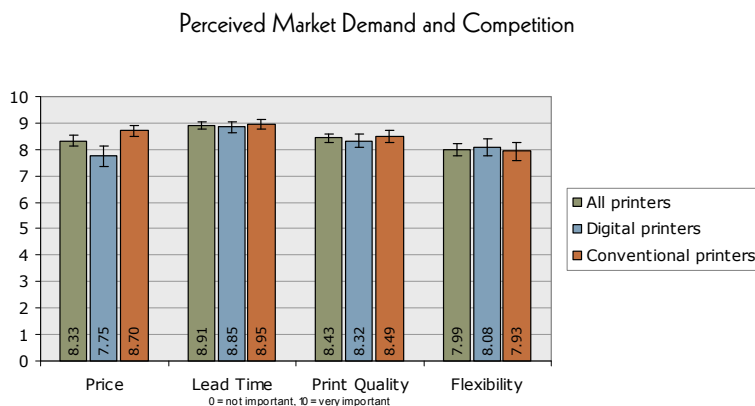


Figure 33. Perceived demand from the market (mean values with a 95% confidence interval).

It is possible to notice a quite clear difference in how commercial printers have positioned themselves (Figure 32) compared to how they perceive market demand (Figure 33). The printing houses believed that the foremost demand from customers was short lead times, while low prices and high print quality were only second to short lead times. The printing houses have deemed it important to position themselves for a high level of flexibility (Figure 32) even though they do not feel that this is a major demand from their customers (Figure 33). Flexibility was, when investigating all printers, subordinate to lead time, print quality and also price (only conventional printers). Having a high level of flexibility has been

considered important when acting in any highly dynamic market. Consequently, the results indicate that the printing houses perceived that their customers are demanding a commodity product.

High flexibility and quality are factors that should enhance the possibility to create a high level of customer satisfaction. The printing houses, in general, are differentiating themselves by providing a high level of service to the customer, which can be a way to escape the commoditization of the printed product.

An interesting result from this study is how the different respondents believed that their customers valued the price factor. There was a significant difference (p -value = .000) between the pressure digital printing houses and conventional printing houses perceived from their customers regarding the pricing of their products. Printing houses that had digital printing felt a lower price pressure than those without digital printing. This result suggests that differentiating towards a higher level of customer service when using digital printing to add value to the products is a successful concept. These printing houses feel that their customers did not have as high demands for low prices as the customers to conventional printing houses.

The market competition in the commercial printing industry has in general been deemed as fierce. This statement is further strengthened by the results from this study, where the printing houses have regarded the market competition as very high (competition = 8.36 out of 10). Even though both digital printing houses (competition = 7.92) and conventional printing houses (competition = 8.64) regard the market competition as high, it is possible to notice a significant difference between the two categories. Companies that use digital printing perceived a significantly (p -value = .001) lower competitive situation on the market than those using only conventional printing technology.

It is also possible to notice a negative medium correlation of approximately -.3 between the share of digital printing used in production and the perceived market competition. The same is true for the correlation between the share of digital printing used in production and the perceived demand from customers on providing low prices. Hence, the use of digital printing tends to make the perceived price pressure and market competition lower. This further strengthens the evidence of digital printing having a positive effect, from the printing houses point of view, on the competitive situation and product pricing.

Strategic Positioning

It is easy to argue that to satisfy customers' needs the printing houses should have a focus that is similar to the demand from the market, which is not the case according to the results from this study (cf. Figure 32 and Figure 33). However, the printing industry has a high, or even fierce, level of competition, largely based on price. This situation does not favor companies active in the industry. However, by shifting focus towards a service oriented organization it should be, in theory, possible to increase the value of the product and accordingly the price. Both the conventional printing houses and the digital printing houses have a similar strategic position (Figure 32). However, it is possible to distinguish in this study that digital printing

houses perceived a lower pressure from the market regarding price and a slightly lower competitive situation. These results indicate that even though the focus is similar, digital printing houses are more successful in their strategic position in providing a higher level of service since they can charge a higher price.

5.6 Summary of Paper VI: Vertical Integration and Profitability: Experiences from the Commercial Printing Industry

Vertical integration is important and one of first diversification strategies considered (Harrigan, 1985b) and even though vertical integration has been, and still is, used to gain cost and competitive advantages, the opinions of the impact of vertical integration on profits differ (e.g. Bowman, 1978; Buzzell, 1983; Maddigan & Zaima, 1985; Reed & Frommueller, 1990; Rumelt, 1974).

The aim of this quantitative survey study of 136 Swedish commercial printing houses is to investigate the degree of vertical integration in the printing industry and to examine how differences in integration affect profit in the Swedish commercial printing industry.

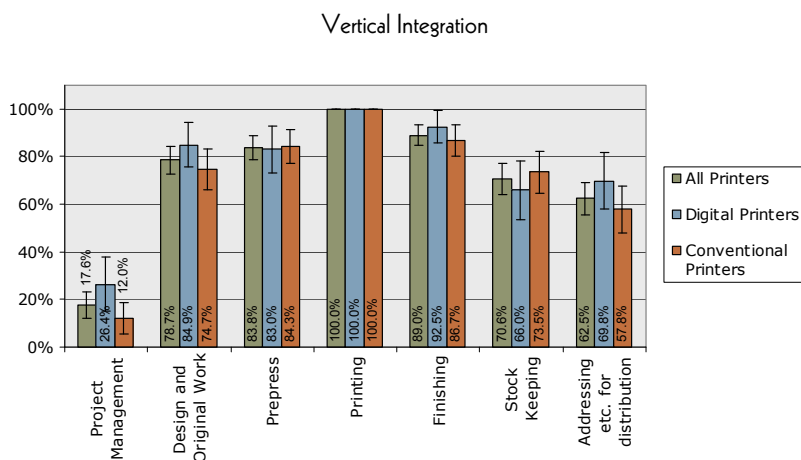


Figure 34. Vertical integration in the printing industry presented as percentages of the companies that have integrated each step of the value system.

The results show that the overall degree of integration in the printing industry is high and there are no significant differences between digital printing houses (digital printers) and conventional printing houses (conventional printers) at a 95% confidence level. The total revenues from all integrated services at the respondents' companies accounted for, on average, 23.2% ($n = 102$) of the total revenues. There were no differences between digital printers and conventional printers. By

investigating the integration curve in Figure 34 it is possible to notice that this study is in consistence with earlier studies (cf. Peyrefitte et al., 2002), as fewer companies have integrated activities farther away from the core business.

Taking the strong competitive situation in the printing industry in consideration (e.g. Birkenshaw, 2004; Smyth, 2006), there is an inconsistency with other researchers such as Balakrishnan & Wernerfelt (1986), Eisenhardt & Schoonhoven (1996) and Harrigan (1985b) who suggest that unstable competitive conditions should encourage a lower degree of transfer from internal units. However, there is more to this discussion. The printing industry is an industry with low bargaining power due to the commoditization of their product (e.g. Birkenshaw, 2004; Smyth, 2006), which makes the industry vulnerable to bargaining from others (cf. Harrigan, 1985b; Porter, 1974). By vertical integration it has been possible for the industry to gain some of the power back and increase the probability of profit. This will be further discussed later on in this section. It should be noted that there is no correlation between the level of vertical integration and the size of the companies (both regarding turnover and number of employees). This implies that the need of being vertically integrated is strong within the industry and it is not only larger companies that follow this strategy.

Level of Integration

The total Vertical Integration Level (VIL_{total}) in the Swedish commercial printing industry is 0.670 (Table 2) (for definition, see the section *Methodology Used in the Included Papers*). This implies that the industry has chosen to integrate many of the adjacent activities in the value system.

Table 2. Integration Level (VIL) in the Swedish Commercial Printing Industry.

	All Printers			Digital Printers			Conventional Printers		
	Total	Back-ward	Forward	Total	Back-ward	Forward	Total	Back-ward	Forward
Mean value:	0.670	0.600	0.740	0.704	0.648	0.761	0.649	0.570	0.727
Std. dev.:	0.192	0.209	0.259	0.218	0.241	0.290	0.207	0.222	0.285
95% CI:	0.032	0.035	0.044	0.060	0.066	0.080	0.045	0.048	0.062
No. of resp.:	136	136	136	53	53	53	83	83	83

Furthermore, the levels of backward vertical integration ($VIL_{backward}$) and forward vertical integration ($VIL_{forward}$) have been measured and calculated (Table 2). Integration forward is done to speed up the delivery times from print to end user, and backward integration is carried out to be able to control the input to the press and backward integration becomes important to create new business opportunities, as been presented in Paper 1. This study indicates that even though control over the input (by e.g. project management) is important for the printing industry, this is done by a significantly smaller portion of the industry (17.6%) than the other studied activities.

Even though the results from this survey study show that digital printers have a high level of backward integration (Table 2), there are no significant differences between digital and conventional printers. There is, however, a tendency of a difference in how many companies that provide project management between digital printers (26.4%) and conventional printers (12.0%), even though this is not statistically significant. This may be an indication that the introduction of new technology, such as digital printing, needs a better control of input for printing houses to be able to produce more suitable jobs for digital printing.

The differences between digital printers and conventional printers have been investigated in this study. However, even though the *VIL* (total, backward and forward) has a tendency of being slightly higher for digital printers than for conventional printers, there are no significant differences between the two groups. If the integration level is weighted with the percentage of revenues from integrated services, the results still indicate no significant differences between digital and conventional printers. The same is true for the other measured values in this study; no significant differences regarding integration could be noticed between companies using digital printing and those using only conventional printing technology.

Integration and Profitability

As been described in the literature, the effect of integration on profitability is both an important and debated issue (Bowman, 1978; Maddigan & Zaima, 1985; Nugent & Hamblin, 1996). In this study a four year average of two separate profitability key figures, profit margin (PM) and profit margin before depreciation (PMd) have been used to investigate the profitability of the printing industry in relation to vertical integration.

The overall profit margin in the commercial printing industry in Sweden has been illustrated in Table 3. It has been rather stable over the years 2003-2006 and on average the profit margin has been 3.2% ($n = 129$). There were no significant differences between digital printers and conventional printers regarding profitability.


Table 3. Profit margin and Profit margin before depreciation in the Swedish Commercial Printing Industry 2003-2006.

	2003	2004	2005	2006	Average
Profit Margin:	3.71%	2.60%	2.75%	4.05%	3.20%
Profit Margin before Depreciation:	8.12%	7.20%	6.58%	6.80%	7.02%

The results show that there was no correlation between VIL_{total} and the profitability key figures. The same was true for both $VIL_{backward}$ and $VIL_{forward}$. Consequently, the results from this study of the printing industry are in conclusion with previous research by e.g. Reed & Fronmueller (1990), which concludes that vertically integrated companies do perform neither better nor worse than non-integrated companies do. Furthermore, the profitability of using digital printing in production was examined with the same result.

Perry (1989) suggests a “vertical equilibrium” in the industry. By taking this discussion into account, the sample was split into two groups depending on the level of integration, one consisting of all companies with lower or equal *VIL* as the average and one with a higher integration level than the average. No significant differences between these groups could be found in this study on any of the two profitability key figures. This further strengthens the result of the *VIL* having no significant impact on the profitability of companies.

Nevertheless, there is more to this discussion on whether to be integrated or not. The results of this study indicate that vertical integration in the printing industry does not seem to increase, nor decrease, the profitability margin of the companies. However, the results in Paper 1 and other case studies have shown that being integrated is regarded as strategically important (e.g. Mejtøft & Packmøhr, 2008; Packmøhr & Mejtøft, 2008). Furthermore, it is important to remember that when a small privately owned company vertically integrates additional activities, it most often leads to increased revenues compared to a company which is not integrated. This may increase the total profit, which might be seen as a driving force to integrate additional activities.



6 Discussion

"The best way to predict the future is to invent it."

– Alan C. Kay*

The research studies in this dissertation are focused on institutional arrangements and their importance for the competitive situation in the commercial printing industry in Sweden. The studies carried out have focused on the need and use of vertical integration and cooperation as well as how companies define their value proposal. Furthermore, the opinions of customers have been investigated to evaluate the commercial printing houses' opinions.

The first part of this chapter gives some theoretical implications for the results and the second part discusses the effects for the commercial printing industry.

6.1 Institutional Arrangements

"I know that strategy is a living, breathing, totally dynamic game. It's fun – and fast. And it's alive."

– Jack Welch†

In this section different ways of dealing with institutional arrangements for gaining competitive advantages and strategic flexibility, are discussed. The results in Paper 1 suggest that vertical integration plays an important role for the success of companies within the printing industry especially for digital printing houses. The results from Paper 6 furthermore show that the use of vertical integration strategy is, in general, common in the printing industry. Paper 4, on the other hand, deals with the importance of cooperation. The paper analyzes two common ways of dealing with cooperation and alliances – cooperating to gain access to complementary resources and cooperation to extend resource capacity when needed.

* Quote from *The early history of Smalltalk* (Kay, 1993, p. 75).

† Quote from *Winning* by Jack Welch, former CEO and Chairman of General Electric (Welch & Welch, 2005, p. 165).

Vertical Integration and Competitive Advantage

"The form and size of the business unit throughout industry generally are evidently influenced by causes independent of economic efficiency, in particular the love of power and the desire for monopoly."

– F. Lavington*

Vertical integration is both an important and widely used way of organizing companies in the commercial printing industry in Sweden. This is supported by the results in the included papers. The results in Paper 1 show that vertical integration (e.g. D'Aveni & Ravenscraft, 1994; Harrigan, 1983a; 1984; Peyrefitte et al., 2002) became a way of overcoming the initial problems with new production technology, since many of the initial problems originated from difficulties in acquiring jobs that were suitable for the new digital printing production technology. The need to ensure appropriate input of jobs and guarantee fast handling of output has led companies to make strategic decisions to vertically integrate additional supporting activities. Hence, vertical integration has been carried out both backwards to e.g. gain customer contact and guarantee a steady flow of input, and forwards, to e.g. take care of finished goods internally to ensure short delivery times (Figure 35). The results demonstrate that this a way for printing houses to evolve into companies that can efficiently support the major business models for digital printing, such as print-on-demand and variable data printing. Because of vertical integration, the companies become more customer-centric focused (cf. Day & Wensley, 1988), which makes it easier to add appreciated customer value to products.

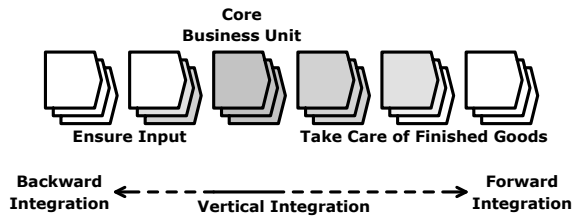


Figure 35. Vertical integration for the creation of competitive advantages.

Even though the results in Paper 1 show that vertical integration is important for digital printing houses, the results in Paper 6 illustrate that there are no significant differences between printing houses having digital printing (digital printers) and printing houses having only conventional printing technology (conventional printers) regarding integration in the value system. Nevertheless, the overall degree of vertical integration in the commercial printing industry is high (Figure 34).

In the eyes of the customers, the choice of printing technology used, hardly ever matters as long as the printed result is as expected (Romano et al., 1999). Given that there is often a lack of knowledge by customers about what new technology can offer (cf. Porter, 1985), it is important for suppliers to have close customer contact. Since the respondents at the printing houses in Paper 1 believed that advertising

* Quote from *Technical Influences on Vertical Integration* (Lavington, 1927, p. 35).

agencies do not fully understand how to utilize digital printing technology, many printing houses strive towards increasing their share of direct customers to solve this problem. This is done through backward integration through incorporated prepress and simpler original work. Providing full service solutions makes it possible for printing houses to increase their share of direct customers. By working directly with customers the digital printing houses believe that they can utilize digital printing in a more effective way since they can influence customers to take advantage of the uniqueness of the new production technology. Hence, there is a better opportunity to add extra value to a customer's product when a company has control over production technology and product development as well as close customer contact.

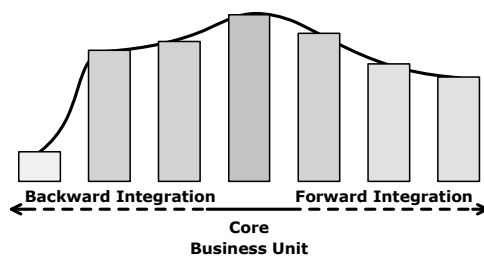


Figure 36. The integration of different stages in the industry has the characteristics of a “bell shaped” curve (cf. Figure 34).

The results and the integration curve in Paper 6 (Figure 34) are consistent with earlier research by showing that fewer companies have integrated activities farther away from the core business (cf. Peyrefitte et al., 2002). Consequently, the integration pattern of different stages in the industry has the tendency to take the characteristics of a “bell shaped” curve (Figure 36).

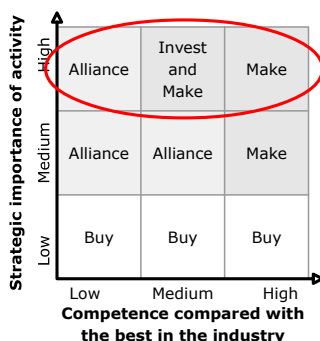


Figure 37. Due to the high strategic importance of activities close to the core business, vertical integration is important for commercial printing houses in Sweden (After Faulkner, 1995, p. 15).

Referring to the model by Faulkner (1995) (Figure 37), it appears as if many companies in Paper 6 regard activities close to the core business as strategically important for their business (supported by interviews in Paper 1), because they have decided to integrate these activities. Consequently, the companies avoid market

transactions and, depending on the degree of competence, primarily integrate or cooperate through alliances to perform the activities in the value system. This is consistent with earlier research regarding the choice of institutional arrangements in the printing industry (e.g. Mejtoft & Packmohr, 2008; Packmohr & Mejtoft, 2008), that suggest a combination of vertical integration and cooperation to be the way the commercial printing industry has chosen to organize itself. Cooperation will be further discussed in the section *Cooperation and Resource Flexibility*.

Taking the highly competitive situation in the printing industry, as been discussed in Paper 5, into consideration (e.g. Birkenshaw, 2004; Smyth, 2006), the results on vertical integration is inconsistent compared to the results of other researchers such as Balakrishnan & Wernerfelt (1986), Eisenhardt & Schoonhoven (1996) and Harrigan (1985b). Unstable competitive conditions should, according to these previous studies, encourage a lower degree of transfer from internal units. This is, however, not the situation in the printing industry since competition is strong and the level of vertical integration is high. A possible explanation for this inconsistency is that commoditization of printed products has made the bargaining power of the printing industry low (e.g. Birkenshaw, 2004; Smyth, 2006), which makes the industry vulnerable to bargaining from others (cf. Harrigan, 1985b; Porter, 1974). By vertical integration it has been possible for the industry to regain some of this lost power and increase the probability of making a profit.. The profit aspects of vertical integration will be further discussed in the section *Vertical Integration and Profitability*. According to the results in Paper 6, there is no correlation between the level of vertical integration and the size of the company. This implies that the need for being vertically integrated is strong within the industry and it is not only the larger companies that choose to follow this strategy.

In addition to problems of finding suitable jobs for the digital printing unit, overcapacity and price-cutting among conventional printing houses are factors that the respondents at digital printing houses (Paper 1) experienced as the worst threats against the digital printing business. Since the breakeven point between using digital and conventional printing is continuously decreasing with respect to the number of copies printed (cf. Figure 3), there has been a need for exploiting more complex services such as variable data printing to avoid competition from conventional printing houses and hence exit the price cutting spiral. There are indications that one-to-one marketing and variable data printing are effective and successful ways of handling customer relations (cf. Aaker, 1996; Peppers & Rogers, 1993). Nevertheless, the share of variable data printing out of the total production is still very low. Using the Internet as a production tool and channel for variable data printing is a way of increasing accessibility, by making easy-to-use variable data printing solutions for the customers. The importance of using the Internet for production of printed products is further stressed by refereeing to the work of the World Wide Web Consortium* (W3C). During 2006, W3C released their

* W3C is an international industry consortium that has, since 1994, created and published standards for Web development. This includes, among others, the standards for HyperText Markup Language (HTML), Extensible HyperText Markup Language (XHTML) and Extensible Markup Language (XML).

recommendation (W3C, 2006) for XHTML-Print, which is a de facto standard for creating web content for print.

Level of Integration

“Being the wrong size is a chronic, debilitating, wasting – and a very common – disease.”

– Peter F. Drucker*

The results in Paper 6 illustrate that the overall level of vertical integration in the printing industry is high (Figure 38, for definition of Vertical Integration Level (VIL), see the section *Methodology and Study Design*) and 42% of the companies have $VIL_{total} \geq 0.8$ (Figure 39). This implies that the industry has chosen to integrate many activities adjacent to their core business.

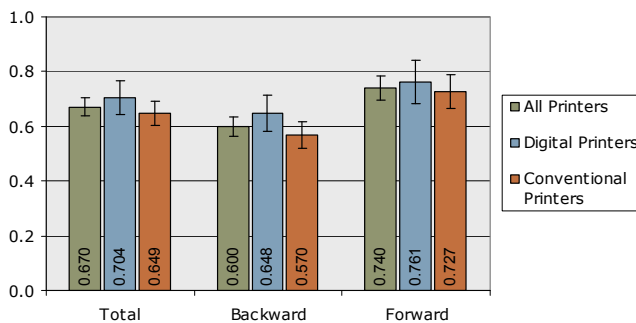


Figure 38. Vertical Integration Level (VIL) (mean values with a 95% confidence interval).

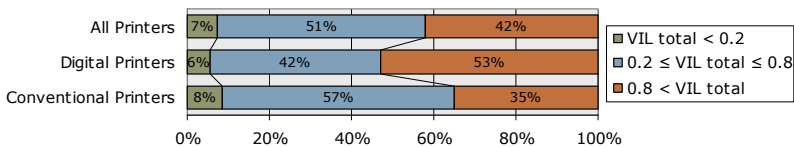


Figure 39. Distribution of companies depending on total Integration Level (VIL_{total}).

Furthermore, in Figure 38 it is possible to observe that there is a significant difference between the level of backward integration ($VIL_{backward}$) and forward integration ($VIL_{forward}$). This difference can also be noticed on the distribution of the results among the companies (Figure 40 and Figure 41). In other words, the printing industry has chosen to have a higher level of integration forward in the value system than integration backward. However, this may only be true for the separation of the value chain done in these studies, any other separations into other activities might give different results. Nevertheless, both backward and forward integration is

* Quote from *Management: Tasks, Responsibilities, Practices* (Drucker, 1973, p. 664).

considerable. As the results in Paper 1 suggest, integration forward is done to speed up the delivery times from print to end user, and backward integration is carried out to be able to control and increase the input to the press. Paper 1 and Paper 6 therefore indicate that even though control over the input (by e.g. project management) is important for the printing industry, this is done by a significantly smaller portion of the industry (17.6%) than the other studied activities. A remark is that backward integrated activities are to a high extent performed by human resources, e.g. project management and original work. Forward integrated activities, on the other hand, are more dependent on investments in production equipment, such as finishing.

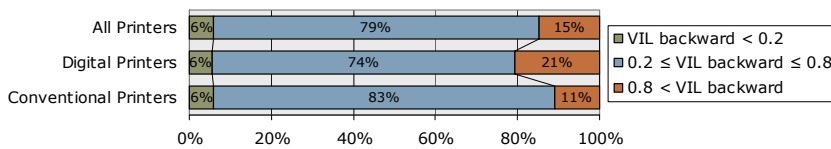


Figure 40. Distribution of companies depending on backward Integration Level ($VIL_{backward}$).

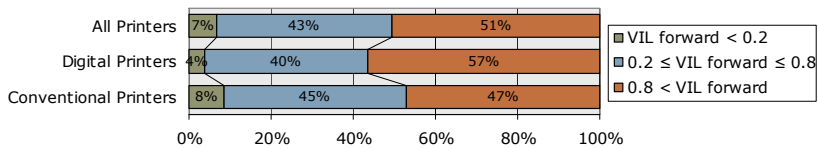


Figure 41. Distribution of companies depending on forward Integration Level ($VIL_{forward}$).

The findings in Paper 1 suggest that it is important for digital printers to integrate backwards to ensure appropriate input to the digital printing units. Even though the results from Paper 6 show that digital printers have a high level of backward integration (Figure 34), no significant differences between digital and conventional printers appear in the survey study. There is, however, a tendency toward a difference in how many companies that provide project management between digital (26.4%) and conventional printers (12.0%). Even though not statistically significant, this may be an indication that the new technology needs a better control of input to be able to influence the market to produce more jobs that take advantage of digital printing.

As has been mentioned earlier, the results in Paper 1 furthermore indicate, that vertical integration is favorable for digital printers to support their business and contribute to the introduction of digital printing technology in the industry (cf. Carlton, 1979). However, there were no significant differences in the Vertical Integration Level (total, backward and forward) between the two groups (Figure 38). If the integration level is weighted with the percentage of revenues from integrated services, the results still indicate no significant differences between digital and conventional printers.

In Paper 6, the commercial printing industry has been compared with the packaging printing industry* in respect to the level of vertical integration. The results show that the packaging printing industry is less integrated than the commercial printing industry ($VIL_{total} = 0.407$). Even though lower, the same pattern regarding backward integration ($VIL_{backward} = 0.309$) and forward integration ($VIL_{forward} = 0.556$) can be observed for the packaging printing industry as for the commercial printing industry. The revenues from integrated services were consequently lower for the packaging printing industry. On average 7.6% came from integrated services, which is only about one third of the corresponding revenue share for the commercial printing industry. The lower integration level can be explained by longer production runs in the packaging printing industry compared to the commercial printing industry. Nevertheless, previous research (Viström & Mejtoft, 2007) shows that shorter runs are expected also in the packaging printing industry in the future. Hence, vertical integration might become more important in the packaging printing industry.

Vertical Integration and Profitability

"You steal a thousand Post-it notes at 12p, you've made profit."
 – David Brent†

Even though vertical integration makes distribution of profits in the value system unclear (Gadiesh & Gilbert, 1998), vertical integration makes it possible to access new profit pools and profit from several different activities in the value system. As has been described in the chapter on the theoretical framework, the influence of vertical integration on profitability is a debated issue (e.g. Bowman, 1978; Maddigan & Zaima, 1985; Nugent & Hamblin, 1996). Peter F. Ducker (1973, p. 60) states that *"profit is not the explanation, cause, or rationale of business behavior and business decisions, but the test of their validity"*. Consequently the profit of vertical integration has to be discussed. In Paper 6 a four year average of two separate profitability key figures; profit margin (PM) and profit margin before depreciation (PMd) have been used to investigate the profitability of the printing industry in relation to vertical integration (for definitions, see the section *Methodology Used in the Included Papers*).

The overall profit margin in the commercial printing industry in Sweden has been rather stable over the years 2003-2006 and the profit margin has been 3.2% on average (Table 3). Notable is that there were no significant differences between digital printers and conventional printers regarding profitability. Consequently, there was no correlation between profitability and the use of digital printing in production. Furthermore, the results also show that there was no correlation between VIL_{total} , $VIL_{backward}$ or $VIL_{forward}$ and the profitability key figures. Therefore,

* This investigation was conducted in parallel with the study in Paper 6 and had a census selection from a list of packaging printing houses in Sweden (equivalent to the list used in Paper 5 and Paper 6) and consisted of 59 eligible companies. In total 27 companies responded, which yields a response rate of 46%. More information regarding the design and method of this parallel study can be found in Viström & Mejtoft (2007).

† Quote from the TV show *The Office, Downsize* (Gervais & Merchant, 2001).

the results in Paper 6, regarding the profitability of vertical integration, is in conclusion with previous researchers such as Reed & Fronmueller (1990), who conclude that vertically integrated companies do neither perform better or worse than non-integrated companies.

Based on the suggestions by Perry (1989) regarding that a “vertical equilibrium” usually appears in an industry, the sample in Paper 6 was split into two groups depending on the level of integration. One group consisting of all companies with lower or equal *VIL* than the average and one with higher *VIL* than the average. No significant differences between these groups could be found in this study on any of the two profitability key figures. This further strengthens the result that *VIL* has no significant impact on the profitability of companies.

Even though there is no correlation between any of the two profitability key figures and vertical integration in the results in Paper 6, there is more to add to the discussion on whether to be integrated or not. Both the results from Paper 1 and from other studies (e.g. Mejtøft & Packmohr, 2008; Packmohr & Mejtøft, 2008) have shown that vertical integration is regarded as strategically important. When a small privately owned company vertically integrates additional activities, it most often leads to increased revenues* compared to a company which is not integrated. This may make the total profit higher compared to if the same company had been non-integrated. In other words, the total profit increases, which may be seen as a driving force to integrate additional activities. The results in Paper 6 show a medium correlation between revenues from integrated activities and *VIL*. Nevertheless, the possibility of increasing the revenues when vertically integrating in the value chain will be left for future studies.

It should be noted that the results show that integrated business units often have lower production capacity than the core business unit (Figure 42) and the production capacity declines with the distance from the core business. Hence, the largest capacity is in the original core business unit, which is natural since the further away from the core business vertical integration takes a company, the less likely the integration is to succeed (cf. Peyrefitte et al., 2002).

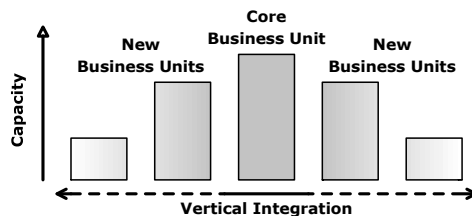


Figure 42. The production capacity becomes lower for integrated activities further away from the strategic core.

* The results in Paper 6 show that the total revenues from all integrated services accounted for, on average, 23.2% of the total revenues. Furthermore, there were no differences between digital printers (23.2%) and conventional printers (23.3%).

Cooperation and Resource Flexibility

"Thus an army without flexibility never wins a battle. A tree that is unbending is easily broken."

– Lao T'su*

The results in Paper 4 illustrate two different ways that printing houses can increase their resource flexibility and get a perceived added value by being part of an alliance (cf. Faulkner, 1995; Gulati et al., 2000; Jarillo, 1988). The case companies' intention to enhance customer satisfaction encouraged them to engage in alliances and even though the two cooperations illustrated in Paper 4 have different purposes, both companies have retained contact with their customers. The case companies mainly cooperated due to two reasons; (1) to complement their line of production and services with complementary resources in order to offer full service solutions to customers and, (2) to add resources that extended capacity and rendered possible temporarily increases in production (cf. Mejtoft & Nordin, 2008). Hence, the main reason for cooperation, in both cases, was gaining access to different kinds of resources.

The case companies in Paper 4 believe that they can perform better on the market by utilizing alliances (cf. Rothaermel, 2001). With respect to how the case companies structure their businesses, their way of using institutional arrangements to become successful is consistent with the findings of Rothaermel et al. (2006), because they are combining vertical integration with various kinds of partnerships. This is consistent with and an extension of the results in Paper 1, where vertical integration was deemed important for the success of digital printing houses.

The major difference between the two different partnerships illustrated in Paper 4 can partly be explained by the degree of dependence between the companies and their partners. Company B has ownership and control over digital printing equipment, but also cooperates with partners to ensure that they and their partners have access to additional production capacity whenever needed. Since they have digital printing internally, they are not entirely dependent on their partners to guarantee delivery to their own customers. Contradictorily to Company B, Company A in Paper 4 did not own any digital printing equipment. This caused Company A to be more dependent on their cooperation within digital printing than Company B, as Company A has developed services for their partners printing equipment. The results also confirm this difference in dependence on the alliances since the company that did not own any digital printing equipment indicated the importance of long-term trust and commitment in the alliances (cf. Jarillo, 1988; Medcof, 1997; Morgan & Hunt, 1994; Ring & van de Ven, 1992).

Even though cooperation with other companies, can provide valuable production resources and render it possible to enhance customer satisfaction, both companies in Paper 4 emphasize the importance of cooperating with customers. Working close to lead-users is a way for these companies to predict future customer value (D'Aveni, 1994; Thomke & von Hippel, 2002; von Hippel, 1986). This is also

* Quote from *Tao Te Ching* (Tsu, 600BC/1997, ch. 76).

described in Paper 3, where the Service Provider (same company as Company A in Paper 4) has built a close relationship with one of its customers which led to development of new services.

In accordance with the literature (e.g. Faulkner, 1995; Whipple & Frankel, 2000), the respondents in Paper 4 believed that the corporate culture and the size of the companies are important for successful alliances. One of the respondents stressed that larger companies often regard a situation from several different perspectives, e.g. how investments should be made, agreements when cooperating and demands from owners. According to the respondents in Paper 4, trust and commitment are closely related to the employees involved in the alliance. According to Child et al. (2005), the need for dedicating human resources toward a cooperation may increase in importance the more strategic an alliance becomes. As mentioned earlier, Company A in Paper 4 had the more strategically important cooperation. This company also stressed the importance of dedicating human resources to nurture alliances, and further that pertinent information is important to maintain trust and consequently commitment in the alliance.

Trust and Risk

"Business is War and Peace. But it's not Tolstoy-endless cycles of war followed by peace followed by war. It's simultaneously war and peace."

– Adam M. Brandenburger & Barry J. Nalebuff*

When acting in a dynamic market a company always takes risks, this is also the case when cooperating with others (e.g. Jarillo, 1988; Morgan & Hunt, 1994; Ring & van de Ven, 1992). As illustrated in Paper 4, the type and level of risk-taking is different between companies. Company A has chosen to engage in more strategic alliances, which imply that the risk is more focused on the actual alliance. On the other hand, Company B has the knowledge and equipment for the production of digital printing in-house, which concentrates the main risk inside the company and not in the alliance.

The level of risk in these cases are different, and so are the ways the companies try to handle it. Company A put a lot of effort into creating trust and commitment in their alliances. This is accomplished both by dedicating human resources and by formal agreements between partners (cf. Child et al., 2005; Jarillo, 1988; Narayandas & Rangan, 2004; Zaheer et al., 1998). To lower the risk in an alliance Company A always tries to formulate their intention in written agreements with their partners. The agreements should cover all aspects of the cooperation, especially the economic issues, and even include how the partnership should be ended if one part wants to contract out of the alliance. Company B on the other hand has strategically chosen to limit its production capacity, and chosen to cooperate to increase this capacity when needed. This limits the risk in ownership. Intuitionally it should be easier to cooperate to gain access to new resources when the resources are plentiful

* Quote from *Co-opetition* (Brandenburger & Nalebuff, 1996, p. 4).

in supply. This is the situation in the printing industry, which limits the risk of being left without the possibility to produce for Company A.

Hypercompetitive Behavior and Cooperation

"He changes his actions and revises his plans, so that people will not recognize them. He changes his abode and goes by a circuitous route, so that people cannot anticipate him."

– Sun Tzu*

As has been discussed in the theoretical framework, many external conditions that Faulkner (1995) deems important for the formation of alliances touch upon the condition of a highly dynamic environment (Bourgeois & Eisenhardt, 1988; D'Aveni, 1994), e.g. turbulence in markets, fast technological development and short product life-cycles. Both companies in Paper 4 tend to work in a hypercompetitive manor, since they are striving to work on a broader field than just the printing sector and thereby change the rules of competition in the industry by for example offering non-printed solutions to their customers. Further on, they are focused on always maintaining customer contact and they try to deliver a high level of customer value by working closely with their customers. However, one major difference between the two companies is their different approach to the printing sector.

Although the two case companies in Paper 4 are quite similar, their strategic directions with respect to printing resources do diverge. While Company B believes that the actual control over the printing resources are crucial for their future survival, Company A has deemed that the future business lies within providing services where the actual output can be indirectly controlled through alliances, which means that it is possible to move more quickly between different services. Consequently, the vision of Company B is focused on outputs that can be produced in the traditional printing industry and preferably at the company's own production facilities. Company A on the other hand has a more customer centric focus, which, according to the respondent, might lead the company to exit the traditional printing industry in the future. Consequently, project management is important for Company A. Although Company B has a more traditional vision, they emphasize the importance of long-term cooperation with their customers, which, according to respondent, might lead them to reevaluate their strategic path in the future depending on their customers' needs.

Having a hypercompetitive-like behavior often means accelerating the competition in the industry and moving the industry into, what D'Aveni (1994) denotes as a hypercompetitive state. As has been discussed in the section *Hypercompetition*, the degree of hypercompetition, and its existence, in different industries have been discussed and there are empirical data that both support (e.g. D'Aveni, 1999; Thomas, 1996; Wiggins & Ruefli, 2002) and give reasons to question (e.g. Gimeno & Woo, 1996; Makadok, 1998; McNamara et al., 2003) the shift to a hyper-

* Quote from *The Art of War* (Tsu, 500BC/1998, p. 205).

competitive state. The results in Paper 3 suggest that some companies in the printing industry tend to work according to the principles stated by D'Aveni (1994) which is about handling a hypercompetitive market. If this is valid in the printing industry in general is still left to investigate. Nevertheless, the competition in cost/price and quality is hard (e.g. Birkenshaw, 2004; Smyth, 2006) and in Paper 1 it can be noted that a transition into service oriented companies, by integration of supporting activities, is taking place.

Having dynamic capabilities is important when acting in a hypercompetitive environment (Teece et al., 1997). Alliances created an opportunity for Company A in Paper 4 (the Service Provider in Paper 3) to act more hypercompetitively by providing the ability to move faster to market, maintaining customer contact, creating customer value and gaining control of resources and knowledge without direct ownership of the production equipment. This makes it possible to better seize the opportunities available in the market.

Cooperation is a way of gaining control over resources, which means that it is possible to offer a complete line of products, both digitally and conventionally printed, to the customers. Nevertheless, for companies that have both conventional and digital printing technology internally, focusing on creating on-demand services and electronic publishing for customers means cannibalizing on one of their core businesses since they educate their customers to print less (e.g. Company A in Paper 4). The results from Paper 3 and Paper 4 show that cooperation was the fastest way of gaining the necessary resources to increase customer satisfaction and a way to escape the fierce competition on the cost-quality arena. The results are consistent with the findings of Lee (2007), who suggests that alliances might decrease time to market. Moving from the cost-quality to the timing and know-how arena, with more control over the input and less control over the production, may be a necessary step for future survival (cf. D'Aveni, 1995b). If you are not capable of cannibalizing on your own business to gain new temporary competitive advantages, someone else will do it.

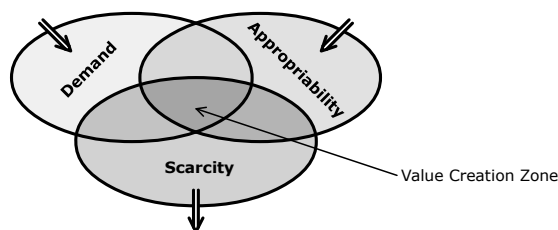


Figure 43. Changes in the value creation zone of digital printing Company A
(After Collis & Montgomery, 1995, p. 120).

The concluding discussion in Paper 4 illustrates that the strategic decision by Company A to purchase digital printing equipment had negative effects on the cooperation. Having direct control is quite a traditional way of working in the printing industry, and basically it was a step “backwards” to a more static way of competing and the upfront competition experienced by Company A’s partner forced the cooperation to end in dissolution. Nevertheless, owning digital printing

equipment became a great opportunity for Company A, when the value creation zone changed (cf. Collis & Montgomery, 1995; 2005). Even though scarcity of digital printing has decreased due to more companies acquiring the technology, appropriability and demand increased for Company A (Figure 43). Appropriability mainly owing to decreased costs from the printing press manufacturers and demand due to applications and smart solutions developed during cooperation.

Even though Company A's purchase of digital printing equipment can be seen as a less dynamic way of competing, it may also be regarded as opportunistic behavior (cf. Gulati et al., 2000; Ring & van de Ven, 1992; Williamson, 1975; 1985). This led to the failure of trust and commitment to the alliance declined. Although not purposely, this behavior led the alliance to end in dissolution, which is consistent with the findings of Gulati et al. (2000), who suggest that a more opportunistic behavior on the market reduces the ability to maintain successful alliances. In other words, Company A used the alliance to learn from the partner, a so-called learning race (Gulati et al., 2000; Jarillo, 1988). When Company A procured digital printing equipment the status quo shifted from an alliance of equally strong partners and became an alliance between competitors (e.g. Hamel, 1991), which is an alliance likely to end in dissolution (cf. Bleeke & Ernst, 1995).

Paper 4 illustrates that strategic alliances can offer the means to obtain the advantages of vertical integration without the need to invest in e.g. development, resources and competence (Jarillo, 1993). Nevertheless, as the results in Paper 6 suggest, the combination of vertical integration and cooperation is widely used in the industry.

Institutional Arrangement for High Flexibility and Competitive Advantages

"For those who, like myself, are inclined to be eclectic, no comprehensive commitment to one approach rather than another needs to be made. What is involved, rather, is the selection of the approach best suited to deal with the problems at hand."

– Olivier E. Williamson*

The results in Paper 1 give indication on the strategic importance of vertical integration to achieve competitive advantages. Furthermore, the results in Paper 6 show that the level of vertical integration, regarding the number of integrated activities, is rather high in the commercial printing industry in Sweden. However, there is a high cost and potential lock-in problems with vertical integration (cf. D'Aveni & Ravenscraft, 1994; Harrigan, 1985b). Even though the competitive advantage of being vertically integrated to meet customers' demands is highly stressed in all studies in this dissertation, it is clear that it decreases the strategic flexibility of the companies.

The case companies' manufacturing flexibility described in Paper 3 and Paper 4 benefits from cooperating with external partners and this flexibility makes it easier

* Quote from *Market and Hierarchies* by Oliver E. Williamson (Williamson, 1975, p. 249).

for the case companies to face fluctuations in customers' taste and demand (cf. Adelman; 1949b; Chang, 1993). Nevertheless, the results of Paper 1, Paper 3, Paper 4 and Paper 6 make clear that cooperation alone is not a competitive strategy for the case companies but that the combination between vertical integration and cooperation is the competitive strategy (cf. Parmigiani, 2007; Rothaermel et al., 2006). Most case companies in these studies have many of the value chain's activities integrated and the importance of being integrated was stressed by the respondents in the qualitative studies.

The respondents in Paper 4 were unanimous in that by cooperating they increased their flexibility in resource deployment (cf. Gulati et al., 2000; Håkansson & Johansson, 2002). This is mainly due to the two main reasons for cooperation mentioned earlier – the possibility of large scale production and reducing investments needs. Not having to cope with new investments and still being able to satisfy customers' needs was important for the case companies. The results in Paper 4 indicate the importance of cooperating to increase flexibility in resource deployment, which has been considered important to increase a company's strategic flexibility according to the literature (cf. D'Aveni, 1994; Eisenhardt and Martin, 2000; Fombrun and Ginsberg, 1990; Miller et al., 1996; Sanchez, 1995; Williams, 1994). The results in Paper 4 suggest that working towards a high strategic flexibility is important, especially regarding resource flexibility. This result is consistent with the findings in Paper 5, regarding how the printing houses are positioning themselves for providing high flexibility as well as the results in Paper 3 regarding having high flexibility in meeting customers' demands.

Even though the printing industry is a production industry with a focus on production resources, the case in Paper 4 is consistent with previous studies since cooperation was an effective and successful way of gaining access to important and valuable resources (cf. Ahuja, 2000; Eisenhardt & Schoonhoven, 1996; Gulati et al., 2000). This is a result of being able to retain customer contact which is more important than the actual production (Paper 3 and Paper 4).

Hence, even though vertical integration is a strategy for creating competitive advantages, it is important to combine vertical integration with cooperation so-called taper integration, to level competitive, flexibility and cost advantages.

6.2 Implications for the Printing Industry

"A satisfied customer. We should have him stuffed."

– Basil Fawlty*

The research in this dissertation has focused on the commercial printing industry, with a special focus on the Swedish market and companies using digital printing technology. This section will discuss some important findings regarding the implication of the results for the printing industry.

* Quote from the TV show *Fawlty Towers, Communication Problems* (Cleese et al., 1979).

Value Added Services as a Service Provider

"The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates."

– Joseph A. Schumpeter*

When digital printing technology first was introduced, the negative reactions were that it was a technology with lower speed, higher cost and a poor print quality in comparison with existing conventional printing technologies. Many improvements regarding these factors and especially the print quality that today is considered comparable to offset (Kipphan, 2008) have been made. Nevertheless, conventional printing technologies still have large scale advantages over digital printing and according to the literature (Porter, 1985), value added services are necessary to be able to take advantage of the technology under such conditions.

The price competition in the printing industry is fierce and continuous price reductions have made it a low margin industry (Birkenshaw, 2003; PODi, 2003). Just as the generic strategies (Porter, 1980) state, digital printing houses try to avoid competition with conventional printing houses, which follow a low cost strategy, by offering value added services using a differentiation strategy. Increased customer value can be achieved by vertical integration (e.g. Harrigan, 1983a; 1984; 1985b) in the printing value system (Figure 44). By vertical integration, it is possible to influence the customers and help them to take advantage of opportunities with digital printing.

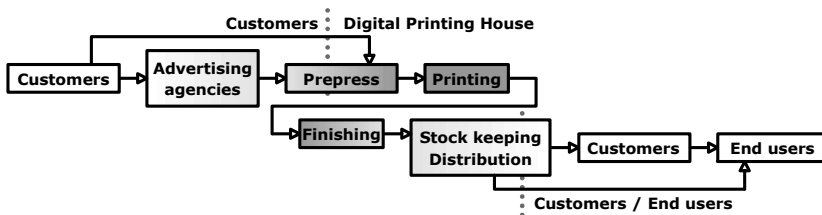


Figure 44. Vertical integration of digital printing houses in the value system.

The possibility of delivering customer value is not static over time and factors such as demand, scarcity and appropriability of a resource are important and changing (cf. Collis & Montgomery, 1995). Unfortunately, for digital printing both demand and appropriability have historically been low and the scarcity of digital printing resources is declining as more and more printing houses acquire digital printing technology. However, today the demand for digitally printed products is increasing but the ability for customers to appreciate the value of digitally printed products is still lacking since print is, in general, regarded as a commodity product (cf. Birkenshaw, 2003). Although, in combination with other resources, such as using the Internet for ordering and production, electronic stock-keeping and automated

* Quote from *Capitalism, Socialism and Democracy* (Schumpeter, 1942/1975, p. 83).

customizations from databases, the appropriability of digital printing may rise. For printing houses that invest in digital printing, the creation of services connected to and focused around print production and market communication for the customer, is a way of increasing the possibility of providing high customer value and becoming more than a print provider.

Instead of calculating and discussing print cost per page or piece with the customers, it is important to focus on the actual value that a customer can receive from the product. Even though the cost per printed piece may be higher, digital printing might help to decrease the total cost of the value chain of printed material by eliminating stock-keeping and decreasing the amount of discarded material, and increasing the potential revenues from the printed matters by e.g. raising the response rate (e.g. Broudy & Romano, 1999; Gidlund et al., 2008). In general there is a trade-off between service related factors and cost/price. Consequently, a focus on service related factors such as high flexibility, high quality and short delivery lead times are often done at the expense of high cost/price. Many companies in the commercial printing industry in Sweden have chosen to focus and differentiate their business towards providing high flexibility for their customers. By conveying the message of lowered total cost by printing on demand and increased revenues by customization to the customers, digital printing houses try to act more as a service provider for information services and customer relations than solely a print provider.

The ongoing development towards more and more information created for electronic distribution, is not all bad for digital printing, but rather the contrary. Even if material is intended to be stored and distributed electronically, printed copies are most certainly needed from time to time. By using digital printing for such on-demand production, stock keeping and surplus editions are avoided. When striving towards a paperless business the most natural, convenient and profitable way of producing a non-electronic output is digital printing. Printed material will probably not disappear in the foreseeable future and therefore digital printing, as a production technology, might increase in importance.

The speed and flexibility of digital printing, makes this technology one tool for printing houses to use for recapturing the ownership over information that they earlier had when the only mass communication medium was printed matters. Nevertheless, it is necessary to focus on the information and not only on the printed matters. To be able to stop focusing solely on print and instead become a true service provider, a widened horizon is necessary.

Added Value from New Production Technology

“Organizational resources – which consist of people, technology, and cash – are very flexible.”

– Clayton M. Christensen*

As mentioned earlier, many digital printing houses have strategically integrated supporting activities such as prepress and finishing, in order to deliver what they believe is enhanced customer value and contract more direct customers without intermediates. Direct customers are often interested in outsourcing greater parts of their print production and strive towards having a long-term relation with their digital printing houses. Furthermore, direct customers do believe that fully vertically integrated companies can provide more accurate and value added services than companies that are specialized. This has led to a procurement or supply management relationship between the printing house and the direct customer (cf. Anderson & Narus, 2004; Dobler & Burt, 1996). The other and most prominent customers to printing houses, the advertising agencies, usually have a greater knowledge about print production. Consequently, in order to control customer relationships and cut costs, they try to purchase different activities in the digital printing value system separately.

When studying whether digital printing is satisfactory for customers in their print production, it is noticeable that digital printing does not achieve a result that customers are fully satisfied with. Regarding the factors *price*, *time*, *functionality/possibilities*, and (print) *quality*, quality was the factor that the customers deemed most important. This was also the factor with the largest gap between satisfaction and importance. The print quality issues seem to become more prominent when simpler use of digital printing, like short runs, are the main purpose. This since conventional printing techniques (e.g. offset) can be used to produce the same output, even though at a higher cost. For more complex digital printing applications, like variable data printing, print quality issues are of less importance (cf. Gidlund et al., 2008).

Interplay between Producers and Customers

“Never get angry. Never make a threat. Reason with people.”

– Don Vito Corleone†

Both printing houses and their customers agree that one of the main problems during the introduction phase of digital printing was the huge gap between what printing houses chose to offer and what the customers actually demanded (Figure 45). Nevertheless, over time the gap between offers and demand has become smaller.

* Quote from *Making friends with disruptive technology* (Christensen, 2001).

† Quote from the movie *The Godfather* (Puzo & Coppola, 1972).

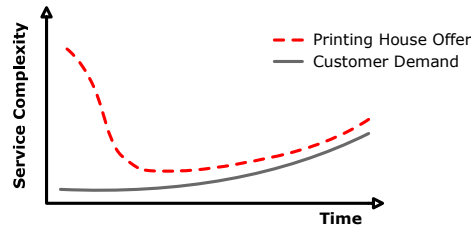


Figure 45. An illustration of the development of the gap between customer demand and printing houses' offers regarding services in connection with digital printing.

Basically, the printing houses began their journey in the field of digital printing by offering what the printing press manufacturers conveyed would give the presumed greatest customer value – variable data printing. At this time, knowledge about how to create value from digital printing was poor among customers which resulted in lack of sales at the printing houses. The early adopters of digital printing have expressed their frustration with the early problems of selling variable data printing as: “*You have beaten yourself bloody against this wall all the time*”^{*}, “*We were fooled into believing the same falseness as everyone else, that variable data printing was just waiting to explode*”[†] and “*[The digital printing press] was more or less a piece of furniture during the first year and a half*”[‡]. The gap between what printing houses offered and what customers wanted was large during the initial introduction of digital printing in the mid 1990’s (Figure 45). When the customers did not buy the offered key services (e.g. variable data printing), the printing houses were “forced” to sell simpler services like producing short runs and fast deliveries, to avoid a possible bankruptcy as an outcome. Even though a service like short runs can be seen as simpler and less complex than variable data printing, the level of complexity should not be mixed-up with customer value. It is very simple; customer value at each point in time is greatest where the customers perceive it to be. In this case the short runs created high customer value, not variable data printing. However, the perceived customer value does of course change over time and it has become apparent that the uses of different forms of variable data printing are growing.

By having attractive offers adapted to customers’ needs, it is possible to form a tight supplier – customer relationship, which results in increased switching costs for customers (cf. Evans & Wurster, 1997; Porter, 1980; 1985; 2001). A tight relationship also provides opportunities for printing houses to influence the customers to make use of more complex service like variable data printing. Migrating from simpler to more complex services is actually what the customers have done since short runs and print-on-demand were the main reasons why digital printing became an option for many customers’ printed matters. Nevertheless, over time more complex services have been introduced and now customers believe that they benefit from different kinds of variable printing, mostly simple applications

* The quote originates from Paper 1 and the respondent at Company D, but does not appear in the published article or the included paper.

† Quote from the respondent at Company E, Paper 1.

‡ Quote from the respondent at Company F, Paper 1.

like changing logos, addressing etc. The services have been gradually adjusted to better fit the customers' needs. In the survey study of the Swedish printing industry from 2006 (see the section *The Swedish Printing Industry*), 77% of Swedish printing houses did variable data printing jobs. However, only about one third of the printing houses performed more advanced variable data jobs, such as variable text or variable images.

By striving towards a tighter relationship to customers, it is not only possible for a supplier to influence customers to take advantage of the possibilities with the technology but also possible to learn from customers and use customers in product development (cf. Magnusson, 2003). By better understanding customer needs and increasing stakeholder satisfaction by focusing on the customers, competitive advantages can be reached. Many of the companies in the commercial printing industry have learned that digital printing is not just a production machine, but also a way of thinking. This message has to be conveyed to customers and throughout the internal organization.

Competition in the Commercial Printing Industry

"It is hardly necessary to point out that competition of the kind we now have in mind acts not only when in being but also when it is merely and ever-present threat. It disciplines before it attacks."

– Joseph A. Schumpeter*

Due to the structure of the printing industry and the commoditization of printed products, the competition in the printing industry is regarded as very tough by printing houses. This is both the general opinion in the printing industry in Sweden and consistent with earlier studies by e.g. Birkenshaw (2004) and Smyth (2006). Both digital printing and conventional printing houses perceive the market competition as harsh. However, when quantifying the level of competition in the industry, there is a significant difference (at a 95% confidence level) between the two categories. Companies that use digital printing perceived the competitive situation on the market to be weaker than those using only conventional printing technology (Figure 46).

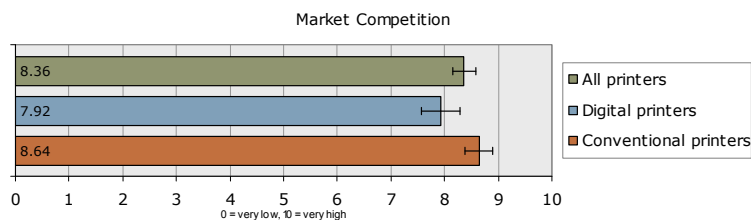


Figure 46. Perceived market competition (mean values with a 95% confidence interval).

* Quote from *Capitalism, Socialism and Democracy* (Schumpeter, 1942/1975, p. 85).

It is possible to observe a negative medium correlation (in accordance with Cohen, 1977) between the share of digital printing used in production and the perceived market competition. The more products produced with digital printing at a company, the less competitive pressure the company experiences.

A similar tendency for competition can be noticed in how the printing industry perceived that their customers valued the price factor. There is a significant difference (at a 95% confidence level) between digital printers and conventional printers in respect to how they perceived the pressure from their customers regarding the pricing of their products. Digital printers felt a significantly lower price pressure than conventional printers. Furthermore, it is also possible to notice a negative medium correlation (in accordance with Cohen, 1977) between the share of digital printing used in production and the perceived demand from customers on providing low prices. Hence, the use of digital printing tends to make the perceived price pressure and market competition lower.

Dynamic Competitive Behavior and Positioning for High Flexibility

"You know that old thing, 'live fast, die young'? Not my way. Live fast, sure, live too bloody fast sometimes, but die young? Die old. That's the way – not orthodox, I don't live by 'the rules' you know."

– David Brent*

The competition in the printing industry is strong and the competitive environment in the printing industry is becoming increasingly dynamic and a hypercompetitive behavior among printing houses is becoming crucial to ensure future individual survival in this industry (cf. Bourgeois & Eisenhardt, 1988; Brown & Eisenhardt, 1998; D'Aveni, 1994; 1995a). In accordance with the literature (D'Aveni, 1994) it is possible, in hypercompetitively acting companies in the printing industry, to notice the shift from the cost-quality to the timing and know-how arena. Moving to the know-how arena might be a way to exit non-healthy price competition, and control the direction of the industry in a more successful manor. The competitors are not only in-industry, i.e. other printing houses. Instead the printing industry is today influenced by a heterogeneous group of competitors. Many of these new competitors are companies that compete by offering other media than printed products and consequently contribute to changing customer behavior and making customers less dependent on print.

It may be necessary for printing houses to create disruption on the market (D'Aveni, 1994; 1995a; Schumpeter, 1942/1975) by e.g. offering several publication channels, even non-printed solutions, to customers as complements to their printed services to gain and maintain customer contact. This may be necessary even for companies that currently have large scale advantages in printing, even though it means cannibalizing on the current core business, e.g. conventional printing (cf. Conner, 1988). By shifting focus from production to customer contact, it might be

* Quote from the TV show *The Office, Party* (Gervais & Merchant, 2002).

possible, for a printing house, to become less dependent on large print volumes, but on the other hand they do themselves contribute to the changed behavior among customers by offering additional non-printed solutions.

The printing industry has differentiated their business towards service related factors, such as having a high level of flexibility, good print quality and short lead times (Figure 32). Thus they have primarily focused on giving their customers a high level of service and enhancing customer satisfaction. There is usually a trade-off between service and cost (e.g. Brandenburger & Nalebuff, 1996; Herer et al., 2002; Rudberg & Wikner, 2004) and the increased level of service has been accomplished at the expense of higher prices to their customers. Having a dynamic approach and a focus on delivering high customer value are important to be successful, especially for digital printing houses. Nevertheless, it should be noted that there were no significant differences (at a 95% confidence level) between companies with and without digital printing in the pattern of how they differentiate their offers with respect to any of the factors flexibility, print quality, lead time and price. Hence, the positions on the market for conventional printers and digital printers, in respect to these factors, are quite similar.

The printing houses believe that the foremost demand from customers was short lead times, while low prices and high print quality were only second to short lead times (Figure 33). As has been mentioned above, printing houses that had digital printing felt a lower price pressure than those without digital printing. This result suggests that the differentiation towards a higher level of customer service, by the use of digital printing to add value to the products, is a successful concept. These printing houses felt that their customers did not have as high demands for low prices as the customers of conventional printing houses. Even though the focus is similar, digital printing has a positive effect in the strategic position of having a higher level of service since digital printing houses can charge a higher price.

There is a quite clear difference in how commercial printers have positioned themselves in respect to price, lead time, quality and flexibility compared to how they perceive market demand. The printing houses have deemed it important to position themselves for a high level of flexibility even though they do not feel that this is the major demand from their customers. Flexibility was, when investigating all printers, subordinate to both lead time, print quality and for only conventional printers also price. Nevertheless, all factors were graded as important as can be seen in Figure 33. Having a high level of flexibility has been considered important when acting in any highly dynamic market (e.g. Brown & Eisenhardt, 1998; D'Aveni, 1994; Sanchez, 1995). However, printing houses perceive that their customers are demanding a commodity product. High flexibility and high quality are factors that should enhance the possibility to create a high level of customer satisfaction. The printing houses are, in general, differentiating themselves by providing a high level of service to the customer, which can be a way to escape the commoditization of the printed product (cf. D'Aveni, 1994; Porter, 1985).

It is easy to argue that to satisfy customers' needs, printing houses should provide an offer that is matching the demand on the market, which is not quite the case according to the discussion above. However, the printing industry has a non-

favorable situation with strong competition, largely based on price (e.g. Birkenshaw, 2004; Smyth, 2006). It is important to act with a hypercompetitive-like behavior and work with speed, surprise, customer satisfaction and continually trying to shift the rules of the industry to the company's favor to maintain business viability and competitiveness. Companies in the commercial printing industry are trying to shift focus towards a service oriented organization with focus on high flexibility. This could make it possible to increase the value of the product and accordingly the price. This is what Porter (1980) refers to as having a differentiation approach instead of cost leadership approach or when D'Aveni (1994) discusses to escape the cost-quality area and focus on e.g. timing and know-how. Both conventional printing houses and digital printing houses have a similar strategic position (Figure 32).

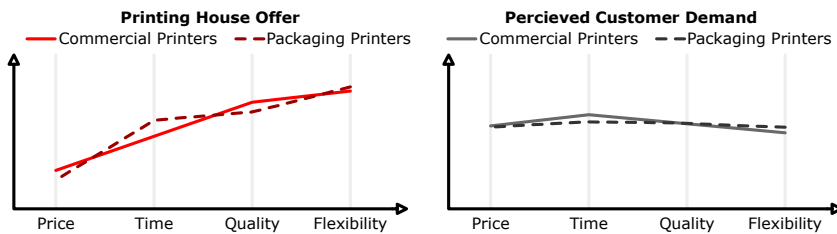


Figure 47. Profiles of differentiation and Demand of Price, Time, Quality and Flexibility for commercial and packaging printing houses.

The same factors, flexibility, print quality, lead time and price, have been investigated for the packaging printing industry in a parallel study (Viström & Mejtoft, 2007). In this study it was possible to notice a very similar pattern in the results for the packaging printing industry as for the commercial printing industry (Figure 47). Consequently, even though the packaging printing industry has a more concentrated structure with fewer companies, the ways of differentiating the offers are similar to the commercial printing industry.

Flexible and Competitive Organization


"Today's customers in many markets are increasingly demanding tailored solutions for their specific requirements."

– Martin Christopher*

The commercial printing industry is striving to build flexible and competitive organizational arrangements. This is most certainly not a unique situation and the concept of combining vertical integration with partnerships has been known and used for a long time in many industries to e.g. handle demand uncertainties (cf. Adelman, 1949b; Parmigiani, 2007).

* Quote from *Logistics and Supply Chain Management* (Christopher, 1998, p. 210).

Many organizations promoting and supporting the printing industry, such as Swedish Graphic Companies' Federation (GFF) and Print On Demand Initiative (PODi) in the US, have promoted the service provider concept for a long time. The results in this dissertation show that the industry is striving towards being flexible to meet customers' demands, taking on the service provider concept and thereby trying to avoid being just a print producer. The printing industry deems vertical integration important to be flexible in meeting customer's demands. A high level of vertical integration, however, creates a non-flexible organization with severe risk for lock in effects in certain investments (cf. D'Aveni & Ravenscraft, 1994; Harrigan, 1985b; Porter, 1980). Consequently, value added partnerships are used and they are very important for loosening the vertically integrated structures and creating more flexible organizations. Even though some companies have chosen to cooperate within their core business, the mainstream way of organizing the companies is by having many value added activities internally. Having control and owning an activity is strategically important for maintaining competitive advantage, and the capacity of the integrated activities is subordinate to this. Through balancing the internal capacity with partnerships it is possible to create a more flexible organization that is more ready to endure changes in the competitive landscape.





7 Conclusions

“42”

– Deep Thought*

The commercial printing industry is a fragmented, over established and mature industry that has had a new production technology introduced and met new threats from the Internet and substitute products like electronic non-printed media. The research objective of this dissertation is to investigate the impact of institutional arrangements, with respect to vertical integration and cooperation, on competitive advantages within the commercial printing industry.

The results in this dissertation demonstrate that vertical integration is important in order to get competitive advantages in the commercial printing industry in Sweden and is a widely used strategy. Being able to contract a full service company is appreciated by customers to printing houses, especially direct customers, due to these customers' need for a supplier of complete solutions for printed matters. Consequently, a vertically integrated full service company can provide value added services which makes it possible for customers to minimize their organization regarding production and purchasing of printed matters. Another reason for engaging in vertical integration is the need for having adjacent activities in the value system in-house to ensure fast deliveries and steady and appropriate input to the printing houses' printing units. The main reason for being vertically integrated is to be able to provide full service solutions to customers, which is seen as a competitive advantage. Because the essence of digital printing is being able to provide fast deliveries, on-demand printing and variable data printing, the results show that vertical integration is especially important for printing houses having digital printing equipment in order to develop their business. By being vertically integrated it is easier to use and introduce digital printing to the end customers.

As almost every other industry, the printing industry is highly dependent on different kind of resources in production. A general problem with vertical integration is the potential inflexibility which can arise due to ownership of production equipment and employment of personnel. The findings suggest that cooperation and alliances can be used to increase printing houses' resource flexibility. By cooperation it is possible for printing houses to acquire fast access to valuable resources, such as production equipment and knowledge, which increases flexibility. The results demonstrate that this can be done either to complement a company's line of production and services with complementary resources to be able

* The ultimate answer to Life, the Universe, and Everything according to Douglas Adams' *The Hitchhiker's Guide to the Galaxy* (Adams, 1978).

to offer full service solutions to customers or to extend the capacity of their current resources when there is a need for a temporarily increase in production capacity. Consequently, vertical integration is a way of creating competitive advantages by providing full service solutions. Furthermore, internal control of resources is regarded as important to be able to satisfy customers' needs and produce customers' orders on time. Through cooperation it is possible to achieve cost and flexibility advantages by reducing capacity or acquiring access to complementary production equipment and still being able to get the same advantages as a vertically integrated company.


Despite the commoditization of printed products, the findings in this dissertation indicate that the commercial printing industry focuses on having a high service level. Flexibility to meet customers' demands, high quality and short lead times are all factors regarded as essential, and in general this industry tries to have a high service level, with respect to these factors, with the trade-off of having a higher cost and price position. Although the commercial printing industry in Sweden is in general focusing on these service related factors, the results point toward that this strategic positioning is more beneficial for printing houses having digital printing technology. An argument for this is the lower degree of competition and less pressure from customers on having low prices that these companies experience. Consequently, even though the whole industry is striving towards service orientation and trying to avoid price competition, printing houses using digital printing experience less price pressure from the market.

Since the value of digitally printed products can not always be calculated the same way as calculating the value of conventionally printed products (a value focus instead of a volume focus), it is important to be vertically integrated backwards in the value system and work close to customers. By increasing the share of direct customers and forming a tight supplier – customer relationships it is possible to identify what the customers really want to achieve and develop customized solutions with a clear and appreciated value. By controlling activities before printing, such as project management, it is also possible to provide customers with and benefit from many different output possibilities, such as electronic publishing. A commercial printing house that accesses new business areas (e.g. electronic publishing), may reduce the company's dependence on large print volumes. This might have to be done even though it may mean cannibalizing on the traditional core business, i.e. the printing, of the company. Nevertheless, a focus on smaller print volumes makes digital printing more useful and cost effective in production.

The results suggest that there is an opportunity for digital printing when the goal is not to print at all. By having a paperless vision, the natural output when printed material is needed is digital printing, since it is possible for customers to order exactly what they want, when they want it, without any need for stock keeping. Even though on-demand printing of short editions is the most commercially successful use of digital printing today, it is clear that it is becoming increasingly important to once again try to influence customers to take advantage of more complex and unique services of digital printing, which could increase the value customers receive from printed products. The breakeven point between digital printing and conventional printing technologies, with respect to print volumes

when printing static documents, is a gray area that is constantly expanding since digital printing is evolving towards longer print runs and conventional printing towards shorter runs. Consequently, today both digital and conventional printing technologies can be used for printing many similar printed products. To avoid price competition between the two technologies, it is important that digital printing add a value that conventional printing cannot. Hence, the sale of different types of variable data printing products has to increase. Even though many printing houses offer variable data printing today, only a small proportion of the total printed volume is variable data productions. Nevertheless, the development of variable data software and Internet applications, has increased the accessibility of variable data printing since the initial introduction of digital printing in the mid 1990's.

Even though the results illustrate that the industry engages in vertical integration and believes this to be strategically important for success, vertically integrated companies perform neither better nor worse than non-integrated companies in regards to profitability. However, integrating new activities may increase revenues and lead to a greater total profit. In an industry structure with many small and medium sized privately owned companies, this might be seen as an incentive to vertically integrate. Hence, when the printed volume decreases, there is a need to incorporate other activities to maintain revenues.



8 Further Research

"What's going to happen? What does the future hold? So many things that I put off. Assuming I'd have time, assuming I'd grow old."

– Ms. Patti Miller*

As been suggested in this dissertation, the combination of vertical integration and cooperation is important to build competitive advantage and at the same time ensure high strategic flexibility and level transaction costs. Nevertheless, to be able to draw more general conclusions, more studies have to be carried out on both vertical integration and cooperation. The studies have been focus solely on the commercial printing industry. The test the cross industry validity, additional studies of both this industry and others have to be performed.

To ensure a high validity of the results in this dissertation, the results are based on both quantitative and qualitative methodologies (cf. Denzin, 1989; Jick, 1979). Nevertheless, to be able to draw more conclusions on the direction of the industry it is important to perform longitudinal studies over a period of time. Future studies should, consequently, include similar studies to provide longitudinal data.

Moreover, the studies in this dissertation were carries out in Sweden only. Nevertheless, Sweden has lately been ranked very high in technological readiness[†] (e.g. Lopez-Claros et al., 2005; 2006; Porter et al., 2007), which might imply that introduction of new technology in Sweden is faster than in many other markets. This could be an indication that the tendencies indicated in this dissertation are going to be more common in other countries in the futures. However, to test this hypothesis, parallel studies in Sweden and other countries and markets are necessary.

Lastly, among these suggestions on future studies; cooperation and partnerships are important to ensure stability in the industry. More studies should be carried out according to the idea on how competitive companies can cooperate to provide mutual competitive advantages for all partners and still keep the tradition in the industry with many small and medium sized companies to carry on.

* Quote from the song *What's Going to Happen* in *Scrubs, My Musical* (Fordham et al., 2007).

† During 2006-2008 Sweden was ranked first in technological readiness in the *Global Competitiveness Report* by the World Economic Forum (Lopez-Claros et al., 2006; Porter et al., 2007).

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Included Papers

The Author's Contribution to Included Papers

This dissertation contains six papers, all written mainly by the author of this dissertation. Paper 1-3 are based solely on studies done by the author and the papers were written entirely by the author. Paper 4-6 are based on studies made by the author in cooperation with colleagues. Paper 4 is based on a study carried out in cooperation with Åsa Nordin, Mid Sweden University, both the author and Åsa Nordin contributed equally to the study. The paper is written mainly by the author. Paper 5 and Paper 6 are based on a comprehensive survey study initiated and carried out by the author and Magnus Viström, both the author and Magnus Viström contributed equally to the data collection. The data in Paper 5 was analyzed in cooperation with Magnus Viström and the author was mainly responsible for writing the paper. The data in Paper 6 was analyzed by the author, who also initiated, compiled and analyzed the additional financial data. The paper was written mainly by the author.

Paper I

Mejtoft, T. (2006). *Strategies for Successful Digital Printing*. Journal of Media Business Studies, Vol. 3, No. 1, pp. 53-74.

Paper II

Mejtoft, T. (2006). *Perceived Satisfaction by Customers in the Digital Printing Value System*. TAGA 2006 Proceedings, pp. 486-511.

Paper III

Mejtoft, T. (2007). *Creation of Customer Value Using Digital Printing in a Dynamic Business Environment*. TAGA Journal, Vol. 3, No. 3, pp. 128-143.

Paper IV

Mejtoft, T., & Nordin, Å. (2007). *Strategic Alliances in the Digital Printing Industry*. TAGA 2007 Proceedings, pp. 38-62.

Paper V

Mejtoft, T., & Viström, M. (2007). *Positioning in the Printing Industry - Differentiation in Terms of Price, Lead Time, Print Quality and Flexibility*. In N. Enlund, & M. Lovreček (Eds.), *Advances in Printing and Media Technology, Vol. 34* (pp. 327-336). Acta Graphica Publishers.

Paper VI

Mejtoft, T., & Viström, M. (2008). *Vertical Integration and Profitability: Experiences from the Commercial Printing Industry*. Submitted for publication.

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Errata: Paper I

There should be a text on the x-axis of Figure 1 (p. 145) reading “Relative Cost Position”, cf. Figure 16 (p. 26).

Strategies for Successful Digital Printing

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Keywords: digital printing, business strategy, vertical integration, differentiation, customer value

Today the printing industry is fragmented and suffers from overcapacity, and printed material is regarded as commodity products. In this article, corporate strategy owing to the introduction of digital printing technology is studied. The focus is on companies that made digital printing investments. Differentiation is a strategic approach that is necessary for digital printing companies to compete successfully. The results show that vertical integration is a way to ensure appropriate supply to the digital printing unit and to add customer value to the service. Educating customers is a way to create a market for the value-added products of digital printing.

Traditionally, printing was the only output for spreading marketing messages and information to customers when referring to non-personal communication channels (Kotler et. al., 2005). During the later half of the 20th century radio and TV broadcasting became additional channels for reaching the audience. Since the mid-1990's, there has been a revolution with the global spreading of Internet and invention of the World Wide Web. Internet has during the last ten years taken the position as a dynamic and inexpensive way of publishing and distributing information. Printing houses are then no longer the obvious owners of the content, and print in general is now seen as just an output channel among others for those who are trying to reach an audience.

One of the drawbacks of printed communication has been the difficulty of achieving cost efficiency in smaller production volumes. The setting-up of a print run and the start-up of the printing press before quality copies can be produced have been work and time consuming. This perspective of printing, as only a mass communication medium, changed in 1993 when two relatively unknown companies – Indigo and Xeikon – introduced digital color printing with professional quality. They had at this time two different approaches to the technology, spanning from liquid toner and cut-sheet paper to dry toner and web paper. They both promised inexpensive short runs and possibilities of customization and variable data printing. Since the introduction of digital color printing, it has been forecasted to grow significantly but the definite break-through has yet failed to come.

Digital printing is a more flexible and easy-to-use technology than traditional printing technology, such as offset. The main difference is that every single copy from a digital press can be unique as there is no need for printing plates. This makes it possible to print customized material for use in e.g. one-to-one marketing (Peppers & Rogers, 1993). Another advantage in comparison to offset, that is

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mainly used for mass production, is the short changeover time and low discard volume, which makes it possible to shorten lead times and being able to print smaller editions. The technological development has been rapid, new and improved printing equipment and software are introduced one after another with enhancements in both speed and quality. Today the speed is high and the quality is comparable to print media produced using offset.

Digital printing affects several segments of the media industry by offering the possibility to output small editions to a competitive cost. This can be done for obvious applications like advertisements and direct mail, but also for traditionally large edition items like newspapers and books. Customization with customer name in direct mailing is an application that has been around for a long time. The development of new systems and more efficient workflows has made it possible to create more advanced personalized campaigns using advanced customer relationship management (CRM) systems. When a company is conducting a personalized campaign to a certain customer segment, digital printing raises the response frequency (Broudy & Romano, 1999) and may thus increase the competitiveness of the company.

Every company active in an industry is affected by its surroundings, which in turn makes up the competitive environment for the industry. Porter (1980) classifies five generic industrial environments when discussing driving forces of competition - fragmented, emerging, mature, declining, and global. The traditional printing industry is a mature industry, while the digital printing industry is a new industry that is still emerging as the volumes printed in digital printing are increasing.

Industry fragmentation is something that occurs when an industry has many players and consists mainly of small- and medium-sized companies. The consolidation level is generally low and no company or industry group has a significant market share and therefore cannot influence the outcome of the development of the industry (Porter, 1980). The printing industry is a fragmented industry (Gilboa, 2002), as approximately 90% of the printing companies worldwide employ less than 20 people (Kipphan, 2001).

The fast technological development is not only a fact in the printing industry but also in many parts of the graphic arts industry, which now all use digital workflows. This has introduced new possibilities in managing the value chain to cut costs and make workflows more effective. Technology is an important factor when determining the strategic path for a company as it is involved in the activities performed. The technology may change the rules of competition by increasing speed and lowering production cost or enabling a unique way of producing a product or service (Porter, 1985). This is what happened after the introduction of digital printing technology. Although the speed is far lower than for traditional printing technologies, digital printing has resulted in possibilities to produce as small series as one unique copy at a reasonable cost.

With changes in technology, first-mover advantages but also disadvantages appear. The advantages may involve reputation, switching cost and knowledge. The disadvantages occur because there are pioneering costs, uncertainty in the demand and early generation technology (Porter, 1985). The uncertainty about customer

needs, most desirable products and most profitable technology may tend to lure companies into trying to provide all kinds of services and products. This is because they do not want to take the risk of making the wrong decision. However, this most often results in a lack of uniqueness and profits (Porter, 1996).

A commodity industry is an industry where the products are interchangeable between different producers. Over time, print media has become more or less a commodity product. This development has been accelerated by the increase in personal computers and the high quality home and office printers available today. Today it is possible to create simple print media without professional help.

Overcapacity of production and commoditization of products may result in fierce price competition among existing competitors in an industry when the products are not differentiated. These kinds of moves and countermoves in pricing may lead to overall sub-profitability, when an industry may be forced to compete primarily on the basis of price. Overcapacity may arise due to the introduction of new or changed production technology. In some cases new production technology either focused on a niche or with a higher production capacity makes its way into the market while an old production technology is still left operating. This may cause overcapacity when there is an unbalance between production capacity and market demands (Porter, 1980).

The printing industry today has a widespread overcapacity (Birkenshaw, 2004). Old traditional printing technology is often still left operating, either side by side in the same company where digital printing technology has been acquired or it has been sold to another printing house. Since capacity expansion is something that usually remains for a long time, it is important to realize the potential consequences of expanding the capacity in an industry. In the printing industry the overcapacity has resulted in continuing price reductions (Birkenshaw, 2004).

Early research in cost of digital printing shows that there are few products that are economical to produce using digital printing technology (Bäck, 1997). During the last few years traditional printing technology has been developed to be able to produce shorter runs and digital printing to produce longer runs. However, by adding unique customer value to the product that cannot be produced by any other production technology available, digital printing can be an attractive production technology.

Objectives of the Study

The objective of this paper is to study changes in corporate strategy brought about by the introduction of digital printing technology. This research study focuses on companies in the graphic arts industry that have made digital printing investments. The study aims to analyze changes made by these companies to differentiate and find a suitable market to create market success.

Theory

One central part in competitive strategy is to determine a company's position within its industry. According to Porter (1980), three generic strategic approaches can be adopted to create sustainable competitive advantages and outperform other companies in the industry - overall cost-leadership, differentiation and focus. Cost-leadership is gained by constructing an effective large-scale production facility, which can produce at costs that are far lower than those of the competitors. Companies that adopt a strategic position by differentiation have carved out a slice of an industry and are creating products that are perceived as being unique and therefore possible to sell at a higher price and also produce at a higher cost. The third strategy is to focus on a particular buyer group, product line or geographical area by serving this target well. A company that positions itself right may earn profitability even though the average rate of return for the industry in general is modest. It is said that a company that cannot develop its business in one of the above-mentioned directions is "*stuck in the middle*" and is in a strategically disadvantaged situation.

The cost-leadership strategy is often achieved by adopting a competitor-centered approach where benchmarking competitors is an important factor. Differentiation and focus often comes from a customer-centered approach where the customers needs are in focus when creating the appropriate services and activities and a non-price competition is possible since competition is mainly performed by product quality and perception of benefit to the customer (Day & Wensley, 1988). Differentiation most often implies a narrow product line that could become a problem for the company if the buyers need for the differentiating factor decreases (Porter, 1980).

Differentiation

When printing large series, digital printing is more costly per print than traditional printing techniques since the cost per print more or less remains the same throughout a print run. This fact makes it hard today for a digital printer to pursue cost leadership. However the possibilities with digital printing technology involves profitability in short print runs and customized variable data printing. This makes digital printing business more suitable for a strategic approach of differentiation or focus. By adopting one of these two strategies, it is possible to maintain a cost position that is relatively high and still be able to gain a customer base because the customer value delivered is higher than the cost leaders products.

The best practices follow something called the production frontier that states the relationship between the delivered nonprice customer value and the cost position of the production (Porter, 1996). Because digital printing has a higher cost position, the production frontier states the need for delivering additional customer value to be able to succeed with digital printing (Figure 1).

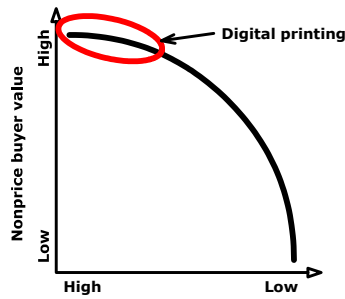


Figure 1. Position of Successful Digital Printing in the Relationship between Nonprice Customer Value and Cost Position (After Porter, 1996, p. 62).

As mentioned before a company can differentiate itself from its competitors by being unique at creating something that is of value for the customer. This uniqueness does not necessarily come from creating a product that is unique but can come from anywhere in the value chain. Consequently, a successful differentiation can arise from other primary or support activities than the core activities in the company. So even though the actual product is a commodity product, support activities can make the final product differ substantially from its competitors (Porter, 1985).

The Industry Value System

Added value is a concept that became very popular in the 1980's and Porter (1985, p. 39) defines it as "*selling price less the cost of raw materials*". A company is performing different types of activities that add value and these activities can be divided into primary and support activities, each important for what is called a value chain. A value chain can be used to understand the behavior of cost and the potential sources that can be used to gain competitive advantage.

Porter (1985, p. 36) also points out the importance of constructing the value chain on a company level and stress that "*an industry- or sector wide value chain is too broad, because it may obscure important sources of competitive advantage*". However, it is also important to "*understand not only the company's value chain but how the company fits in the overall value system*" (p. 34).

Day and Wensley (1988) have a similar view but with a focus on the importance of having an approach of looking at the industry value system. Day states that a competitor-centered focus together with just looking at internal activities and costs may obscure opportunities gained by vertical linkages with other value chains in the industry value system. A value system can then describe how activities in different companies can interact to create value to a product or service (Porter, 1985).

The principal value system for print media (Kipphan, 2001) constitutes a good basis for understanding the different activities that are done to create, print and distribute print media. By analyzing the value system, it is possible to investigate the strategic path the printing companies have entered and to study their use of the value system to work with differentiation as a competitive strategy. In this paper, a slightly altered

and simplified value system (Figure 2) will be used to be able to understand the general strategic changes in the digital printing industry.

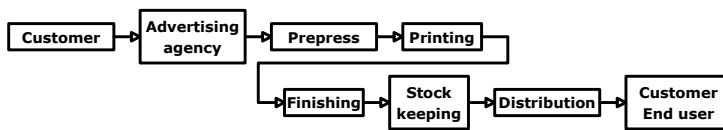


Figure 2. Value System for the Printing Industry.

In the value system, each individual step has its own value chain but in order to understand how to gain competitive advantage it is necessary to see how every part fits in the industry's overall value system (Porter, 1985). The linkage in this system is in other words a so-called vertical linkage that links different companies or different divisions value chains together.

Since the cost model for the digital printing technology is mainly based on low total cost on short-runs, it makes it possible to more or less eliminate the stock keeping of printed material since the basic idea is to print only necessary copies and to print them on-demand. This also eliminates or lowers the volume of a printed material that has to be discarded due to information that has become out of date before the material has been used. However, the activity regarding stock keeping in the value system for digital printing will still be kept to be able to illustrate how the industry works.

Vertical Integration

Vertical integration occurs when a company chooses to produce its own inputs or takes care of its own outputs, in order to increase that company's power in the marketplace (Porter, 1985). A company can then engage in backward or forward vertical integration into neighboring activities in the value system and make these activities strategic business units (SBU). Behind every decision regarding vertical integration, management has to ask the question whether products or services should be purchased from a partner or produced in-house. Vertical integration is an important part of corporate strategy since it is often one of first diversification strategies considered (Harrigan, 1985). The choice of a vertical strategy is often a reflection of long-term visions made by the company's founder or chief executive officer (CEO) (Beal & Yasai-Ardekani, 2000; Harrigan, 1985; Schein, 1983).

By engaging in vertical integration, a company can obtain competitive advantages. As identified by Harrigan (1984), a company may benefit from reduced costs by avoiding time-consuming tasks, improving coordination between activities, opportunities for differentiation of products and assuring supply. To gain end-user contact by integration is a way for a new product to penetrate a mature market since it is possible to show the products superiority (Harrigan, 1985). Vertical integration does also imply possible disadvantages such as increased internal cost and high exit barriers (D'Aveni & Ravenscraft, 1994; Harrigan, 1985). The distribution of profits and cost in the value system also becomes unclear when vertical integration becomes more common (Gadiesh & Gilbert, 1998).

The integration between activities does play a major role in strengthening the company's position and makes it possible to exploit some of the benefits gained by broadening the specific company's value chain or to form collations with other companies (Porter, 1985). The dimension of the vertical integration can differ depending on conscious or unconscious strategic decisions made in the company. These decisions regard the breadth of integrated activities, stages of integrated activities, degree of internal transfer and the form of ownership (Harrigan, 1984).

Previous research shows that a successful strategy may become legitimate in an industry and thereby adopted by other companies in the same field (DiMaggio & Powell, 1983). However, it is also stated that the condition of the industry is important for vertical integration to be advantageous or not (Chandler, 1962; Livesay & Porter, 1969), and vertical integration should be adjusted to changing conditions in the industry (Harrigan, 1986). A low degree of competition in the industry does in general favor vertical integration (Balakrishnan & Wernerfelt, 1986; Harrigan, 1983). A steady increase in demand does often imply more activities and stages that are integrated (Harrigan, 1985).

To be able to benefit from vertical integration it is important to take advantage of both existing knowledge and at the same time let new knowledge in the company evolve (Kazanjian & Drazin, 1987). However, the further away from the core business the vertical integration takes a company, the less likely the integration will be successful (Peyrefitte et al., 2002). This since the learning will be more complicated when new markets and process technology are introduced in the company (Kazanjian & Drazin, 1987).

Methodology

By utilizing a qualitative case study method, it is possible to gain deeper knowledge of the behavior behind the strategy used in a studied company (Bell, 1999). This study is an exploratory study, which is a study that aims to explore what really is happening and to seek new insights in the studied problem. There are three principal ways of conducting exploratory research: a search of literature, talking to experts in the field or conducting focus group interviews (Saunders et al., 2000). In this study, a literature review has been done and interviews have been conducted with respondents at a selected number of digital printing houses in Sweden.

To keep an explorative view of the study the concept with focused interviews was used (Robson, 2002). A couple of general questions were listed in advance to keep focus on some main topics and to be able to get comparable results from all of the respondents. This made the answers from the interviews more comprehensive when follow-up questions could be adjusted to the situation (Bell, 1999; Robson, 2002).

The interviews were all conducted at the printing house of each respondent during the summer and autumn of 2004. They were held under calm conditions without any major disturbance or time pressure (Bell, 1999). Additional information has been collected from annual financial reports and websites from the companies in the study.

Choice of Companies and Respondents

Companies from different stages in the print media value system have adopted digital printing, and therefore the companies studied have been selected to represent the following groups.

- Companies whose first major printing investment is in digital printing.
- Companies that have traditional printing equipment and choose to invest in digital printing as a complement.
- Companies that earlier had traditional printing equipment, but after investing in digital printing are phasing out the traditional printing equipment and making a transition into an all-digital printing house.

Previous research shows the importance of the founder and the CEO of an organization (Beal & Yasai-Ardekani, 2000; Harrigan, 1985; Schein, 1983). The business strategy and organization culture is often a direct reflection of the persons responsible for the business development in the organization. The leader in an organization is the one that should communicate the company's strategy to other co-workers in the organization (Porter, 1996). Due to this the CEO or the founder were interviewed at each company, as they are responsible for incorporating the business strategy among co-workers. Since most of the companies were small or medium sized companies the CEO in most cases was the founder or co-founder of the company. To gain deeper knowledge about certain aspects regarding the equipment and technology at the printing houses, additional co-workers were interviewed in some cases. Those persons were in some way responsible for the technological systems at the printing houses.

Results of the case studies

Company A

Company A is a typesetting company founded in the 1970's. During the 1980's, the company did not follow the trend with computers, which led to a bankruptcy. The company was divided and reconstructed and has been working in its present form since the beginning of the 1990's. Their first investment in printing was a web-feed digital printing press in the mid 1990's. At this time, they did not feel that there was a market for digital printing. However, they had a belief that the market was going to increase, and felt that the investment had to be made to create the market.

At the time of investment Company A had a strong confidence in the business of variable data printing, but they soon realized that the technology at this time was not mature enough to produce more advanced variable data productions since only minor parts of the contents was possible to vary. Short lead-times were also an important factor and the possibility to have an all-digital workflow in the company.

The growth of the digital printing market has been much slower than Company A could imagine at the time of investment. Despite this problem, they managed to make a fast return of investment (ROI) for their first digital printing press and since then they have invested in two more web-fed xerographic presses. They state that

they need more than one press to be able to ensure delivery times to customer in case of problems with the press.

Although the technology to produce variable data productions has developed, the market has not increased to any larger extent and is still only a small part of the total production in Company A. Today their business model is based on short runs and time critical jobs and they intentionally try to focus away from advertising agencies and try to work more and more with direct customers.

Company A was one of the first with digital printing in Sweden and they still want to be a pioneer. They try to stay ahead of competitors by continuously upgrading their digital presses thereby keeping their technological advantage.

The integration into printing from typesetting and prepress was a natural step since the company wanted to offer their customers more services. According to Company A, digital printing was a better option than offset since the digital printing market did not have the same overcapacity as the offset market had at the time.

In the beginning, they wanted to have subcontractors for finishing. Since this was becoming a weak link in the possibility to have short lead times, today they have all common finishing in-house.

Company A sees the overall price rivalry in printed material as the main competitor. This involves both offset printers and digital printers that sell below the actual cost.

They vary their production capacity by deregistering some of the presses temporarily, in this way they try to follow the market demands. In this way, they avoid unnecessary costs in service contract of presses that are currently in use. Company A believes that costs is an important factor and they try to be very cost-conscious.

Company B

Company B started in the early 1980's as a copy shop. During the last two decades the company has grown mainly by takeovers and acquisitions of both other companies and printing divisions of companies whose core business is not printing. In addition to the copy-shop, several offset presses were used in parallel with the digital printing equipment until the beginning of 2000 when the last offset press was phased out. Today Company B only has digital printing equipment since they believe that digital printing is more flexible. To be able to keep all customers they have allied themselves with another printing houses that have offset technology, this makes it possible for them to offer a complete solution for the customer.

The initial business model was based on the possibility to offer printed material with short lead times, and this is still a crucial factor. However small series are also becoming an essential part of their business model.

The ability to offer a complete solution to the customer is currently the main business model. To be able to support the business model with digital printing, Company B does not solely work with printing but also has incorporated a lot of other services as prepress, finishing, distribution and stock keeping of pre-printed material for printing financial statements, letters etc. Through this strategy, with

offering of complete solutions and concepts, Company B can retain customer contact even though they turn to subcontractors when they do not have the necessary resources in-house. Today a large fraction of the revenues comes from support activities and not from the actual printing process.

Company B has made some efforts to sell variable printed material but even though they have both software and competence, they feel that the market is not ready. The production only consists of a few jobs per year that are true variable data printing.

According to Company B, offset printing houses are a strong competitor since today's offset technology makes it possible to print shorter series and can thereby compete with digital printing in shorter series.

Company C

Company C was founded in the beginning of the 1990's and the founders were persons with knowledge that made it possible to work with the whole chain from original to print. The growth has been organic to about 30 employees and even today most of the staff is trained to be able to handle the whole value chain in the company. Today they use both digital printing and offset printing in their production.

Their business model has always been based on working with the whole chain from customer to end-user and to offer a complete solution for their customers. Company C believes that digital printing is about flexibility and fast lead times and therefore the equipment, both digital and offset presses, solely consists of sheet fed presses since this increases flexibility.

The current business model is to be able to offer technological solutions that are ahead of the company's competitors, their goal is to already be where *"the market is in three years"*. They try to *"give services and a possibilities to the customers that the rest of the market cannot offer"*. Digital printing is growing considerably and Company C believes that there will be a 50-50 production between digital printing and offset in the next three years. Currently they are investing in order to satisfy this demand. Company C tries to keep up with the speed of the technological development if they feel that the technology has any market potential and can increase customer value. They think that they can take advantage of the new technology and feel that it is to their advantage that the graphic arts industry is relatively conservative regarding new technology.

Traditionally Company C has had a focus on customers that are international companies and work with different language versions of their printed material, but the investment in digital printing has broadened the customer bases since the number of customers have increased. Their main objective is to work increasingly directly towards the customers and not through advertising agencies. Company C believes that by creating simple solutions for the customer it is possible to increase the use of advanced digital printing applications like variable data printing. Although their small customers are mainly local and regional customers, the use of the Internet makes Company C *"never further away than a mouse click"*.

As fast lead times are becoming more important, they have chosen to have common finishing equipment in-house. Company C believes that the knowledge among advertising agencies does not meet the requirements to be able to produce jobs suitable for digital printing. As Company C is trying to take advantage of the digital printing technology, they believe that the threat is if they *“cannot make the advertising agencies to realize [the potential in the technology]”*.

By working directly with the customer it is possible to educate and show the real value and the real cost associated with digital printing. It is important to help a customer to realize how to make profits on a printed matter, *“What is more interesting, what you can profit on the printed matter or what the costs is per copy?”* By working with original work, Company C can both support the digital printing business model and reach a higher profitability.

Besides vertical integration, Company C has built other supporting activities like image databases that can be used both internally and sold as a service to others. This makes it possible to tie up their customer tighter to the company. By both vertical and horizontal integration the company can more efficiently tie the customer to the company and increase the switching cost.

Company D

Company D has a long tradition and was started in the beginning of the 1970's. The ownership has been the same since the start and their first business model was based on dyeline printing services towards the construction industry. They have always had the vision to be in the technological frontier and were very early with CAD service when the need appeared. They bought their first color copier in the middle of the 1980's and invested in their first digital web-fed color press in the mid 1990's. The same press is still in use today and has been complemented with a digital imaging press.

The potential and possibilities in variable printing was crucial for the digital printing investment to be carried through. Experience from the technological development in the computer area made Company D buy a top-of-the-line digital press with almost all extras that were available at the time. The press had an initial depreciation time of three years but is still running.

During the first period, there were severe problems with the press and Company D believed the time to be *“a blood bath”*. Experiences from this time have made them wait to upgrade to a new press and they do not want a new press to cause as much problem as their old one did when it was new. Even though they do not currently have any need for additional printing capacity, they think that some interesting alternatives have finally appeared, and are planning to replace their web-fed digital press for a sheet fed press.

To be able to focus on print and fast delivery they have bought their own delivery service vans to ensure fast delivery in the local and regional area. Today they are specialized on printing and do not seek to handle the whole chain from client to customer. This is one reason that they have chosen to complement their digital press with a digital imaging press to be able to print larger jobs and not to loose

customers and revenues. Although the press was bought on the idea of variable data printing, today Company D does not print any variable data jobs. Company D believes that the customer value of a variable data campaign has not yet reached the customers.

Company D believes that the unhealthy price trend in the industry is a problem. They believe that it is important to try to avoid this price competition.

Company E

Company E was started in the beginning of the 1900's and was a traditional printing house until the end of the 1990's. When investing in their first digital press, they phased out their offset presses and focused solely on digital printing.

Before engaging in digital printing, Company E investigated the market and expectations to be able to build a good business model for their digital printing investment. Variable data printing was a sector where they saw a big potential, *"Well, we were fooled into believing the same falseness as everyone else, that variable data printing was just waiting to explode"*. After a short period they realized that the market was not ready and started selling other printing services than variable data printing to keep the press running and avoid bankruptcy.

Company E believes it is important to have good customer contact. They are seeking a business model where they can handle the whole chain from prepress to distribution. Although they do not have any original work today, they are working with other companies to provide original work that can suit their way of working with digital printing. Company E is focusing mainly on contact with the customer as a distribution company and do not only distribute their own printed material but also printed material and giveaways produced by other companies. They are focusing largely on complementary services and today over one third of the revenues are from other services than printing. Despite this effort over 60% of all prints produced on their printing presses are jobs where they act only as a printing house.

By information and education to the customer, Company E can support the marketing model of digital printing. By working with the customer and trying to show the actual cost for printing and handling of their printed material they are trying to show the customer the value of smaller series and customized material. Company E believes that digital printing is *"a matter of selling customer value"*. They believe that it should be easy for the customer to make use of the benefits of digital printing and are currently working with different web-to-print solutions to support customization.

As the time from print to end user is a very crucial factor Company E keeps the number of sub contractors to a minimum and has integrated all services from print to end-user in the company.

They do not believe other digital printers to be a threat if they support the marketing model with digital printing with added value and do not print at a too low cost. Traditional printers are not a threat since they cannot create the same type of products and services as Company E can. They believe the real threat to be digital

printers that do not realize the potential in the technology and chose to print to a price that is below the actual cost and by that contribute to declining profitability in the digital printing industry. Company E also believes that the current technological development is too rapid to be healthy for the industry since it is hard to follow all the new upgrades and improvements.

Company F

Company F was founded in the beginning of the 1980's as a distribution company. Approximately 10 years later a change of generations in the company resulted in a directional change and the company started working more with new technological solutions and computers. In the early 2000's they bought a digital printing press, this was their first investment in printing.

"Actually, the initial idea was mainly to do a lot of variable jobs" and the first calculation showed that the press should be profitable after two years. However problems with the sales function to realize what to sell resulted in low volumes on the press during the first period: *"When it was installed, it was more or less a piece of furniture during the first year and a half"*. Based on these experiences they believe that for future investments, *"it is extremely important to find out what the customer really wants and make investments based on that."*

To take advantage of the press Company F has changed their purpose for the press from variable data printing to short runs and on-demand printing. Most variable jobs concern postal addressing and not more advanced variable data productions. Since they do not have any prepress work in-house, Company F believes that they are dependent on variable data jobs from advertising agencies or from direct customers. Company F has discerned a trend towards less total amount of printed material and more on-demand mailing. This has led them to develop a system for electronic stock keeping of Acrobat files that are printed on demand in their digital press.

Currently Company F does not have any original work or prepress work but since the print ready files that are delivered by their customers do not always meet the necessary requirements, they help their customers to fix problems in the delivered files. This is a growing problem when more and more customers deliver directly to Company F and do not go through an advertising agency.

Finishing that is connected to distribution has always been a part of the company, however digital printing has made it necessary to include other types of finishing into the workflow. To avoid long lead times, they have chosen to have enough finishing to be able to handle fast deliveries when necessary.

They believe that *"color printing is just a complement to our other services"* and that this integration into printing has not expanded the customer base to any large extent. They mainly use digital printing as a service to their existing customers.

Discussion

Initial Problems

Opportunities for variable data printing was one of the main reasons why the respondents choose the digital printing business, but conscious and unconscious strategic decisions have changed the way they are performing their business. Although they worked intensely with trying to sell the variable printing in the early stages of their business development they all were forced to base their business model on producing small series and time critical jobs since the market for variable data printing was not yet ready.

All companies except Company C have had quite extensive initial problems with their equipment. The problems were most severe for Company D that was a very early adaptor of the technology. The problems were more comprehensive for the companies that did not have printing as their core business before engaging in digital printing.

An Undeveloped Market

The market for the value-added products that digital printing can offer and the volume of digital print media is still very small. The respondents believe that one main reason is the customers' and advertising agencies' lack of knowledge about the possibilities of the technology. As mentioned before technology change may result in uncertainty about customer needs, this has happened in digital printing. The lack of input jobs suitable for digital printing has forced the digital printing houses to more and more create their own input to be able to take advantage of their production technology. All companies steadily increase their share of direct customers and to some extent work as an advertising agency. By working directly with the customers and not via advertising agencies, it is possible to create jobs that are suitable and economical for digital printing. This weak market also raised the need for educating customers, this education is necessary to stimulate the market and the needed inputs for the digital printing equipment.

Despite the problems of finding suitable input jobs, most of the respondents mentioned overcapacity and price-cutting among the traditional printing houses as the greatest threat against their business. This has created a need to exploit the opportunity with the technology of digital printing in order to offer a differentiated service that does not compete with traditional printing houses.

Full Service Companies

One major problem for the digital printing industry has been that they have not been able to take advantage of the opportunities in the technology since companies that work upstream and downstream in the value system have not provided the appropriate input and have not been able to handle the output in a suitable way. There is no doubt that digital printing has changed the way profits and costs are distributed along the industry value system, the cost of printing becomes higher but the cost for stock keeping, distribution and discarded copies becomes lower. This

has made it necessary to vertically integrate in the value system to make the core strategic business unit (SBU), digital printing, profitable. By offering a complete solution from customer to end-user, it is possible to profit on the other activities in the value system.

Almost all of the respondents first tried to sell the digital printing as a product, this did not result in any significant sales. This was because the market for print media was a commodity and it was not easy to sell a product based on nonprice competition.

To de-commoditize the product all companies in this study in some way have adopted a strategy that involves differentiation and to some extent even focus. The focus is most clear when discussing how they work geographically. The five companies that come from the graphic arts industry have a focus that is on local and regional customers. The different companies also have focused on servicing different lines of business.

By vertical integration in the value system the digital printing companies in this study have chosen to remake themselves into full service companies that can offer a digital printing service and not only the production of digitally printed material. They can offer a service where they can act as a supplier of print media at a low total cost and not only at a low print cost. When working with larger parts of the value system it is possible to change the behavior of the customer and help them identify the true cost of print media production.

Since the companies are rather small, a differentiation strategy results in a narrow line of services. As mentioned earlier, there are theoretical problems in the differentiation strategy that involve the narrow product line. In many cases, this problem has been overcome by coalitions with traditional printing houses that can offer longer runs at a cheaper price. In this way, it is possible to still satisfy customers even if production cannot be done in-house.

As mentioned before, backward integration was a result of the need to ensure a supply of jobs for the digital printing equipment. The integration into, for example the finishing service was, according to the respondents, a result of the need for short lead times. Many of the companies in the study found it necessary to have finishing in-house to be able to ensure the business model for digital printing with fast delivery and short runs.

Despite the initial problems with the variable data printing market, Company E and Company C have again started to more intensely market variable data printing as a service. This is mainly a result of new web-to-print solutions that makes it easy for the customer to create and order customized printed material in a simple way. The respondents believe that easy applications are essential for the market of variable data printing to grow.

Both the digitalization and the vertical integration in the printing industry shorten the lead times further for the customers and may help them take advantages of the possibilities of digital printing technology since they bypass intermediaries. By direct customer contact, it has been possible for the companies to offer simple services that the customers need and can benefit from. With the adoption of backward

vertical integration it is possible for a printing house to totally bypass the printing step and offer the customers other output channels as a complement to printing, e.g. electronic media. This, however, has a direct negative effect on the printing SBU but may broaden the customer base and strengthen the relationship with their customers.

Vertical Integration

Even though it is possible, when working in a differentiated business market, to make a business model less vulnerable to general negative changes in the industry like price-cutting, a company can never exclude the need for competition through price. It is important to realize that the industry will change and the need for establishing a low-cost position to be able to continue with the current production may be necessary.

This is a way for digital printers to attempt to de-commoditize their product. Although differentiation makes it possible to work at a higher cost level, the existing market situation in the printing industry does not allow digital printers to ignore costs. Cost-consciousness is very important in order to succeed even though they deliver services that have a high value for the customer. The companies in this study are working with a high cost consciousness due to the current market situation with competition from low cost traditional printers.

Generally, the risk is high when engaging in vertical integration if the competition is intense. In the digital printing industry, the competition is somehow unclear since they do not see each other in the digital printing industry as their main competitors. Digital printing is a subset of the printing industry and the respondents believe that the digital printing industry will grow when new actors enter into the digital printing business. Even though the printing industry in general is a mature market, the digital printing industry is emerging as a subset. The companies have gained customer contact via integration, which is important when trying to launch a new product in a mature market.

Except for Company F the companies' core businesses are focused around the printing unit. The studied companies have lowered the risk in the integration by making the integrated SBUs smaller than the core SBU. Then the major risk is still in the digital printing business unit since it is the one with the largest capacity. One example is the finishing business unit that takes care of smaller output for fast delivery but for larger volumes or more advanced finishing external partners are used as suppliers of finishing services.

This does also conclude with the theory of integration close to the company's core SBU and the integration has pretty much involved smaller steps in the value system. Depending on the origin of the company, the value chain has expanded to include neighboring steps in the value system. This is consistent with previous research that shows that the further away from the core business the vertical integration goes, the less likely it is to succeed.

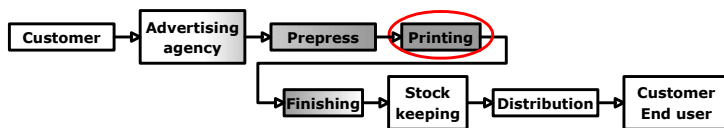


Figure 3. Vertical Integration in the Value System for Digital Printing.

The study shows that companies working with digital printing are adopting the value system of the digital print industry as their internal value chain (Figure 3). This is a way of transforming the actual printing process to a step in a print media service where a total cost saving or added value to the customer can be made with resources that are different than those used in the traditional printing industry value system.

This study has only treated the stages of integrated activities and not the breadth. However as mentioned before the integrated SBUs in general are not adjusted to be able to create or take care of all internal transfer. The printing SBU still takes input from external advertising agencies and delivers to external finishing companies. In most cases, the integrated SBUs do not have the breadth or capacity to survive on their own as a stand-alone company.

Although differentiation is one key to success and is accomplished by vertical integration, the integration is both conscious and unconscious since some changes had to be done in order to survive in the business. Digital printing business differs from traditional printing business since it is not based on large volumes in the way the general printing business is. Volumes are important, the respondents are unanimous about this fact, and it is important to have full order stack on the digital printing equipment. However, the problem in digital printing is that the volumes rarely come from a single job but from a large number of jobs. By working with a customer focus and creating added value, it is possible to increase the revenue from both the printing SBU but also from other activities in the value system. When the number of jobs is high, the workflow becomes important and by vertical integration the closeness between the different activities increases. This makes the workflow run smoother and the knowledge of the possibilities and limitations of the technology increases.

The profiles of the companies are different and some have specialized on short runs and fast delivery and some on more sophisticated services involving personalization and print-on-demand. However, what characterizes these companies is that they all have accomplished vertical integration to some extent to pursue their strategy.

Conclusions

In the larger media perspective, digital printing has strengthened the competitiveness of print by providing a more flexible output than material printed with traditional printing technology. Historically, printing has been an output option only for mass production. With digital printing this condition has changed and it has become possible to create and publish smaller and customized editions. This has a direct impact on all customers to printing houses that has smaller customer

bases, or use one-to-one marketing in their customer contact. As printing is one output channel among many others, and cross channel publishing is becoming more and more common, it is important for printing houses that the printed material offers the flexibility and customization opportunities that other media do.

Even though digital printing offers this flexibility and can easily be used as an on-demand output channel, it still has a cost disadvantage in the printing and distribution steps over electronic media that can use the Internet as an inexpensive way of distributing information. On the other hand, digitally printed matters have to be assessed from other values, not least the tangible ones compared to the intangible that electronic media offers, without having the same need of a large-scale production as offset.

Many of the companies in this study had different strategic business units (SBU) before engaging in digital printing. But the move to digital printing has caused companies that earlier worked in different steps in the value system, to work alongside each other with the digital printing service. Although almost all companies in this study had major initial problems with sales and technological issues, they are confident that the digital printing investments are good for their businesses.

The need of ensuring input and fast handling of output has led the companies to make strategic decisions to vertically integrate additional SBU. This has been carried out both backwards to get customer contact and forward to e.g. take care of finishing in-house. By differentiating the product by adding a higher customer value, it is possible to work in a segment with a relative high cost position comparing to the companies that are cost leaders.

The study also shows that the companies are working towards increasing their share of direct customers in relation to advertising agencies. The printing houses have adopted a strategy that involves going towards a full service customer-centered company. This is very well suited for direct customers since they often want a complete service. By engaging in vertical integration it is possible to create a service that can add customer value not only by offering variable data printing but also to cut costs in stock keeping, distribution and discarded copies. This has helped the digital printing business de-commoditize their business to some extent.

The study, however, shows that due to the undeveloped market for variable data printing, the primary way added customer value arises is by cost efficiency in small editions and short lead times for time critical jobs. As an attempt to increase the market for variable data printing, education and support have become important parts of the way the companies work with direct customers, advertising agencies and subcontractors to make the customers realize the possibilities with digital printing.

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Perceived Satisfaction by Customers in the Digital Printing Value System

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Perceived Satisfaction by Customers in the Digital Printing Value System

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Keywords: customer value, digital printing, business strategy, vertical integration

Adding customer value to products and applications is important to be able to successfully compete using digital printing. In this study the perceived satisfaction of added value was explored. It was concluded that digital printing does not entirely fulfill the demands that customers have on their printed material, but it was indicated that digital printing will become more important for producing printed material in the future.

Among the critical success factors, time, quality, functionality/possibilities, and price, quality was the factor that customers deemed most important. This was also the factor that they were least satisfied with in relation to their needs. Time was the only factor that the customers were satisfied or more than satisfied with.

Based on the assumption that it is not possible to, realistically, have high demands on all critical success factors and that there has to be some tradeoff between them, the factors have been summarized and compared using mean-centered values.

Introduction

The printing industry in general is a fragmented business (Gilboa, 2002; Kipphan, 2001) with overcapacity, and printed material is regarded as a commodity product. This situation has forced the industry to compete primarily on the basis of price (Porter, 1980), and there have been continuous price reductions over time (Birkenshaw, 2004). Since the production cost in digital printing exceeds the cost for traditional printing technologies, the most successful strategy for digital printing is differentiation (e.g. Porter, 1980) because it is hard for digital printing houses to pursue cost leadership. This can be done by engaging in backward integration and helping customers to create material suitable for digital printing, that is for example variable productions and short runs. Higher customer value can also be achieved by forward integration and reducing costs for distributions, stock keeping and lowering the discarded volume (Mejtoft, 2006).

As vertical integration (e.g. Harrigan, 1984, 1985; Porter, 1985) is becoming an important factor for succeeding in digital printing, the services that traditionally have been carried out by advertising agencies and prepress companies are developing into an incorporated service that the integrated digital printing houses are offering. The integrated digital printing house is here defined as a company that can provide services, to different extents, along the greater part of the value system

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and is therefore vertically integrated to a high degree. The further away from the core business the vertical integration goes, the less likely it is to succeed (Peyrefitte et al., 2002). Digital printing houses often have the greatest capacity in the business unit that they originate from.

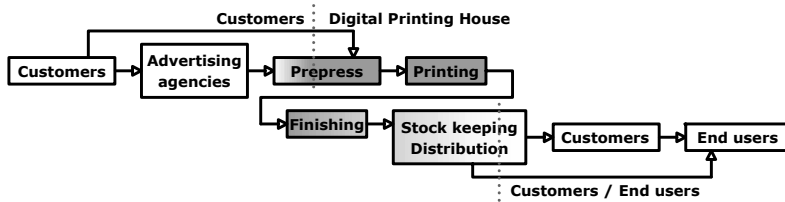


Figure 1. The value system for the digital printing industry (After Mejtøft, 2006).

Differentiation as a strategy often comes from a customer-centered approach where the customers' needs are in focus when creating the appropriate services and activities (Day & Wensley, 1988). This implies the importance of investigating how customers in the value system (Figure 1) experience the situation and identifies the sources of customer value (Roos & von Krogh, 1996). In this paper, the term value system is used for the whole industry instead of the value chain to capture the width and multiplicity of different relationships in business markets. Two types of important customers to an ordinary digital printing house are advertising agencies and direct customers. A direct customer is an end customer of the printed matter that chooses to bypass the advertising agencies and purchase the services directly from the digital printing house.

Objective of the study

The objective of this paper is to study how customers in the digital printing value system experience the value received from digital printing. This study focuses on customers that have made the transition from traditional printing production to digital printing production and how internal and external changes have been carried out to profit from the advantages of digital printing.

Theory

Porter (1985, p. 130) declares that a company working with differentiation as a strategy must be able to "create competitive advantages for its buyers". Differentiation cannot be successful unless it somehow raises the perceived value for the customer. Since the purchased product is to be incorporated into the value chain of the customer, it is important that a product can either lower costs for the customers' value chain or raise the revenues.

Since the cost for the actual printing process in digital printing is higher for longer runs, than it is for traditional printing technologies, the lowered cost must come from either decreasing the volume of the printed material or from decreasing the cost in other steps. This cost reduction can be in either the internal value chain of

the printing company or the value chain for ordering, handling and using printed material at the customer level. Increased revenues are possible to achieve with digital printing by using one-to-one marketing (Peppers & Rogers, 1993) to customize advertisements to end consumers, which increases the response rate. One-to-one marketing is when a company does not strive to gain the biggest market share, but concentrates on building sustainable long-term relationships with their most important customers. Broudy & Romano (1999) showed that just by using simple personalization (full color prints and adding the name of the receiver) the response rate increased by 135% over black and white static mailing. Moreover, by using database information to customize offers to consumers, the response rate increased over 500%.

Earlier studies show the importance for printing houses to gain customer contact by integration in order to educate the customers and increase the number of jobs suitable for digital printing (Mejtoft, 2006). General research in vertical integration shows advantages like avoiding time-consuming tasks when improving coordination between activities and assuring supply (Harrigan, 1984), but also implies possible disadvantages such as increased internal cost and high exit barriers as the distribution of profits and cost in the value system becomes unclear (D'Aveni & Ravenscraft, 1994; Gadiesh & Gilbert, 1998; Harrigan, 1985). However, vertical integration is a way for new products to penetrate a mature market since it is possible to show the product's superiority (Harrigan, 1985). There has been an endless discussion on how new technology changes the rules of competition (e.g. Carr, 2003; Porter, 2001; Stewart, 2003). Digital printing has changed the cost- and profit pools of the print media value system. This has made it important for both digital printing houses and customers to change their behavior to be able to profit from the new technology. Both the introduction of new technology and consequently the changes in strategy have affected the way digital printing houses approach their customers.

Purchasing orientation

The bargaining power of customers is one of the five forces in the five forces framework, constructed by Porter (1980). The customers are most likely powerful when the sellers' industry consists of many small actors, the products are considered a commodity and switching costs are low. This is the state of the printing industry in general today. Information is also an important factor for bargaining power. If the customer has more information about products, prices, quality etc., the bargaining power of the customer increases.

Purchasing is the process where a company acquires different resources from other companies. The customers of a digital printing house consist to a majority of companies that are going to use the printed matter for information or marketing. Purchasing is a broad concept that can be divided into three orientations dependent on how broad the purchasing orientation is - *buying*, *procurement* and *supply management* (Anderson & Narus, 2004; Dobler & Burt, 1996).

The buying orientation is when a customer strives for the best deal in terms of minimizing the price of a product and maximizing quality and availability. In a

fragmented, commoditized and over established market like the printing industry, the buyers' power is high. Procurement is when the customer focuses on improving quality by cooperating with the supplier and reducing the total cost, and not just the price, of a product or service. With supply management the goal is to obtain the greatest total value of a product or service. This is achieved by integrated cooperation with suppliers to build supply networks that complete whole business processes (Anderson & Narus, 2004).

Hypercompetition

In many industries, it is not possible to solely compete on terms of cost leadership, differentiation or focus (Porter, 1980). Earlier studies of the digital printing industry point out differentiation as a way to compete with the technology in the printing industry (Mejtoft, 2006). One problem is however that the industry suffers from a widespread overcapacity, which has led to severe price competition (Birkenshaw, 2004). When acting in this kind of environment the concept of hypercompetition occurs (D'Aveni, 1994). When hypercompetition occurs it gets hard to create the sustainable advantages Porter (1980, 1985) describes. In this environment, the goal is not to achieve sustainable competitive advantages by using a strategy of differentiation but to use this strategy to disrupt the stationary state and create a continuous series of competitive advantages without waiting for competitors to undermine those already achieved (D'Aveni, 1994, 1995a).

Michael Porter's (1985) theory of competitive strategy states that the sustainability of differentiation depends on continued perceived customer value and lack of imitation from competitors. Since the service most certainly will be copied when acting in a hypercompetitive market, working with customer value will be very important because *"the process of developing new advantages or undermining those of competitors begins with an understanding of how to satisfy customers"* (D'Aveni, 1995b, p. 240).

Buying from a differentiated supplier will increase switching costs for the customer (Porter, 1985), which will reduce the customers' willingness to change suppliers, even if other companies create similar services. However, one of the major corner stones of hypercompetitive theory states the importance of speed and surprise to create and react quickly to opportunities in the industry environment (D'Aveni, 1995b).

If hypercompetition is a "self-inflicted wound" (Porter, 1996) or something that eventually happens in almost every industry as an inevitable outcome (D'Aveni, 1994) is a debated area. It is apparent that the dynamics of competition have changed and become faster, more intense and the available time to enjoy each competitive advantage has become shorter (Wiggins & Ruefli, 2005).

Critical success factors

For a producing company to be successful in a changeable industry environment, they have to consider the critical success factors (CSF) - cost, quality and time (Blocher et al., 1999). Cooper (1995) introduces the role of the survival triplet –

cost, quality, and functionality, which is crucial for survival using a confrontation strategy. A company must compete effectively in all these three to succeed.

Cost, *Time*, *Functionality*, and *Quality*, are all factors that are important when purchasing printed matter and, as described earlier, they differ between digital and traditional printing. Therefore, these CSFs will be considered in this study. Since the factors are studied externally from the customer's point of view, the term *Price* will be used instead of cost to be consistent with Cooper (1995). Accordingly, the functionality of the technology is also the possibility for the customer to use the printing technology to order unique products. The factor *Functionality/Possibilities* has thus been used.

Customer Value

Customer value is something that is stated and experienced by the customer, but product value is created along and in every step of the value system. This implies the importance of thorough market analysis or a good relationship with customers (Svensson, 2003). This is also something that the integrated digital printing houses are becoming better at, as they move closer to customers and end users in the value system.

The kind of printed material a customer orders from a printing house differs, but in general printed material has an informative or marketing function. In marketing a company often adopts a channel mix of for instance printed material, e-mail, Internet and tele-marketing (Kotler et al., 2005). This means that several marketing channels often compete for the same budget.

As mentioned before it is important to deliver perceived customer value. Customizing offers is one important way to do this. This kind of mass customization has become more common with new technology (e.g. powerful computer systems and detailed databases) (Kotler et al., 2005; Peppers & Rogers, 2000), even though there are still doubts about what the technology actually can achieve (e.g. Kuchinskas, 2000).

There are many similarities between the Internet and digital printing as channels. The outputs of both have the advantage of being easy to differentiate, customize, and personalize. By using the Internet as an interface of digital printing, web-to-print, it is possible to move from customization to customerization (Gennard et al., 2000). This is when a customer takes a more active roll in the creation and production of the final product or service (Kotler, 2005). The complexity and how customers perceive their added value are different between the applications mentioned above. While print-on-demand is easy to use it gives a low customer value and complex variable data printing gives a higher customer value.

The Internet has an advantage over digital printing, as the cost of distribution over the Internet is very low. Internet has during the last ten years become an important channel for companies to sell and supply information about their products and services (Friedman & Furey, 1999). In general, when discussing the potential of the Internet the predominant literature takes its starting point in concepts like richness and reach in terms of technological possibilities (e.g. Evans & Wurster, 2000).

It is, however, still important to remember the fundamentals of strategy. One of the most fundamental virtues of strategy is that of value creation. If a company cannot provide a value that someone outside the company is willing to pay for, the company will inevitably go bankrupt. As seen here the Internet is both a competitor and a necessity for digital printing houses today.

Methodology

In this qualitative study, focused interviews have been conducted to gain deeper knowledge of the behavior behind the strategy used in the studied case companies (Bell, 1999; Saunders et al., 2000; Robson, 2002). An approach inspired by Grounded Theory (Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998) has been used, as this method is suitable for understanding how customers experience a situation and to find new phenomenon. All case studies have been conducted in parallel, then the material has been coded and conceptual constructs have been formed. Also a literature study has been carried through to compare the results with findings in the literature. In Grounded Theory the idea is to partake of the literature after the empirical study has been conducted to be as uninfluenced as possible and increase the chance of new findings and insights. However the opinions are divided about this approach to the literature (Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998) and initial theoretical knowledge may be vital to enhance the theoretical sensitivity. In this study, literature reviews were conducted both before and after the empirical studies where carried out.

The interviews have been carried out with respondents from a selected number of customers to digital printing houses in Sweden. The interviews were all conducted either at the customer's company or at a place of their choice during the late spring of 2005. They were held under calm conditions without time pressure (Bell, 1999). Additional information has been collected from annual financial reports and websites of the companies in the study.

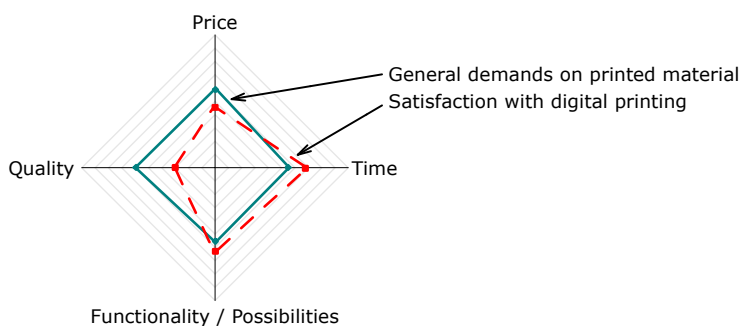


Figure 2. A model of the critical success factors - price, time, functionality, and quality.

During the interviews, a short survey was conducted. In the questionnaire, the respondents were requested to grade from 1 (low) to 10 (high) their general demands on printed material and their satisfaction with digital printing according to

the critical success factors (CSF) price, time, functionality/possibilities, and quality. To be able to easily compare the satisfaction in relation to the demands between the respondents, the sum of the demands has been mean-centered. This implies that by using an average mean centered value of the results from the survey, the result from all respondents add up to a total of 22. However, their satisfaction level does not necessarily add up to the same sum, but to a value that is proportional to their actual level of satisfaction compared to their demands. The CSFs have been presented in graphs and there they represent two areas that show their demand on printed material and satisfaction with digital printing (Figure 2). In addition to these calculations a score point has been calculated for each CSF to establish how the CSFs are ranked among each other by each customer company. The least important CSF has been given a score of 1 and the second least a score of 2 etc. If two or more CSFs have the same rank each of them has been given an average of the summarized scores.

Besides the questionnaires during the personal interviews, additional data has been collected, by telephone and Internet, from other companies that have not been personally interviewed.

Choice of companies and respondents

Previous research shows that vertically integrated digital printing houses are trying to increase their share of direct customers. This is because it is possible to influence customers to order printed material better suited for digital printing, by providing grater parts of the value system for print media (Mejtoft, 2006).

For digital printing houses the major part of the customer base still consists of advertising agencies. But since the shares of direct customers are increasing, companies for this case study have been selected to represent both professional customers, i.e. advertising agencies, and non-professional customers, i.e. direct customers, to digital printing houses. In total 12 customer companies have participated in the survey study of which 8 have been interviewed. In the calculated averages all 12 companies have been included. The respondents interviewed were persons responsible for purchasing digital printing, which is in most cases were project managers at the customer companies.

Results of the case studies

This chapter contains a descriptive summary of the 8 individual customer companies interviewed in this study. Results from the survey, of all 12 customers in the study, have been presented as graphs in Appendix 1. The analysis of the case studies is presented below under "*Discussion*".

Customer 1

Customer 1 is a small advertising agency that works in a network with other agencies. They try to build long-term relations with the printing houses they work with and today they use approximately ten different printing houses, some are integrated printing houses and some are printing houses focused on the printing

SBU. For Customer 1 price is a less important factor in general, but an increase in or high price can be an incentive to change the base of printing houses they currently work with. Customer 1 uses different printing houses depending on the special need for a job, if the current job demands special finishing or distribution they choose a printing house that can handle every step needed. When they deliver a job to a printing house it is in the form of a print ready digital document.

Today the volume of digital printing is under half of the total volume, because digital printing is most cost effective in short runs. They strive towards doing more variable data job but it is hard to sell a variable data job to the end users. The opinion of Customer 1 is that the digital printing houses are not adept at marketing digital printing towards their customers and believes this to be a major reason for the low volumes.

In the beginning reduced costs for smaller editions and the need for shorter runs were the biggest incentive to start ordering digital printed material. Even today it is mostly the ability to produce short runs that has increased value for Customer 1. Digital printing has given them the opportunity to promise shorter deadlines to their clients and take on jobs that are time critical. It has changed the strategy for Customer 1 to work with time as another variable. Unfortunately it is not possible to obtain any sustainable competitive advantages of this aspect since all competitors have the same opportunity and it is a considerable risk that *“one spoils the customer, and they get used to short [delivery] times”*. It is difficult to get paid for increased value, and for Customer 1 the pricing is more focused on the lifecycle of a customer relation than a single project.

As Customer 1 believes that quality is an important argument when selling their products, digital printing has a substantial disadvantage since they believe that the quality is poor and below their expectations. They also consider it important to know about the different types of printing technologies in the family of digital printing. Digital printing consists of several different printing technologies and the different technologies give quite different results quality wise. According to Customer 1, this makes it harder to be a customer since the digital printing house has an advantage over the customer, with its greater knowledge about how to use the different technologies for the best result.

“Earlier the advertising agencies had an increase in the price of print of about 25%, this increase does not exist any more.” They feel that the printing houses are working towards increasing the share of direct customers. This is to increase revenues but also to cut steps in the value system and speed up the process. Despite this, the advertising agencies believe that the printing houses appreciate them because the material delivered to the printing house is better thanks to the professional knowledge of an advertising agency in contrast to the direct customer.

More and more of Customer 1's production is digitally printed, this is a development that they believe is going to continue, *“digital printing is not a hype that will go away, it will develop and become more and more common.”* But the price of digital print must decrease and the quality must increase.

Customer 2

Customer 2 is a large international industrial group. In this study the focus has been on their instruction manual production. They are in a process of transition from producing standard instruction manuals for all individual products in a series to produce individual customized instruction manuals for every single product delivered from their factories. Today Customer 2 is the only one among their competitors to produce a customized instruction manual to this extent.

They use several printing houses for all printing production in the industrial group, but for the instruction manual they use only one integrated printing house that can handle both prepress and the finishing. As a part of a long-term contract, the printing house has invested in the development of a production system to suit Customer 2's needs and the price of each instruction manual is set accordingly. All compilation of the customized manuals is then performed at the printing house in their system. The instruction manual is a part of the whole instruction handbook that is delivered with the finished product. The composing of this handbook is performed at the same printing house that prints the customized manual.

For Customer 2 it is a question of outsourcing, as the instruction manual produced is regarded as a component of the finished product. This decision has been made not only by comparing the lowest cost but also considering service and quality. The idea to start using digital printing was by an initiative from Customer 2, and the main reason was to increase customer value by customization of the product and in the long run reduce the cost for production. With print on demand they experience a cost reduction by avoiding stock keeping and discarding of preprinted parts of the instruction manual.

The quality expectations were higher than the results delivered on the finished products. This was probably due to the fact that the printing house promised higher quality than they were able to deliver without raising the price of the finished product. The quality also varies between single copies of the manual. There have been a lot of general problems in the start up phase but they believe that the printing house has supported them in a constructive way. Among other things is has been necessary to perform many random inspections so the wrong manual will not be delivered with a finished product.

As mentioned before, the main goal was to increase customer value by only providing the needed information in the customized instruction manual. It was also important to increase the value and simplicity for internal employees when constructing manuals. They have conducted some interviews with users of the instruction manual to find out how the end users perceive the customer value. Today they believe that their product is more technically advanced thanks to customization than just by having a nice layout and good quality. However, these are factors they are also working with now.

They have a strict cost restriction on the finished manual, but the goal is to increase both quality and functionality further. Customer 2 wants to change from grayscale to color printing, which may be possible in the future since the prices on digital print are decreasing. The long-term aim in the future is to integrate the "instruction

manual” as a part of the product and create a self-explaining product. This would mean that they could avoid the printing step completely.

Customer 3

Customer 3 is a Swedish government agency that produces large quantities of printed material in the form of e.g. reports. They have recently started an internal project that aims at storing and distributing their reports as digital documents. The goal is that only the most important reports should be printed in larger quantities and all others should be printed on-demand with digital printing. Before the transition project started just below half of the production was digital printing, this part will increase when they stop the excess-production of printed material. In regards to the number of orders, approximately eight out of ten is an order for digital printing.

Today over 200 writers in the organization can decide for themselves what should be printed, the size of edition and how the distribution stock keeping should be handled. However, by utilizing digital printing and limiting the authority to order printed material to just a few persons, the internal situation should be easier to control. These persons will have greater knowledge of how to order and handle printing production.

This customer has been working with their current printing house for approximately two years and they reduced their costs for printed material by 40% when they changed their supplier of printed material. Price and time were two important factors when the contracts were signed with their current printing house, with the price as the most important. They also placed high ethical and environmental demands on their supplier of printed material. The printing house they are working with has sub-contractors for different kinds of print and the printing house is responsible for the latter steps in the value system.

The initiative came from Customer 3, they wanted to have print-on-demand and *“wanted to save time, money and trees, ... so it is obvious we are moving towards [using] more digital printing.”* They believe that the support from their printing house is good and the printing house has arranged seminars and help-sessions to ease the transition into using digital printing and print-on-demand. The printing house actually has several employees located at Customer 3 to act as a gateway for orders and support. *“This is the only way the printing house can handle this, otherwise, impossible ordering situation”.* In the contract with the printing house there are specifications about lead times and economic compensation when those are not met.

Customer 3 believes that the use of digital publications and distribution is a very cost-effective way of working. When working with digital publications, digital printing is the natural way of output since time will be an important factor if a publication is needed in printed form. The new way of working will increase the value for Customer 3 by decreasing storage volumes, and consequently the amount of discard volumes. But also, since fewer publications will be printed, the content quality of what is printed will increase.

Customer 3 does not believe that lack of having printed material in stock will be a large problem since most of the stocks are non-moving. The major step is to get the co-workers to realize the advantages with avoiding stock keeping of their publications. The lack of use of different paper grades and finishing is a disadvantage for digital printing in the co-workers opinion.

Employees at Customer 3 have expressed positive response to the idea of customized information and publication on their intranet. When the transition project has been carried through, they will look into the possibility of customizing their publications.

Customer 4

Customer 4 is a large international industry company with dealers all over the world. Their Nordic division serves approximately 150 dealers in the Nordic countries. The greater part of their printing production is advertising material produced with traditional printing technology.

Customer 4 is now in an introduction and test phase of introducing the web-to-print solution to their dealers. This is done in cooperation with a printing house they have been working with for about two years. With this system, Customer 4 wants to move away from mass customization into a more active involvement from their end users side. This will both minimize the work for Customer 4 and help the end users to receive the material they need.

When ordering other traditionally printed material in larger volumes, they usually purchase every step in the value system separately and handle all contacts with the sub-contractors. However, for the digital printed material the digital printing house handles everything from printing to distribution and invoicing for the dealers. This means that they do not need to take any part in this chain or have any more costs once the corporate profile has been applied and templates have been created in the web-to-print system.

Their aim when they started to utilize digital printing was both control over templates and increased service to their dealers. Simplicity is what Customer 4 believes is the greatest value they experience. Earlier every dealer had to produce their own business card, letter papers and envelopes according to Customer 4's corporate profile, with varying results. Today they can, for those dealers that order through the web-to-print application, control templates so business card, letter paper and envelopes look the same for all dealers.

By contracting a digital printing house that already had a web-to-print application developed, they believed that the introduction of the system would be quick. They also hoped the price would be on such a moderate level that the dealers would use the system. They have no guaranties regarding lead times, but the distribution works well with delivery within two days from ordering.

There have been technical problems with the web-to-print application. Customer 4 believes that the digital printing house exaggerated how far they had come in the development of their system. This has produced a certain level of frustration when they have not been able to increase the use of the application further. They believe

that the problems with the application have been an annoying factor that has reduced their ability to spread the application to their dealers.

Another problem is that the general computer knowledge among the dealers is low and varying, this makes it harder to introduce a web-to-print system. As the dealers are the ones that pay for the ordered material and Customer 4 is worried that this new system has raised the cost for the printed items in comparison with ordering at a local printing house as done before.

Today they produce business cards, letter paper and envelopes in the application. The goal is to increase the number of items possible to order in the system. Even other parts of their printed production may be produced with digital printing in the future, e.g. after sales contact. But if another digital printing house would present a better solution, they are not unwilling to switch suppliers.

Customer 5

Customer 5 is a large group of companies active in the clothing and gifts industry. They have an internal division consisting of 15 persons working with advertising and they have had this division for over ten years. The main goal with the in-house division is to avoid using advertising agencies, this is a way of reducing costs both of the original production and the purchasing of printing as they are working with about seven different printing houses.

They mostly produce advertising material for the business market, but also some to the consumer market. By producing their own advertising material they believe that they get added value by getting closer to their products and customers.

The main reason for the initial use of digital printing was to reduce the costs of small series. The ability to customize has since then become another driving force, since they wanted to change e.g. addresses and logos for their retailers. They have in-house competence for variable data production and create the job before delivering it to the digital printing house. They work with printing houses that are also able to handle finishing and distribution in-house.

Quality is an important factor in general for Customer 5, but they did not have any big expectations on the quality of digital printing and they are not fully satisfied even though the quality has become better over time. They believe that different printing houses deliver very dissimilar quality of digital print. To be able to purchase digital printing successfully Customer 5 believes that it is important to realize that there are limitations with the quality. Their main supplier of digital print has helped them to increase their knowledge about the limits and possibilities of digital printing.

Digital printing has reduced Customer 5's lead times and lowered their costs. The lowered cost mainly comes from other steps in the value system, like reduced distribution cost when they can pre-sort the mail items.

Digital printing has not changed the way they work except for the above mentioned and they have not yet created any more advanced variable data campaigns. They

believe that in the future they will need faster delivery times. For Customer 5 to increase their use of digital printing, the quality must improve.

Customer 6

Customer 6 is an advertising agency that started out about five years ago and is specialized on marketing strategy. Since their start, they have had collaboration with a local printing house that prints about 90% of their printing today and most of this production is produced using digital printing. They try to sell concepts around communication and with cross channel publishing, printing is just one possibility to output information or messages among many others channels like web and mail.

Since they are a relatively new agency, digital printing has always been an interesting technology. The concept of one-to-one marketing was the reason why digital printing became an alternative for Customer 6 to produce customized printed material. They believe it was a symbiosis with their printing house that influenced them to start with digital printing.

Even though there is a fierce price competition on the printing market, Customer 6 has chosen to work with just one printing house and with a collaboration built on mutual respect and understanding for each others costs. Customer 6 believes that the collaboration with the printing house instead of a buying situation is an important basis to run a successful business. This collaboration gives them a continuous dialogue, and helps Customer 6 produce efficient campaigns for their clients.

"If one wants to succeed it is important to work with added value [for the customer]", and they use digital printing as a way to increase their clients' value. They want their clients to work with media that has a high-end customer value but at the same time is cost efficient. This is done by working with cost per potential customer and not cost per reached customer when they are spreading a market message with the aim to sell.

The major disadvantage with digital printing is that the quality, colors and durability is not as good as expected and does not reach the demands of Customer 6. *"The small differences [in quality and colors] may lower the status of digital printing just because one compare with offset"*, this makes it important to work differently with digital printing than with offset to increase the customer value. Customer 6 believes that it is very important to have knowledge about the marketing message since one-to-one marketing is an important way of taking advantage of the technology.

Customer 7

Customer 7 is an industry group that has a wide range of customers all over the world. They produce, both marketing material and instruction manuals, mainly at their factory in Sweden and it is printed at a local printing house. They have a more than 10 year long relation with their current printing house, from which they order a mix of offset and digital print. One reason why they chose to collaborate with this printing house is that they offer an online web shop, in which Customer 7 easily can order printed material.

They deliver both print ready digital documents and digital documents where the printing house performs the prepress work. But as they order an item in the web shop the printing house handles all the latter steps in the value system, e.g. finishing and distribution to end user. Customer 7 has a tight relation with their printing house since they have a long tradition of working together and the printing house is handling the web shop and the image database for customer 7. The use of a vertically integrated printing house was important when choosing to continue their collaboration with their current printing house. Customer 7 believes that the local nearness of the printing house is an advantage compared with other printing houses that are not represented in the region. It is important that the printing house has a high level of competence in their field, which their current printing house has in most areas.

Need for on-demand printing to reduce stock keeping and discarded volume was one factor to start printing their material with digital printing and this is also their perceived value today. The volumes of the editions also decreased, which made it more advantageous to print with digital printing versus offset. Reduced levels of discarded volumes are the greatest cost saving up to date. Digital printing in collaboration with the web shop has made it easier to order small series and make direct marketing campaigns.

Due to print-on-demand, Customer 7 has high demands on the printing house to develop lead times and quality. They have guarantees from the printing house that assures certain delivery times and the web shop makes it easy to follow the internal workflow in the printing house. It is important to follow the technological development to know what can, realistically, be demanded of the printing house.

In general the quality is an important issue and more specifically the color management, this is because Customer 7 wants their logotype to be reproduced with the right shade of colors. Thanks to discussions with the printing house the quality has increased, but it is still not as good as they hoped. For Customer 7 the selection of paper is important, and they do not believe that digital printing can handle the paper that they require for their needs.

In the future Customer 7 wants to be able to handle more one-to-one communication with their customers. They also want to decrease the printed material and increase the use of digital documents, in order to decrease lead times, and increase flexibility and accessibility even further than digital printing allows. The use of digital documents on the Internet is today both a competitor and a compliment to the printed material.

Customer 8

Customer 8 is a rather large advertising agency working mainly with Internet and printed material. Today they work frequently with approximately four different printing houses to which they deliver print ready digital documents. If their clients want to choose a printing house of their own, the client is responsible for that production. However, if Customer 8 should handle the purchasing of the printing step in the value system, they take responsibility, but they also increase the price by

10%. Approximately 10-15% of their current production is produced with digital printing technology today.

Customer 8 believes that they have control over the transition to digital printing and it is basically the demand for shorter lead-times and smaller volumes that has been the driving force. Although the jobs that are digitally printed are increasing, the number of variable data productions are limited to just a few per year. They believe that it is hard to sell more advanced variable data productions, since the market is undeveloped. Another problem with digital printing is that it is more expensive and the quality is poorer compared to traditional printing.

Digital printing and the Internet are competitors and as the cost for the clients are becoming more and more important the question “*are we going to do it as an electronic campaign or are we going to do a printed campaign?*” arises. As Customer 8 is not dependent on the output channel, their main concern is to make great campaigns for their clients and not to print for the sake of printing.

They do not believe that they, all the time, have the full knowledge to decide the suitable way of producing printed material, but they believe that contact with colleagues and printing houses are valuable to decide the best and most efficient production method. Long-term relations to printing houses are therefore valuable even though it is not good to get too dependent on one printing house. *“I am just a buyer, I do not care how they print it.”*

As lead times are becoming shorter, digital printing is becoming more important to be able to keep deadlines. Currently they are not actively helping their clients to reduce the printed volume, they even suggest that they *“order a little extra, you know you will need it”*. If prices for digital printing decrease and if it becomes economical to print larger volumes, Customer 8 would most certainly increase their share of digital printing.

Discussion

Purchasing orientation

Both advertising agencies and direct customers strive towards having a long-term relation with their digital printing houses. The direct customers were more interested in procurement or supply management than the advertising agencies, and this is consistent with previous research that shows that vertical integrated digital printing houses strive towards increasing their share of direct customers. This has its basis in the fact that the knowledge among advertising agencies of handling every step in the digital printing values system is higher than for the direct customers. It may also be possible to lower the cost by separately buying every single service.

Engaging in digital printing

This study indicates that the main reason for starting to use digital printing was print-on-demand, that is the need for shorter editions, to shorten lead times and to reduce stock keeping. The need for variable data was a more uncommon reason for

starting to use digital printing. But over time variable data printing has, even though slowly, attracted the attention of the customers. And today several of the customers feel that they benefit from different kind of variable data printing, but mostly simple variable jobs. The study also indicates that the need for variable data printing will increase in the future.

Critical success factors

Both categories of customers were not fully satisfied with digital printing as a service for their printed material when examining the critical success factors (CSF) - Price, Time, Functionality/Possibilities, and Quality. When studying the average value of the CSFs measured in the survey, it is possible to discern that the general demands from advertising agencies were higher than from the direct customers (Figure 3). And the advertising agencies were also much more dissatisfied with digital printing in comparison with their demand.

The ultimate purchase as a customer is to receive high quality and functionality, with short lead-times and at a low cost. The method of mean centering is based on the assumption that it is not possible, realistically, to have a high demand on every factor, there has to be some tradeoff between them. Just as the theory describes, the implications of these CSF change over time but under all normal conditions, including a hypercompetitive scenario, increased functionality, quality or lowered lead-times results in the opportunity for the producer to charge a higher price for the product or service.

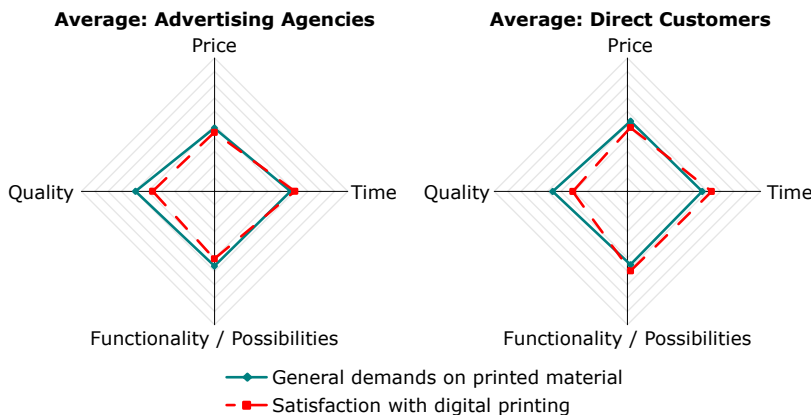


Figure 3. Mean-centered average demands on printed material and satisfaction of digital printing for advertising agencies and direct customers.

There was a slight difference in how the four different CSFs were ranked among each other between advertising agencies and direct customers for their general demands. Both customer categories ranked quality as their main need and price as a less important factor regarding printed material. Advertising agencies ranked time and functionality as nearly as important as quality while direct customers ranked these CSFs more or nearly as unimportant as the price aspect (Table 1).

Table 1. Ranking of CSFs for the demand on printed material, score point in parenthesis.

	Time	Quality	Functionality	Price
Advertising agencies	2 (2.75)	1 (3.08)	2 (2.75)	4 (1.42)
Direct customers	4 (2.25)	1 (3.00)	3 (2.33)	2 (2.42)
All customers	3 (2.50)	1 (3.04)	2 (2.54)	4 (1.92)

Regarding the *time* aspect of digital printing, both customer categories were satisfied. Time was actually the only CSF that fulfilled the demands of the customers in general, as there was only one respondent that was not satisfied or more than satisfied with the time factor of digital printing.

Quality was the CSF that the customers had the highest demands on and were least satisfied with. All respondents but two did not think that the quality of digital printing did meet their demands. There has been a lot of talk about “good enough” in quality of digital print. This study, however, shows that quality is the factor that the customers gave the highest priority and where least satisfied with. Many respondents also pointed out the need for quality improvements to bring quality closer to what the customers expect, that is the quality of offset, if they were going to produce more with digital printing.

In regards to the *functionality and possibilities* of digital printing, the customer group was divided. The advertising agencies did not feel that this factor met their demand. The direct customers were more than satisfied with the functionality.

The vertical integration in the printing houses has led to direct customer contact, which made it possible to make use of the technology and “educate” the customers to take advantage of the technology. Earlier research shows that the digital printing houses are not fully satisfied when working with advertising agencies, since they believe that they do not take advantage of the functionality and possibilities that digital printing technology offers (Mejtoft, 2006). The fact that direct customers are more satisfied with functionality may come from two sources; direct customers level of knowledge regarding this area is lower than for advertising agencies and digital printing houses may influence direct customers more easily to take advantage of the technology and functionality.

In general the respondents were not satisfied with the *price* (Figure 3), although this was a CSF that was ranked low in respect to the other factors (Table 1). The dissatisfaction with the price of digital print may just be a consequence of the fact that customers, by definition, think that prices are too high. The satisfaction problem with the price may also be a result of the fact that the price of digital printing is in general higher per copy than for e.g. offset. Only Customer 2 was more than satisfied with the price. This was because they choose to make use of more of the functionality with digital printing when customizing their instruction manuals and therefore they rank price very low in respect to the other factors. In other words, they seem to have found the added value that digital printing offers. As mentioned before, most of the customers used digital printing for applications like print-on-demand, which has a low customer value. For customers working with

applications that provide a higher perceived customer value, like variable data printing or web-to-print, the price becomes more insignificant.

Price was the CSF that got the lowest total ranking. The printing industry in general is in a state of hypercompetition and the price competition is fierce. This is probably the reason why the price is of low importance when buying printed material, since most printing houses on the market have generally speaking low prices.

By calculating a “score point”, it is possible to determine how the different customers rank the individual CSF against each other. The basis of calculation is that each company contributes equally to the total score, independently of how they have ranked the CSF. If two or more CSFs have the same rank they share the sum of their points. This makes it possible not only to determine the total rank of the CSF but also how they are distributed along the “score axis”, that is the value in the parenthesis in Table 1. It is possible, in the future, to conduct further studies to investigate how the importance of the CSFs change over time.

Future changes

Many of the customers strive towards a non-printed solution for the material that is printed today. This may include both building more intelligence into industry products and handling more campaigns through other cheaper and faster mediums as the Internet. Substituting printed material for electronic material may not have the same negative effect on digital printing as it has on offset. Digital printing will be the natural channel for printed output of material that is otherwise spread electronically, as such material most often is printed on-demand or an output channel for material customized on the Internet by web-to-print solutions.

Conclusions

The study concludes that digital printing does not entirely fulfill the demands that the customers have on their printed material. But all respondents indicate that digital printing is becoming an increasingly important production technology for their printed material.

Applications like print-on-demand, that provides a low added value, was one of the main reasons that customers engaged in digital printing in the first place. This basic application is still how most customers make use of digital printing even though some customers believe that they benefit from simple variable data printing.

Among the critical success factors (CSF), Time, Quality, Functionality, and Price, quality is the factor that customers believe is the most important one. This is also the factor that they are least satisfied with in relation to their demands. For small volumes, digital printing is a quick printing technology in relation to traditional printing technology, like offset. This study shows that time is the only factor that customers were more than satisfied with. In general customers were quite price insensitive, which is a result of the fierce price competition in the printing industry. Customers that utilized more complex applications like variable data printing and

web-to-print were more satisfied with the price than those using basic applications like print-on-demand.

Many of the customers indicated that their future goal is to go towards a non-printed solution, like intelligent products or Internet based information to avoid large printed volumes. In many aspects the use of digital publications and distribution is a very cost-effective way of working, and by implementing such a system digital printing will be the channel for printed output.

Acknowledgement

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Appendix 1

Mean-centered results of the survey.





Creation of Customer Value Using Digital Printing in a Dynamic Business Environment

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Creation of Customer Value Using Digital Printing in a Dynamic Business Environment

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Keywords: customer value; digital printing; business strategy; differentiation; hypercompetition

Digital printing is used most successfully with a differentiated strategy that delivers high customer value when printing short runs or customized printed matters. This qualitative case study of a customer – supplier relationship aims to identify and analyze how digital printing can be utilized as a business tool in the relationship between a service provider and a customer in a dynamic business environment.

The service provider in this case has strategically changed the focus of the company from a production to a service company with the focus on customer contact. Even though the service provider had an advantage on the market, they choose to create disruption since they realized that they could not sustain this advantage forever on their dynamic market. This was realized even though it meant cannibalizing on their former core business – printing.

The study indicates that a hypercompetitive-like behavior is becoming increasingly important to be able to survive in the dynamic and changing printing industry. The industry is today influenced by, and competing with many companies that are not in-industry. By reengineering their products and services and moving from the cost-quality arena to timing and know-how it is possible for the service provider to control the outcome of the industry in a more successful manner.

This study concludes that digital printing is used successfully when the customer's main objective is not to print at all. Printed material will probably not disappear in a foreseeable future and therefore digital printing most certainly will increase its importance as a production technology. In the strive towards a paperless office, digital printing is a natural, convenient and profitable way of producing a non-electronic output is digital printing.

1 Introduction

“Does the manufacturer exist for the consumer or does the consumer exist for the manufacturer?”

Henry Ford (Ford & Crowther, 1922, p. 135)

Customers in the digital printing value system do not believe that digital printing technology fully fulfill the demands that they have on their printed material, although there are indications that digital printing is becoming a more and more important production technology (Mejtoft, 2006b). Since digital printing technology has a higher production cost than traditional printing methods for longer print runs,

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it is important for digital printing houses to pursue a competitive strategy involving differentiation (Mejtoft, 2006a; Porter, 1980). Differentiation is a competitive strategy involving a more customer-centered approach where the company must try to “*create competitive advantages for its buyers*” (Porter, 1985, p. 131) to be able to succeed (Day & Wensley, 1988).

This is why the main objective of digital printing must be to deliver a higher customer value. The most prominent feature of digital printing is its ability to produce each print in a unique manner, which makes it possible to deliver prints that are changed based on data from e.g. a database, variable data printing, to be used in e.g. one-to-one marketing (Peppers & Rogers, 1993). Since discarded volumes are small and startup times are short it is also possible to print shorter print runs and print-on-demand, at a low cost compared to traditional printing technology, like offset.

The non-profit digital printing industry consortium PODi (2003) has, in the case of the digital printing industry, identified two fundamental economic forces that are connected to successful cases in digital printing – increased effectiveness and increased efficiency. What PODi refers to is the use of documents as a more effective business tool through personalization and the use of more efficient all-digital workflows. Even though variable data printing has a higher potential customer value than print-on-demand, it is on-demand printing that is mostly used by the customers and is also what they value the highest with digital printing (Mejtoft, 2006b). In general digital printing houses are striving towards increasing their share of direct customers, this is done for two reasons – to gain customer contact and to educate them to take advantage of the possibilities of digital printing and to increase their share of revenue within the value system (Figure 1) (Mejtoft, 2006a). Customers that are working directly with printing houses and not via an advertising agency also tend to use more complex service like variable data printing (Mejtoft, 2006b).

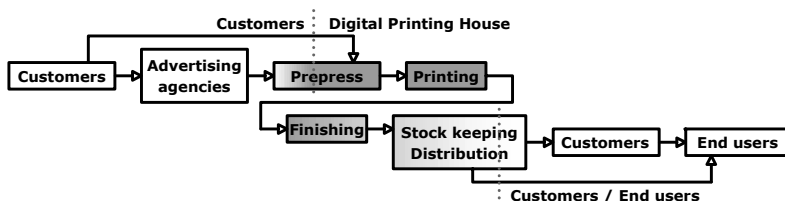


Figure 1. The value system for the printing industry (Mejtoft, 2006b).

In the eyes of the customers the printing technology hardly ever matters as long as the end result is as expected. This makes it important for printing houses that choose to work with direct customers to offer a service that in some way is more cost-effective or valuable to the customer. The opportunity to add extra value to a customer’s product opens up when a printing house has control over production technology and product development as well as close customer contact. This is what one digital printing house that has been strategically vertical integrated has accomplished.

1.1 Objective of the study

The objective of this case study is to identify and analyze how digital printing can be utilized as a business tool in the relationship between a service provider and a customer in a dynamic business environment.

2 Theory

In Porter's Five Forces Framework (1979; 1980), the bargaining power of the customer is one of the five forces. If an industry, such as the printing industry, consists of many small actors, the products are considered a commodity and switching costs are low (Porter, 1980), the bargaining power of a customer is likely to be high. This is the current nature of the printing industry, as it is today a fragmented industry (Gilboa, 2002; Kipphan, 2001) where total production capacity is far greater than demand (Birkenshaw, 2004). It is most certain that this situation has been caused by printing being, in general, undifferentiated (Porter, 1980). When buying products or services that have been around for a long time, and are more or less considered commodities, the knowledge among the customers increases which makes their bargaining power even stronger. This generally results in near-zero margin profits in the printing industry (PODi, 2003).

Customers of digital printing houses do not believe that price is an important factor in digital printing (Mejtoft, 2006b). This attitude is most certainly brought about by low prices in the printing industry in general (Birkenshaw, 2004). The bargaining power of customers has been further bolstered by globalization and the use of the Internet to gain information about suppliers and prices (Evans & Wurster, 1997; Morgan, 1996; Porter, 1996; Porter & Millar, 1985; Timmers, 1998).

2.1 Customer Value

Customization of products is becoming more common for both consumers and businesses. Products like Dell's personal computers and heavy trucks from Scania are assembled after being ordered to meet customer specifications. Just-in-time manufacturing (JIT) was introduced by Toyota in the 1960s (Voss, 1987) and is today a common method of production. When working in this way it is important to have everything delivered to and from an organization just when the producer needs the different parts in the production process. With this sort of thinking digital printing is a good option for printing e.g. instruction manuals or advertising material, since it will be possible to postpone the printing of the message and customize the printed material to the produced product. Printing in this way can also eliminate stock keeping. Postponement strategies were first proposed in the early 1950s (Alderson, 1950; Bucklin, 1965) and Stern and El-Ansary (1992, p. 22) states that *"postponement promotes efficiency by moving differentiation nearer to the time of purchase when demand is more certain, thus reducing risk and uncertainty costs"*. By postponing the printing of e.g. the instruction manual it would be possible to create customized manuals to the produced customized products.

A purchasing situation arises when a company or a person acquires resources of a different kind from another company. According to Lyson (2000, p. 1) purchasing in an organizational perspective can be defined as *“the function responsible for obtaining by purchase, lease or other legal means, equipment, materials, components, suppliers and services required by an undertaking for use in production or resale”*. Purchasing can be classified into three orientations – buying, procurement and supply management – dependent on the broadness of the purchasing orientation. When the customer is working towards minimizing the price of a product or service and maximizing quality and availability, the customer is said to follow the buying orientation. Improving the quality of a product or service by cooperating with the supplier in order to reduce the total cost, and not just the price is the main objective in procurement. In supply management the goal is to obtain the greatest total value in close cooperation with suppliers to build supply networks that complete whole business processes of a product or service (Anderson & Narus, 2004; Dobler & Burt, 1996).

The speed, richness and reach of the Internet today provides customers with information and makes it easy to identify good offers of commodity products like print (Evans & Wurster, 2000; Porter, 1980) and in theory a company would always make the right decisions and choose the supplier that could provide the best available offer. However this is not the case in reality since there are always switching costs (Porter, 1980; 1985; 2001) even though the Internet has lowered them. In the case of the direct customers in digital printing, the purchasing of printed products are often not a strategic business unit (SBU) in the company which may make it less important to switch suppliers. Other factors such as a long-term relation where the supplier has built a special competence, also raise switching costs.

Earlier research (Mejtoft, 2006a; 2006b) shows that customers in the digital printing value system strive towards having a long-term relation with their digital printing houses. Direct customers are interested in outsourcing greater parts of their print production, which has led to a procurement or supply management relationship between the printing house and the customer. Because of these direct customers prefer contact with vertical integrated digital printing houses, just as vertical integrated printing houses strive towards increasing their share of direct customers.

Porter (1985) defines two basic mechanisms that are important when trying to increase customer value – lowering customers costs or increasing customers performance. The goal in the digital printing industry may be a little of both. On-demand printing may decrease the cost for stock keeping, discarded volumes and distribution costs. On the other hand when discussing variable data printing the increase in customer value is supposed to come from making a campaign more efficient and e.g. increasing the response rate.

Since there often is a lack of knowledge from the customer side about what opportunities new technology can offer, it is important for suppliers to educate their customers to take advantage of and value the differentiation in the technology. This may also be a way for a supplier to increase the switching cost of a product or service for the customer by offering training and education on a specific solution (Mejtoft, 2006a; Porter, 1985).

The generic strategies defined by Porter (1980) – cost leadership, differentiation and focus may work well until competitors have copied or outmaneuvered them (D'Aveni, 1994). The goal of the generic strategies is to obtain and sustain the competitive advantages in the market. In the theory of competitive strategy, sustainability of differentiation depends on continued perceived customer value and lack of imitation from competitors (Porter, 1985). To be able to continuously deliver value that the customer appreciates, it becomes important to focus on Schumpeterian competition. Schumpeter (1942) regarded capitalism as an economic system in continuous change that would die if it became stagnant, “*creative destruction*” is, according to Schumpeter, the essence of the capitalism. Collis & Montgomery (1995, p. 124) describes it as “*in a world of continuous change, companies need to maintain pressure constantly at the frontiers – building for the next round of competition*”. Once a company has created competitive advantages, it is possible to maintain and prolong these advantages by strategic acquisition of resources and capabilities.

2.2 Resource Based View

The resource based view of the firm (RBV) (e.g. Collis & Montgomery, 1995; Wernerfelt, 1984) was the natural extension of the Porter framework and became dominant in the 1990s, and this marked a shift away from the predominant market based models, like Porter’s generic strategies.

Resources cannot be valued alone, but have to be put into a market context. Collis and Montgomery (1995) describe three important market forces that are necessary to consider in order to determine the value of a resource, service or product – demand, scarcity and appropriability. It is where all these meet that we have a “value creation zone” (Figure 2). To constitute a real value all these fundamental market forces should be well represented, but “*resources are only valuable if they meet customers’ needs better than those of their competitors*” (Collis & Montgomery, 2005, p. 35). By providing value based on resources that are hard to copy it is easier to sustain a competitive advantage. This is however harder and harder to accomplish (e.g. Thomas, 1996; Wiggins & Ruefli, 2005).

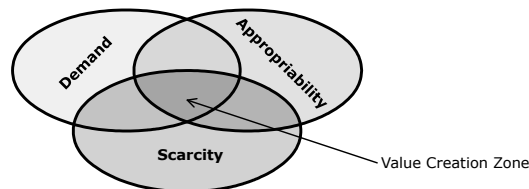


Figure 2. Demand, Scarcity and Appropriability determine the value creation zone (Collis & Montgomery, 1995, p. 120).

The value creation zone is not static over time as the demand, scarcity and appropriability of a resource are factors that change. Unfortunately, in digital printing both demand and appropriability have historically been low and scarcity is declining as more and more printing houses acquire digital printing equipment. However, today the demand is slowly increasing but the ability to capture the value (appropriability) of the printed product is still lacking since print is regarded as a

commodity product. Although in combination with other resources the appropriability of digital printing may rise. For a printing house that invests in digital printing the creation of services for the customer is a way of expanding the value creation zone.

Although this is an internal struggle in the company and industry it is important to remember that substitution and imitation are the two most common external factors that threaten the value of a company's resources (Collis & Montgomery, 2005).

For example Xerox had, in the 1970s, 95% of the world market for photocopiers. They had built up gigantic entry barriers and created products and services that were hard to copy by relying on patents and an extensive service organization. Since Xerox had built strongholds around their industry, Canon found a way around the patents with low cost copiers for distributed printing. This attack from Canon was not head-to-head but rather from the flank and it took Xerox by surprise and was ignored for a long time by Xerox (van der Heijden et al., 2002).

2.3 Hypercompetition

In industries today it is becoming increasingly hard to sustain advantages for long (e.g. Thomas, 1996; Wiggins & Ruefli, 2005), and a hypercompetitive behavior becomes crucial. The aim of a more dynamic approach to strategy is to disrupt the status quo and create an endless series of small competitive advantages. This makes it important even for companies that have obtained advantages to challenge them before their competitors undermine those already achieved. It is important for a company to *"realize that control of the evolution of competition in the market is more important than earning current profits"* (D'Aveni, 1994, p. 238). This has become a popular way of thinking, especially in the age of information that has been a fact since the mid 1990s. Evans & Wurster (1997) discusses the importance of information and how richness and reach of information shifts power from the producer to the customers and increases hypercompetition. As switching costs decrease it is important to find new ways of generating customer loyalty (Evans & Wurster, 1997), and relationships with customers becomes important since *"the process of developing new advantages or undermining those of competitor begins with an understanding of how to satisfy customers"* (D'Aveni, 1995b, p. 240). In other words, good disruption is disruption that creates a temporary possibility to serve customers in a superior way.

A company is therefore forced to destroy their own competitive advantages and create new ones before the full course of the traditional product cycle. This means that they have to cannibalize their own product and brands before their competitors do so.

Simplified, competition occurs on four different arenas; *cost and quality, timing and know-how, entry barriers and deep pockets*. Companies move between these arenas once the competitive environment has escalated and competitive options have been exhausted in the current arena (D'Aveni, 1994). This means that instead of only playing the game, it is better to change the rules, scope and players in the game.

An actor in a hypercompetitive environment makes progress by trying to modify the world to their own needs by disrupting advantages made by others and changing the rules of the competition. D'Aveni (1994; 1995a) defines seven key elements of a dynamic approach to strategy in the new 7S's theoretical framework:

- Superior stakeholder satisfaction
- Strategic soothsaying
- Positioning for speed
- Positioning for surprise
- Shifting the rules of the game
- Signaling strategic intent
- Simultaneous and sequential strategic thrusts

Everything around this framework is based around disruption, and the seven elements above represents how to have vision, capabilities and tactics to create disruption of the status quo on market elements in a dynamic strategy (Figure 3). This framework is based on the 7S's framework, presented in the beginning of the 1980s by McKinsey & Co (Waterman et al., 1980).

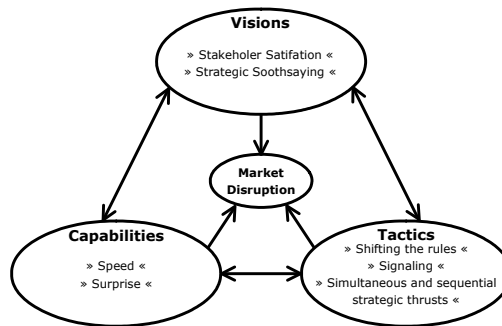


Figure 3. The new 7S's Framework (D'Aveni, 1994, p. 248).

Companies that act successfully in a hypercompetitive environment build a series of temporary advantages instead of trying to sustain the advantages gained. *"It is this series of advantages, this constant seizing of the initiative, that is the true source of sustained advantage"* (D'Aveni, 1995b, p. 172).

2.3.1 Vision for disruption

In general the shareholders of a company are the stakeholders that should be prioritized. However, in a hypercompetitive environment putting the customer and workers before the shareholder can be the solution for surviving since understanding the customer may create advantages against competitors (D'Aveni, 1994). All needs that a customer knows that they have are easy to identify, because they will probably tell a seller since they want to have these needs satisfied. Customers are in general a very interested, capable and inexpensive business developer (Magnusson, 2003). Through close customer contact and involvement of customers in the development of new products and services it is possible to better identify needs that a customer cannot articulate for. This is also a way of creating

new demands and to predict and understand future evolution of market and technology before it really happens (D'Aveni, 1995a).

Employees are important for building superior customer satisfaction since they are the ones that have customer contact and may understand both current and future needs. It is important to be able to serve the customers extremely well without neglecting the needs of the employees and investors (D'Aveni, 1994).

Strategic soothsaying is a way of understanding the future evolution of the market and the technology and how these can be used to serve both existing and new customers. This soothsaying will form the basis of where the company should focus the future disruption of the market (D'Aveni, 1994). Lead-users are important to be able to predict future customer value and a close relation with these customers is a very valuable source for product and service innovations (Thomke & von Hippel, 2002; von Hippel, 1986).

2.3.2 Capabilities for disruption

As mentioned before the new 7S's theoretical framework is based on creating a series of temporary advantages instead of sustaining competitive advantages (Porter, 1985). There are two basic capabilities for successful disruption of the status quo and creating temporary advantages – *speed* and *surprise*. To be able to create one advantage after another speed becomes very important to stay ahead of competitors. This is not the rate of production but rather “*speeding up their ability to move and to change*” (D'Aveni, 1994, p. 271). Surprise on the other hand is a way for a company to extend the period in which the advantage is unique. Nevertheless, once an advantage is recognized, the competitors start to duplicate and to create an even better advantage to serve customers. However, the time it takes for the competitors to undermine an advantage and take away its uniqueness becomes longer if they are taken by surprise (D'Aveni, 1995a). Dynamic capabilities are important to be able to ensure long-term competitiveness (Teece et al., 1997), and by investing in more general resources that can be utilized on a wider arena it is possible to take your competitors by surprise and off guard (D'Aveni, 1994).

2.3.3 Tactics for disruption

Almost every industry has unwritten rules of how to behave and how to compete conventionally. The tactics of disruption is to attack these conventions and *shifting the rules* of the market to undermine the advantages of competitors and make it possible to create temporary advantages for oneself (D'Aveni, 1994). This can e.g. be Dell's shift from using retail in computer sales to mail order and lately Internet sales. This attacked the conventional knowledge that consumers needed personal service in retail stores to be able to purchase personal computers (Christensen, 2001; Serwer, 1997). Southwest Airlines is another company that successfully pursued a low cost strategy that lowered the prices in the short-haul point-to-point flight industry and became the most profitable airline company in the US. This resulted in loss of advantages for former industry leaders like American Airlines when Southwest Airlines changed the rules of competition by carrying passengers at a price much lower than the unit cost of the rest of the airline industry in the US (Smith, 2004).

By signaling strategic intent in a dynamic and fast moving market environment it is possible to “forestall moves from competitors and encourage customers to wait for their products rather than buy competing products that make it to the market sooner” (D’Aveni, 1994, p. 278). Companies like Microsoft and Intel, who continuously announce their next technology, have used this tactic very successfully. As mentioned this is about signaling strategic intent and not the tactics used to get to the strategic position, meaning that the competitors know where the company is moving but not how and when.

By having a simultaneous and sequential strategic thrust, a company should be able to move on to the next move at the same time as the competitors respond to their first attack on the market (D’Aveni, 1994). Instead of having a linear strategic intention as following one of the generic strategies (Porter, 1980) a company acting on a dynamic market should be able to attack on several fronts with a series of thrusts against competitors.

2.4 Strategic alliances

When acting in a hypercompetitive environment it is important to have access to resources and have dynamic capabilities to create disruption on the market. It is not always possible to acquire all necessary resources in-house and networking may be a way for a company to “get access to external resources, necessary in the pursuit of their opportunities” (Jarillo, 1988, p. 39) and make it possible to offer a complete service to the customers. According to Jarillo (1988, p. 32) a strategic alliance is a “long-term, purposeful arrangements among distinct but related for-profit organizations that allow those firms in them to gain or sustain competitive advantage vis-à-vis their competitors outside the network”. Alliances may also be a way for smaller companies in an industry to build their own deep pockets to be able to compete with aggressive large opponents (D’Aveni, 1995b).

As discussed before, opportunistic behavior in a hypercompetitive environment results in the possibility to gain temporary advantages (D’Aveni, 1994; 1995a; 1995b). However, this behavior may result in lack of trust, which is a central issue in creating and sustaining strategic networks (Jarillo, 1988).

3 Methodology

In this qualitative case study two companies have been studied, the customer company (referred to as *the Customer*) and the service provider of print services (referred to as *the Service Provider*).

As a printing house in Sweden, the Service Provider is a part of the dynamic media environment. The Service Provider has offered a deal to the Customer where the main advantages for the Customer is lower print volumes and lower discard volumes as most of their publications will be printed on-demand. This case was chosen to illustrate the shift into a more dynamic business environment, where the printing houses have to act faster and more hypercompetitive to be able to capture temporary profits above average (D’Aveni, 1995a).

Open-ended interviews (Yin, 2003) have been conducted to gain deeper knowledge of processes that change the way the customer company publish their publications and the way the printing house acts in their competitive environment (Bell, 1999; Robson, 2002; Saunders et al., 2003). During the interviews open-ended general questions were asked and depending on the answers follow-up questions could be adjusted to the situation (Bell, 1999; Robson, 2002).

The interviews were all conducted at the company of each respondent during the period from early summer 2005 until spring 2006 and followed a longitudinal methodology to be able to capture changes and development (Saunders et al., 2003). Respondents from different parts of both the studied company and their contracted printing house were interviewed. The interviews were held under calm conditions without any major disturbance or time pressure (Bell, 1999) and during the interviews the respondents could talk freely and openly (Robson, 2002). Additional information has been collected over telephone, email, documents, and websites from the companies in the study.

An objective view is important when conducting independent research and therefore an approach inspired by Grounded Theory (e.g. Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998) has been used. This is both a good method of understanding how customers experience and act in certain situations and to find new phenomenon. The approach to the use of literature studies and theoretical frameworks in grounded theory has become divided (Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998), and in this research study literature studies were conducted both before and after the interviews to enhance the theoretical sensitivity (Goulding, 2002).

At the customer company employees and project managers involved in the project and the transformation process were selected as respondents. At the printing house, both involved employees and the CEO were interviewed as previous research shows the importance of the CEO of an organization when setting and communicating business strategy (Beal & Yasai-Ardekani, 2000; Harrigan, 1985; Porter, 1996; Schein, 1983).

4 Results of the case studies

In this chapter the results from the case study will be presented with summaries and highlights from the interviews. Analysis and discussion concerning the results of this study is presented under Discussion below. The Customer is presented first, since this part also gives important information on how the Service Provider is currently working.

4.1 The Customer

The customer company (that will further on be referred to as *the Customer*) in this study is a government institution in Sweden. They annually order large quantities of printed material and the main production is publications and reports for different purposes.

They have been working with their current printing house (that will further on be referred to as *the Service Provider*) for approximately three years. When they decide on suppliers they had to, as any Swedish government institution, follow the Act (SFS 1992:1528) on Public Procurement, which means that they have to invite offers from at least three suppliers and do regular procurements of suppliers for products and services. Also, when they contracted the service provider they chose, as many other government institutions have to, a supplier that had high ethical and environmental standards (Dobler & Burt, 1996).

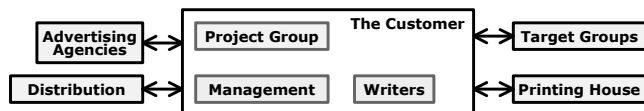


Figure 4. A simplified outline of the organization for publication at the Customer.

The situation today is as follows: approximately 200 writers at 13 departments at the Customer can order prints of their publications (Figure 4), together they order prints of approximately 2000 publications annually. It is up to every individual writer to decide on volumes, finishing etc. on every order. The total cost for printing of printed products (excluding prepress, distribution and stock keeping) was approximately €1 million in 2004, of which 40% was digital printing. This cost was split into a total of 2000 orders of which 70-80% were orders for digital printed products. The cost was cut by roughly €700'000 when they changed to their current supplier.

The discarded volume 2004 was 23% of the total stock, which summarized adds up to 12 metric tons. An additional 23% of the total stock (15 metric tons) were publications that were three years or older and are regarded as material that could be discarded as well. This means that the Customer only regards half of its current stock as useful material and a majority of the stock is non-moving. Although a lot of the printed matters are used and not in stock, there has been a huge overproduction and the long-term goal is that *"you should not be allowed to put printed matters in stock if you do not have a really good reason"*. A lot of the problem with over production of publications comes from the complicated decentralized order situation, the Customer believes that *"we have to fix this, we have to get an overview, we have to try to change the organization and we have to regulate, and to regulate we have to categorize [the publications]"*. They are currently running an internal project that aims at rethinking the way they produce, store and distribute their reports.

The large amount of annual orders and the complex situation with many writers that are handling the ordering, has made it important for a close collaboration between the Customer and the Service Provider. The Customer and the Service Provider have agreed on integrating three employees of the Service Provider at the Customers premises to control the orders. These employees were actually acquired from their previous printing house when the Customer changed supplier.

4.1.1 The customer's customer

One problem that has led to the current situation with large quantities of printed materials in stock is the poor knowledge inside the Customer's organization of the internal and external usage of their material.

In general they have three different groups of users of their publications – Internal, External and Public users. During 2005, the Customer conducted a reader study to gain knowledge about how their publications are used. They believe that this study can form the basis for decisions on how to categorize the different publications, and *“the result shall be useful at the preparation of a strategy or policy of our publication business”*.

Even though it is possible to order publications and reports directly from the Customer, many publications and reports are distributed with a push policy. That is that they are distributed without a direct order being made by the receiver. In the reader survey 20% stated that they received publications without ordering them.

Better knowledge about the usage of the publications and reports when they leave the Customer, has helped to identify that many of their publications are not used in the anticipated way or to the intended extent.

By using a system where every publication is categorized dependent on the amount of work put into a publication, and having clear instructions how to order depending on category, it is possible to reduce the amount of printed matters. Other important criteria for categorization are the useful life of the publication, importance for the organization, importance for the target group, and the size and homogeneity of the target group. The goal is to identify the primary publications to be able to locate which publications that could be printed with traditional printing technologies and kept in stock. *“We don't want the writers to stop producing publications, but we can distribute them in another way, we can distribute them in digital form.”*

4.1.2 Digital publications

Publications that are not regarded as primary publications will not in the future be printed for stock keeping, but only for the intended purpose. These publications will instead be kept and distributed as digital documents. Today all relevant publications and reports produced by the Customer are available on the Internet. The main goal is to create a solution where all publications are offered as digital documents, and if someone is interested in a printed copy it will be possible to order one by print-on-demand directly from the Service Provider.

This way of working will increase the value for both the Customer and for the customer of the Customer since both volumes kept in stock will decrease, and consequently the amount of discarded volumes. But also, they hope that the average content quality of the publications that are actually printed will increase. By combining internal organization changes with the use of digital printing as a more influential production technology, it is possible to change the current situation to a more cost effective way of working. The obstacle the Customer believes they will face when starting to work more with digital publications is that *“it will be hard to get people to value a digital publication instead of a printed publication”*.

Budget cuts started this process and forced the Customer to investigate their publication policies. This trend towards digital publication is not entirely unique for the Customer, and is something that is becoming more common among government institutions in Sweden.

4.2 The Service Provider

The Customer's provider of print services (referred to as *the Service Provider*) is a large traditional printing house in Sweden with their main production volumes in offset, they are part of a larger communication group. They are a vertically integrated printing house that can provide almost all services connected to printed matters. They do not currently own any digital printing equipment but do offer this service through a co-operation with a partner, who also is a vertically integrated smaller printing house specialized solely on digital printing.

The Service Provider has focused on customers that work directly with end consumers (B2C) and long-term relations with these customers are an important factor for the Service Provider. However, in this case, the Customer is a government institution and the Act (SFS 1992:1528) on Public Procurement render it impossible to sustain long-term customer contact since every contract has to be purchased regularly. As mentioned earlier the integration of employees at the Customer is a way of increasing the stickiness and learning from the Customers' problems and increasing the possibility of renewing the contract.

When the Service Provider signed the contract with the Customer it also became the starting point for the transition into a more dynamic way of working towards their customers and to find new visions for disruption. Below is described how the Service Provider has started working in a more dynamic way by acting according to the new 7S's Framework (D'Aveni, 1994; 1995a).

4.2.1 Extending focus

As mentioned before the Service Provider is a vertically integrated printing house that can offer everything from original work to distribution, either in-house or in co-operation with partners. They are currently working towards increasing the total revenues of backward integrated services like pre-press and media- and market management.

The Service Provider also has during the last couple of years started to incorporate competing services to print into the organization, this is a form of horizontal integration and is done to a large extent organically and not through acquisitions. These services are to a large extent based on non-printed solutions like electronic documents etc. By being alert to their customers' demands and inquisitive they can get information on how to develop future applications and activities for the market. They can create mutual value for both the shareholders and the customers by working and learning from their customers in this way. They want to work with customers that also want to create common value and not those that only want low prices. They believe that much of their way of doing business comes from identifying "*what the customers' problem really is and how are we going to solve it?*".

The Service Provider took a strategic decision a couple of years ago to start offering digital printing as a production technology to their customers, however they did not choose to invest in the technology themselves. Instead they formed a strategic alliance with a local digital printing house as a sub-contractor for digital printing, and the Service Provider became a subcontractor for traditional printing technologies for the digital printing house.

Since this alliance was formed the Service Provider has developed several applications that are totally based on digital printing output and uses the unique features of this technology like on-demand printing and variable data printing. The Service Provider believes that it is the connection between digital printing and render other parts in the value system more streamline, like efficient logistics and template-based integrated solutions for production, that are important to fulfill market demands. They have developed unique services that they have been first on the market with. The Service Provider believes that speed in combination with surprise is important to be able to gain temporary advantages on the market when developing new products and services.

By these kinds of applications and the solution for the Customer described earlier, the Service Provider has created contracts and applications that do not favor their original core business, the traditional printing units.

5 Discussion

5.1 Creating disruption

The main focus when competing in a dynamic environment is on how to create disruption. As a traditional printing house the conventional way of competing is by using large production capacity to produce at low cost. This is what Porter (1980) refers to as cost leadership.

The case in this paper has been chosen to illustrate how the Service Provider has jumped from one arena to the next to create disruption on the mature market. By moving from the competition by cost-quality to timing and know-how the Service Provider is able to start helping the Customer to fulfill their vision and need to reduce volumes and working towards an all-electronic solution for the publications.

5.1.1 Vision

The Service Provider has during the last couple of years changed the order of prioritization among their stakeholders. The traditional way of prioritizing the stakeholder is to put the shareholder at the top. However, deep pockets have given them the opportunity to change focus from shareholders to customers. This is a way of changing from shortsighted to long-sighted shareholder value. Today the Service Provider believe themselves to *“be very much customer and offer orientated”*. By working closer with their customers the Service Provider has been able to, quickly, develop more accurate services for their customers.

5.1.2 Capabilities

Speed in product development is indeed important. Basically, many of the companies in the customer segment that the Service Provider is currently working with are in a state of hypercompetition, which in turn influence how the Service Provider works. It may be even more important to understand the environment the customers are facing to meet their demands than understanding the rivalry among the existing firms in the industry (see Porter, 1980).

5.1.3 Tactics

Using digital printing is a strategic decision by the Service Provider, but gaining control over the resource by a tactical decision of strategic alliance is a way of quickly gaining the resource and the knowledge and shifting the rules of the industry. Resources can be directly or indirectly controlled (Håkansson & Johanson, 2002), and in this way the Service Provider gains indirect control over the digital printing resource.

By networking the necessary resources it is possible for the Service Provider to focus on creating activities that can increase customer value. However, in the case of the traditional printing industry this means cannibalizing on their core business since they educate their customers to print less. This can however be compensated by increased revenues from services earlier in the value chain.

Networking was a way of gaining control over resources to be able to offer a complete line of offers to the customers. But in the case of this service provider, that came from a core SBU of traditional printing, networking into digital printing and the product development of products based on digital printing or electronic distribution means cannibalizing on their original core SBU. This way of moving from the cost-quality to the timing and know-how arena may be a necessary step for future survival (D'Aveni, 1995b). If you are not capable of cannibalizing on your own business to gain new temporary advantages, someone else will be able to do it.

In this case, a strategic alliance was the fastest way of gaining the necessary resources to be able to create superior customer satisfaction and try to escape the fierce competition on the cost-quality arena. Digital printing became a success factor for the Service Provider and enabled them to offer a solution that strives towards an all-electronic solution.

5.2 Moving from arena to arena

Today, the competition in the cost and quality arena in the printing industry is fierce, that is why the Service Provider has chosen to move into the timing and know-how arena. This is not an easy step since it means building additional resources that connect new knowledge to the printing industry. The Service Provider has used the deep pockets of the communication group that the Service Provider is a part of, to try to change the rules of competition when moving from cost and quality competition to timing and know-how.

By working with know-how instead of cost-quality it is possible to capture a larger amount of the profits connected to digital printing since it expands the value creation zone (Figure 2), when appropriability and scarcity increase. By gaining

customer contact it is also possible to increase the customer demand for digital printing, which should increase the value creation zone even further.

Regarding entry barriers, the Service Provider has chosen a specific customer segment that they are trying to satisfy. By specialization on this particular segment they try to build knowledge regarding working with these customers and thereby build entry barriers to scare away new competitors.

Noteworthy about this way of competing is that they do not compete statically but are in constant movement between the different arenas and act dynamically on each and every one of them to control their competitive environment and create new competitive advantages.

A traditional printing press is not constructed for short print runs and by offering this opportunity with digital printing, customers' behavior will start to change. On the other hand customers in general strive to reach low costs. And by offering a multi-channel opportunity involving both electronic and printed channels customers will probably not settle for an all non-printed solution in the end.

5.3 Digital printing as a cost saving technology

By adopting a hypercompetitive behavior it has been possible for the Service Provider to create cost saving solutions for their customers. The main cost saving in this case comes from reducing discarded volumes of outdated publications and reports. This is a result of a change in the way the Customer publish their reports. The change has been made possible due to the widely spread use of the Internet, which makes electronic distribution an easy-to-use cheap solution. This philosophy makes digital printing a natural and efficient way of producing tangible copies and the on-demand features of digital printing makes it possible to rely on electronic stock keeping.

6 Conclusions

The competitive environment in the printing industry is becoming increasingly dynamic and a hypercompetitive behavior may be crucial to be able to ensure future survival in this industry. It is possible to notice the shift from the cost-quality to the timing and know-how arena for the hypercompetitive service provider is this study. By moving to the next arena it is possible to control the future of the industry in a more successful manor. The printing industry is today influenced by a more heterogeneous group of competitors with a much broader base of experiences. This since the competitors are not only in-industry, i.e. other printing houses, but rather companies that are changing customer behavior to make customers less in-need for print.

The Service Provider is strategically changing the focus of the company from a production company, with focus on the production equipment, to a service company with focus on customer contact. By shifting focus the Service Provider will become less dependent on large print volumes, but on the other hand they do themselves contribute to the changed behavior among customers.

Even though the Service Provider had an advantage on the market with a large-scale production facility, they chose to create disruption since they realized that they could not sustain this advantage forever on their dynamic market. This was done even though it meant cannibalizing on their former core business. By changing the path of their products and services they can, in a better way, control the evolution of the market. The way that the Service Provider is acting is hypercompetitive-like and is crucial to try to control the outcome of the printing industry and ensure survival for the company.

6.1 Integrated with non-printed solutions

The conclusion of this study is that digital printing is used successfully when the main objective of the customer is not to print at all. When striving towards a paperless business the most natural, convenient and profitable way of producing a non-electronic output is digital printing. Printed material will probably not disappear in the foreseeable future and therefore digital printing will most certainly increase its importance as a production technology.

In the case described above, digital printing is, today, used mainly for producing shorter print runs and for avoiding large amounts of discarded quantities. But digital printing also provides the potentials in producing customized documents, which will be more important in the future.

When looking back at the quote by Henry Ford (Ford & Crowther, 1922, p. 135) cited in the beginning of the paper - "*Does the manufacturer exist for the consumer or does the consumer exist for the manufacturer?*", the truth may be that in the dynamic competitive environment of the digital printing industry they exist for each other in symbiosis to co-create a mutual value for both the customer and the service provider.

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Paper IV

Strategic Alliances in the Digital Printing Industry

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Strategic Alliances in the Digital Printing Industry

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The fast technological development and the convergence of the media industry have made competition in the printing industry harder and not only in-industry any longer. This puts great pressure on individual companies, and in a climate of rapid change, companies need to respond quickly to external forces in order to remain competitive. To accomplish this many different competitive resources and competences need to be managed. This can be achieved either directly by ownership or indirectly by cooperation. This qualitative case study sets out to investigate how alliances are used in the dynamic business environment of the printing industry, with a focus on cooperation in connection with digital printing.

The primary reason, for the companies' cooperation was gaining access to resources to enhance customer satisfaction and retain customer contact. This paper illustrates that alliances and cooperations can be used in different ways and being part of an alliance can be regarded as successful and something worth nurturing. Even though alliances can provide competitive advantages, this study also indicates that hypercompetitive behavior, like being to opportunistic, clearly can have drastic negative effects on an alliance.

Introduction

There are often many reasons why two or more companies decide to cooperate. The reasons may be based on both external factors, e.g. turbulence in the market, fast technological changes and the impact of globalization, and internal factors, e.g. acquiring access to other firms assets and knowledge, reducing risk and helping shape the market (Child et al., 2005). Alliances and different kinds of cooperations are important for achieving competitive advantages in business. This importance was strongly indicated during the beginning of the 1990's, when the number of alliances grew with as much as 25% annually (Bleeke & Ernst, 1995). Strategic alliances have been used successfully by e.g. IBM, who used alliances in many areas such as marketing, research and production. IBM also created alliances in new business areas to "harness the capabilities and the dynamism ... in order to do things it would be hard to do alone" (Krubasik & Lautenschlager, 1993, p. 56). Harrigan (1986) suggests that due to technological and economical changes, cooperations have been of great importance in international business since the mid 1970's.

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The printing industry has historically been a fragmented industry (Gilboa, 2002), consisting of many privately owned small- and medium sized companies. This is still the general situation (Gilboa, 2002; Kipphan, 2001), as approximately 90% of the printing companies worldwide employ less than 20 people (Kipphan, 2001). However, the situation is constantly changing with mergers and bankruptcies. Also, the technological advancements in printing have been rapid, which has resulted in expanded printing capacities in Western Europe and the US (Birkenshaw, 2004; Smyth, 2006). This situation has led to continuous price reductions and commodization of printed products.

Since the mid 1990's, professional digital color printing has been a part of the printing industry landscape. Digital printing affects several segments of the media industry by offering the possibility to produce small editions at a competitive cost, and to customize printed matters to be used in e.g. one-to-one marketing (e.g. Peppers & Rogers, 1993). However, one should bare in mind that there are drawbacks with digital printing such as lower print speed, and that the cost is fixed and does not decline with the length of the print run. This makes it more expensive to use digital printing than conventional printing for larger editions.

The fast technological development is not only a fact in the printing industry but also in many parts of the media industry, which now use digital workflows. This has introduced new possibilities in managing the value system to cut costs and make workflows more effective. Due to this development and the convergence of the media industry, the competition within the printing industry is not only in-industry, but involves a wider spectrum of communication companies. The changed industry landscape and competitive situation have created a need for broader competence within a company. Control over many different resources and competences are important, and this can be achieved either directly by ownership, or indirectly by cooperation (Håkansson & Johansson, 2002).

This faster and more aggressive competition, which is common in many industries, may lead companies to a more dynamic way of dealing with strategies. This is partly the situation in the printing industry, as some larger companies tend to act in a hypercompetitive manor (Mejtoft, 2007). Previous research (Mejtoft, 2007) suggests that alliances could provide the "creative destruction" (Schumpeter, 1942), which is needed in the printing industry's changing environment.

Research Objective

The objective of this paper is to investigate how alliances are used in the dynamic business environment of the printing industry, with a focus on cooperations in connection with digital printing.

Theoretical Framework

This chapter will introduce a theoretical description of important factors when using strategic alliances, followed by a section describing a theoretical framework for how companies may act in a dynamic business environment. The last section

discusses the implications of strategic alliances in this business environment and emphasis concepts that are particularly important for this study.

Strategic Alliances

Strategic alliances can be described as a long-term, purposeful work between legally independent players to create and/or preserve competitive advantages against the surrounding world (Gulati et al., 2000; Jarillo, 1988; Todeva & Knocke, 2005). According to Jarillo (1988, p. 38), *"the critical component that makes a relationship take the shape of a 'typical market' is the high degree of (perceived) 'opportunity for joint value creation' between the two organizations"*. When alliances are formed, complementary assets are often one important criterion along with compatible corporate cultures and synergies between companies (Faulkner, 1995; Whipple & Frankel, 2000). According to Porter (1985) it is possible, for an individual actor, to focus on a small part of the value system, when being part of an alliance. This means that the actor can keep the organization at an optimal size and focus on core activities. Other activities and resources can be obtained through cooperation (Levin, 1998).

Bleeke & Ernst (1995) suggest, based on the relationship between partners engaged in cooperation, that six different types of alliances exists – *collisions between competitors, alliances of weak companies, disguised sales, bootstrap alliances, evolutions to a sale and alliances of complementary equals*. They claim that the first two almost always fail, while only the last, alliances of complementary equals, is expected to be a success. The others are likely to end up in a merger or a sale. It should be noted that this situation may not be regarded as a failure since a merger or sale could benefit involved partners. Bleeke & Ernst (1991) show that only approximately 50% of strategic alliances can be regarded as successful for all parts after two years.

Researches such as Child et al. (2005), Faulkner (1995), Gulati et al. (2000) and Jarillo (1988) highlight the importance of decreased transaction costs in a strategic alliance. While e.g. Jarillo (1988) deems transaction costs most important and believes that participation in the alliance must be efficient in lowering transaction costs, Faulkner (1995) considers them to be subordinate to gaining control over resources. Faulkner (1995) also mentions speed to market (Lee, 2007) and spreading of financial risk as possible internal motives to engage in cooperation.

Regarding participation in strategic alliances, Håkansson & Johansson (2002, p. 146) suggest that actors in an alliance have *"differential knowledge about activities, resources and other actors in the network"*. Even if they have experience from similar areas, their experience is not the same. This causes different actors to have dissimilar, and sometimes conflicting, interests. Increased control from any part in the alliance is always achieved at some other parts expense. Sherman & Sookdeo (1992, p. 78) state that *"perhaps the biggest stumbling block to the success of alliances is the lack of trust"*. Thus, trust, or rather lack of trust may have an impact on alliances between actors.

Trust, Commitment and Control

Moorman et al. (1992, p. 315) defines trust as *"a willingness to rely on an exchange partner in whom one has confidence"*. Morgan & Hunt (1994, p. 22) state that the presence of both commitment and trust are important because they make alliance partners *"resist*

attractive short-term alternatives in favor of the expected long-term benefits of staying with existing partners". Child et al. (2005, p. 60) discuss the importance of the actual human resources involved in an alliance and stress that *"the growing ability of each partner's staff to understand and predict the thinking and actions of the other's can provide a further basis for trust between them"*. Interpersonal trust is a key factor to build trust between partners in an alliance and failure to build such trust often results in failure to achieve a close cooperation.

To handle this situation, control is deemed as essential in strategic alliances (Geringer & Herbert, 1989; Medcof, 1997). According to Jarillo (1988), it is necessary, through agreements, to divide risks between partners in the alliance to maintain long-term trust. Trust becomes more important if the risk is higher. Apprehension of risk and lack of trust are factors that change over time (Ring & van de Ven, 1992). Das & Teng (1998, p. 495) emphasize the importance of control and suggests that trust and control can be separated, as *"even with minimum trust the partners still can develop a fairly high level of confidence, if adequate control mechanisms are in place"*. Partners in an alliance sometimes feel insecure about how much information concerning their own organization they should hand over to other partners. However, communication is a foundation for fostering trust and commitment (Morgan & Hunt, 1994), and it is important that the information is timely and correct (Moorman et al., 1993).

Gulati et al. (2000) indicates that if one part in an alliance believes that they could produce a better return by working outside the alliance, they may be caught in a race to learn and exploit as much as possible from partners, and later on exit the alliance (so-called learning races). Accordingly, Jarillo (1988) describes how opportunistic behavior from one part affects the alliance in a negative way. In these cases the trust between partners decline, and consequently the commitment to the alliance fails. A dissolution of an alliance should, however, not automatically be regarded as a failure as the learning experience may have been the goal (Hamel, 1991).

Resources

As mentioned earlier, gaining control over resources is an important reason for forming alliances (e.g. Faulkner, 1995; Jarillo, 1993; Levin, 1998). Resources can come in many forms; they can be physical (e.g. production facilities or raw material), intangible (e.g. brand or knowledge), or organizational capabilities (e.g. routines or a combination of assets, co-workers etc.) (Collis & Montgomery, 2005). According to Barney (1991, p. 101), a company's resources *"include all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness"*. Resources can be controlled directly, by ownership, or indirectly through relationship (Håkansson & Johansson, 2002). Indirect control can be achieved by a relationship with an actor with direct control over the resource, in other words through cooperation. Actors' knowledge about and experience of resources is of great importance, and Håkansson & Johansson (2002, pp. 147-148) suggest that resources are heterogeneous and *"there are always further possibilities to use the resources in a different way or in a different setting"*. Resources are unique and when they are

combined, they can never fully be imitated by a competitor (Collis & Montgomery, 1995; Gulati et al., 2000).

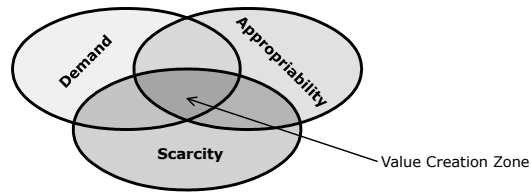


Figure 1. Demand, Scarcity and Appropriability determine the value creation zone (Collis & Montgomery, 1995, p. 120).

The ability to directly or indirectly control resources can create competitive advantages. However, resources should not be valued alone, as they should be put into context with market forces. This is further developed in the Resource Based View of the firm (RBV) (e.g. Collis & Montgomery, 1995; Wernerfelt, 1984), which combines the internal (i.e. resources) and the external (i.e. industry structure) perspectives on strategy. Collis & Montgomery (1995) describe three important market forces – demand, scarcity and appropriability – necessary to consider in order to determine the value of a resource, service or product. Where these factors meet, is called the *value creation zone* (Figure 1). To constitute a real value all these market forces should be well represented, but *“resources are only valuable if they meet customers’ needs better than those of their competitors”* (Collis & Montgomery, 2005, p. 35). It is easier to sustain a competitive advantage by providing value based on resources that are hard to copy.

Gulati et al. (2000) state that the RBV has not given much attention to finding the source of value creating resources outside the company. Strategic alliances can give access to resources not currently present within the company and by combining different resources and knowledge in an alliance, the network structure itself becomes a valuable resource (Gulati et al., 2000). On the downside, this type of integration in an alliance can create a risk for locking companies into unproductive relationships (Gulati et al., 2000).

Hypercompetition - A Dynamic Competitive Environment

In today’s industries, it is becoming more difficult to accomplish sustainable advantages (e.g. Thomas, 1996; Wiggins & Ruefli, 2005) since demand, scarcity and appropriability (Figure 1) of a resource are changing factors. This has led hypercompetitive behavior to increase in importance. Hypercompetition is competition in a *“high velocity environment”* (Bourgeois & Eisenhardt, 1988, p. 816) and is characterized by *“intense and rapid competitive moves”* (D’Aveni, 1994, p. 217). The aim of this strategic approach is to disrupt the status quo and *“move quickly to build advantages and erode the advantages of their rivals”* (D’Aveni, 1994, pp. 217-218) thus creating an endless series of small competitive advantages. Companies acting in a dynamic hypercompetitive business environment have to be agile in spotting new opportunities, developing short cycle strategies, abandoning old cash cows and meeting customers’ current and future needs. Also, hypercompetition even makes it important for companies that currently have obtained competitive advantages in the

industry to challenge them before their competitors undermine those advantages already achieved. It is important for a company to “*realize that control of the evolution of competition in the market is more important than earning current profits*” (D'Aveni, 1994, p. 238).

According to D'Aveni (1994) competition occurs on four different arenas; *cost and quality, timing and know-how, entry barriers and deep pockets*. Companies move between these arenas once the competitive environment has escalated and competitive options have been exhausted in the current arena. This means that instead of only playing the game, it is better to change the rules, scope and players in the game.

An actor in a hypercompetitive environment makes progress by trying to modify the world in accordance with their own needs by disrupting advantages made by others and changing the rules of the competition. D'Aveni (1994, 1995) defines seven key elements of a dynamic approach to strategy in the new 7S's framework: *superior stakeholder satisfaction, strategic soothsaying, positioning for speed, positioning for surprise, shifting the rules of the game, signaling strategic intent, and simultaneous and sequential strategic thrusts*. This theoretical framework is based around disruption, and the seven elements represent how to form visions, capabilities and tactics to create disruption of the status quo on market elements in a dynamic strategy.

Forming visions for how to create disruption is important. Among *stakeholders* of a company, shareholders should, traditionally, be prioritized. Narver & Slater (1990) suggest that creating superior customer value is a major goal for companies producing commodity products. This is becoming an important success factor, even though it means putting customer and co-workers before shareholders. Customers, in general, are very interested, capable and inexpensive business developers (Magnusson, 2003), and understanding the customer may create advantages against competitors (D'Aveni, 1994). Lead-users are important for *strategic soothsaying* to predict future customer value and a close relation with these customers is a very valuable source for product and service innovations (Thomke & von Hippel, 2002; von Hippel, 1986). This soothsaying can form the basis of where the company should focus the future disruption of the market (D'Aveni, 1994) and how existing and future customers can be served.

Developing capabilities for *speed* and *surprise* are important for creating disruption and generate temporary advantages, which is necessary to create one advantage after another and stay ahead of competitors (D'Aveni, 1994). Bettis & Hill (1995) believe that introduction of new production technology changes the competitive landscape and may create “*gusts of 'creative destruction'*” (Pisano, 1990, p. 173). Dynamic capabilities can be a way to ensure long-term competitiveness (Teece et al., 1997). By acquiring more general resources, it may be possible to take the competitors by surprise and catch them “*off guard through an unexpected action*” (D'Aveni, 1994, p. 274) and prolong the time the activity is unique (D'Aveni, 1995).

Almost every industry has unwritten rules of how to behave and how to compete conventionally (DiMaggio & Powell, 1983). The tactics of disruption are to attack these conventions and *shifting the rules* of the market to undermine the advantages of competitors and make it possible to create temporary advantages for oneself (D'Aveni, 1994). By *signaling strategic intent* towards competitors, it is possible to

“forestall moves from competitors and encourage customers to wait for their products rather than buy competing products that make it to the market sooner” (D’Aveni, 1994 p. 278). By having a *simultaneous and sequential strategic thrust*, a company should be able to move on to the next advantage at the same time as the competitors respond to their first attack on the market (D’Aveni, 1994). Instead of having a linear strategic intention as when following one of the generic strategies (Porter, 1980), a company acting on a dynamic market should be able to attack on several fronts with a series of thrusts against competitors.

Influence of Hypercompetitive Behavior on Strategic Alliances

In the climate of rapid change, companies need to respond quickly to external forces in order to remain competitive. Acting on such a market implies acting faster and constantly trying to disrupt the status quo. This, however, may have both positive and negative effects when working with strategic alliances.

Faulkner (1995) suggests seven common external forces that describe why alliances are formed; turbulence in markets; economies of scale and/or scope; globalization of the industry; regionalization of the industry; fast technological change leading to ever-increasing investment requirements; shortening product life-cycles and high economic uncertainty. As seen in the previous section, many of these forces touch upon those conditions that a hypercompetitive-like environment (Bourgeois & Eisenhardt, 1988; D’Aveni, 1994) deals with.

Hypercompetitive behavior is based on taking the opportunity to create disruption to the market and shift, with both speed and surprise, the rules of the industry to the company’s favor (D’Aveni, 1994). Trust is important between partners (Child et al., 2005; Morgan & Hunt, 1994) and damaging trust and engaging in opportunistic behavior may have a severe impact on the alliance and be *“costly because the damage to one’s reputation can influence not just the specific alliance in which one behaved opportunistically, but all other current and potential alliance partners”* (Gulati et al., 2000, p. 209).

Having dynamic capabilities is essential when acting in a hypercompetitive environment (Teece et al., 1997), and this is dependent on a flexible organization form (Volberda, 1996). An opportunity with alliances is to gain control of resources and knowledge without direct ownership (Håkansson & Johansson, 2002), and thus, increasing the flexibility and dynamics in resource control. The flexibility in the alliance structure is important and Lorange (1990, p. 27) proposes that joint ventures *“are always in a state of evolutionary development”*. Bleeke & Ernst (1991) conclude that nearly 40% of the alliances in their study gradually broadened the scope of collaboration after the alliance was formed. This flexibility to change an alliance also made the success rate higher. Rothaermel (2001) illustrates how incumbent firms in the pharmaceutical industry gain superior performance in a highly competitive environment using strategic alliances. Further on, Rothaermel et al. (2006) found indications that combining vertical integration with outsourcing and alliances have a positive effect on the company. This illustrates the flexibility in combining several strategies to create successful company structures.

Alliances can be seen as an enabler that provides dynamic resources and capabilities to foster a hypercompetitive behavior. On the other hand this behavior can damage the possibilities of maintaining long-term alliances. Strategic alliances can, consequently, both function as a barrier for entering an industry or market, but at the same time they can be a shortcut in to an industry or market for the companies who are a part in them (Gulati et al., 2000).

Methodology

This study was designed as a qualitative multiple case study (Yin, 2003) with two case companies. The printing houses were selected to be comparable, i.e. similar size, company structure and market potential. Qualitative case studies make it possible to gain deeper knowledge of the behavior behind the strategy used in the industry (Robson, 2002; Saunders et al., 2003). According to Yin (2003, p. 9), a case study should be considered when *“a ‘how’ and ‘why’ question is being asked about a contemporary set of events, over which the investigator has little or no control”*.

Business strategy and organizational culture in a company are often a direct reflection of the founder and the CEO, which are the persons responsible for the business development in the organization (e.g. Beal & Yasai-Ardekani, 2000; Harrigan, 1985; Porter, 1996; Schein, 1983). Collins & Montgomery (2005, p. 3) state that *“because the impact of corporate strategy is so pervasive and long lasting, it has more important consequences than most other managerial decisions. Setting corporate strategy, therefore, is a critical task and responsibility of the CEO”*. Therefore, the CEO at each printing house was chosen for an interview.

During the interviews open-ended general questions were asked and depending on the answers follow-up questions could be adjusted to the situation (Robson, 2002). The interviews were all conducted at the company of each respondent during the period from spring 2005 until spring 2006. Additional information has been collected by telephone, email, and from the companies' websites.

In the Results chapter, each printing house has been presented separately, while the empirical material has been analyzed with respect to the question areas regarding strategic alliances, resources, trust, commitment, control, and the competitive landscape.

Results of the Case Studies

Company A

Company A is among the larger graphic arts companies in Sweden and consists of several subsidiary companies. They are also a part of a larger communication group. Earlier their business focused on print, but because of a change in direction they have tried to move focus from print to more general print and communication services. Also, during the last couple of years they started to incorporate complementary services into the organization, and this integration was mainly done

organically and not through acquisitions. These services were to a large extent based on non-printed solutions like electronic documents etc.

Today Company A have large production volumes in offset print, but, during the last couple of years, they have started to develop services for digital printing. Until recently, they only had access to digital printing through an alliance with another printing house.

Ways to Cooperate

Company A currently has three important two-way cooperations and a couple of smaller cooperations to be regarded on a subcontractor level. The respondent's view of a two-way cooperation was a cooperation where the involved companies offer each others services, and in some cases even have common marketing campaigns. In general, Company A experienced a great value from alliances and are constantly searching for new partners in different work areas and on different levels.

In the search for new cooperation partners Company A try to benchmark the competition and they see no limitations to the form of cooperation. New cooperations can be alliances, subcontractor agreements and potential acquisitions. In some cases they searched for opportunities to develop new services, and in others to gain complements to existing activities. Although, one limitation the respondent emphasized was the geographic location of potential partners, they believed that being located in the same area is important for a successful relationship.

A couple of years ago, Company A took a strategic decision to start offering digital printing as a production technology to their customers, even though they did not choose to invest in the technology themselves. Instead they formed a strategic alliance with a smaller full service digital printing house. The idea behind this cooperation was, according to the respondent, to have a two-way alliance. Company A used this partner for digital printing, and the partner used Company A for conventional printing.

Company A's main reason for cooperating was to give their costumers access to a complete range of solutions, by extending their knowledge and resources into neighboring areas. These were both activities in the value chain of print media, but also complementary services such as e-documents. They found it important that the alliance partner complemented their business and had something that was highly valued by the customer, e.g. better price, performance, service or production, since the vision of Company A was to fulfill "all" their costumers' needs through a full service concept. They did not see in-industry companies as their only partners, but also creates tighter ties with important customers to develop new and accurate services. Through cooperation with costumers they believed that they developed accurate services for their customers. In some cases they even started cooperations with customers to create new offers with the intention to create future competitive advantages.

The respondent believed that cultural difference between companies can cause problems in alliances and should be considered when deciding on partners for

cooperation. The actual size of the companies is also important, in larger companies it is easier to dedicate human resources to nurture the alliance. In smaller companies the focus is mainly on production. According to the respondent, another difference linked to both cultural traditions and company size, was how they look at cooperation with competitors. In the printing industry, direct control over resources has traditionally been seen as a competitive advantage.

Partners must agree upon what they want to accomplish together and why, and one of the most important things when Company A engages in an alliance is that there is *“a clear measurable value for all parts, otherwise the will to cooperate fades away fast”*. This value can be hard to distinguish in the beginning of a relationship, but by starting a cooperation loosely by trying to solve a common problem, the relationship can grow deeper over time. Regarding the time aspect, Company A always calculates that their major alliances will “last forever” and they try to dedicate human resources to ensure that the alliance survives.

Resources and Use of Resource

Company A believes that the future potential in conventional printing presses are limited, and that *“offset printing is very standardized [between different companies] and effective, which makes it hard to create any additional profits [using conventional printing]”*. Instead they feel that opportunities lie within digital printing. In general, making a resource unique in the printing industry today requires working with the parts that are not standardized, *“it is in the services that it is possible to differentiate [from the competitors]”*.

The focus of Company A is changing from production to services, which, in some cases, leads to cooperation around services instead of physical resources. Cooperation around services is harder than around products and it is hard to change the scope of an alliance by e.g. lifting the cooperation from production to a development level. According to the respondent, Company A has not had any cooperation that started at a production level and then moved over to a service development level.

Relations and Agreements

The respondent suggests that when cooperating at a high level, like a two-way cooperation or cooperation in service development, the individuals involved in the cooperation becomes important. At that level it is necessary for the involved parts to have the same or similar way of thinking for the business to work. This is, however, less significant in a subcontractor relationship.

An offer proposal can be the first embryo of an alliance. If it works well and both parts are satisfied, it can lead to agreements of cooperation and in an extension it can lead to a joint business plan. A business plan, or some kind of agreement that describes how the cooperation should proceed is important. The respondent believed that it is important with some kind of management in detail, so both parts feel that they have control over the cooperation. *“You have to have a business jointly with your partner, were the goals are clear. With a ‘if you help me, I help you’-business plan, it is hard to build a lasting relationship”*. The further into the cooperation they get, the more important Company A believes that a written agreement is. Such a document should also describe how the cooperation, if it becomes necessary, will end.

Commitment, Trust and Risk

The respondent suggested that integration in an alliance is important. To create a tight connection between the partners in a cooperation, it is an advantage if the companies have employees physically working at the other company's premises. Company A always wants to have a key-account manager in their cooperation, an employee who works at the other company. They believed that *"for a cooperation to last, you have to sit together and breathe the same air"*. The respondent emphasized the importance of having direct contact between employees on all levels in the companies in the alliance. Maintaining trust and commitment is important since there is a major economical risk involved in being part of an alliance since there could be economic consequences due to actions and decisions from others in the alliance.

Company A see cooperation very much like a marriage, trust becomes important and it is not possible to hide everything from your partners. *"It is like love and passion, you cannot have forced partnerships"*, and you have to work actively to maintain trust and commitment in the alliance. If one part is unfaithful, the trust declines fast. To maintain trust Company A will try to distribute almost all internal information, with the exception of purely strategic documents, to their alliance partners. This is, according to Company A, a major risk in cooperating, since it becomes harder to conceal strategic intent.

Company A believed that tensions in relationships tend to develop when the alliance becomes successful and one part increases sales due to resources or services that are controlled through the network. When this situation occurs it is possible that one part in the alliance will start to see the other as a competitor and instead procure the resources to the company. This is what the respondent pointed out to be the major risk in maintaining an alliance.

In Company A's case, judging from the respondents words, their cooperation regarding digital printing took an unexpected turn when they decided that they should invest in digital printing production equipment in one of their subsidiaries companies. The strategic decision to internally control the digital printing resource was a result of two major factors; lower printing cost and higher print quality, which made the resource attractive to own. This decision resulted in their alliance partner in digital printing to cancel any further cooperation between the two companies.

Company B

Company B is among the larger print- and communication companies in the graphic arts industry in Sweden. Historically their strategy has been growth by acquisitions of strong companies in the industry. They believed the competition in the printing industry to be hard and stated that *"if you are just selling print, you are one out of a hundred that bids on a job and the lowest price usually wins"*. Company B illustrated the changing industry environment by regarding their *"competitors to be something else today that they were 10-15 years ago. Back then you mentioned names of printing houses, but you don't any more. However, it is exciting to see the landscape [of competitors] change."*

To avoid price competition, Company B objective is to be a service provider in the graphic arts industry. *"If you can ally yourself with your customer and be their partner, it is possible to be a part of their development and understand their needs. Then a long-term relationship can be established."* According to the respondent, a majority of Customer B's end-customers are active within the manufacturing industry.

In a series of strategic decisions, Company B has integrated the complete value system of print and graphics production. They have also purchased and internally control both conventional and digital printing technologies. According to the respondent, this was necessary to gain competitive advantages as a provider of complete solutions and not only be a subcontractor on the market. Although they have this focus on the actual production resources they believe that customer contact is important and they try to directly contract end-customers. This makes it possible for them to offer a cost effective solution, even if they not always have the lowest production price.

Today Company B's major revenues come from conventional printing. However, they do feel that they have to change direction and focus more on building system solutions for their customers to be able to continue as an independent company. Company B's major sales efforts are, right now, concentrated on system solutions. This can e.g. be creation of systems for template based print production, where the customer can create original material and produce it at any printing house, not exclusively at Company B.

The respondent said that their business idea is to provide the end customers with all services connected to the production process, as long as the end-product is produced on paper or the Internet. A major difference between being a print provider and a systems solution provider, according to the respondent, is the time-to-decision, which is much longer when a customer is going to decide on purchasing a new system for creating (print) media. In contrast to buying print, these decisions often involve top level management. In some cases Company B has agreed to finance the development of some services and the business model has been in the form of "pay per use" of the service.

Company B stressed that they have changed how they approach their customers. Earlier they printed larger volumes, but lately they have changed their strategy and now they try to apply a more on-demand approach. Even though they feel that they do not really support their own printing business by sometimes recommending customers to print less or not to print at all, the respondent thought that this is a better strategy in the long run. According to the respondent their customers' profit from smaller inventory and less discarded volumes using an on-demand approach. In some cases Company B has signed agreements with customers to make Company B the legal owner of the customers stock, and the customer is invoiced when material is ordered from the stock. This is, according to the respondent, an example of a win-win situation where customers reduced their costs for stock keeping and discard volumes and Company B gains control over handling, structuring and printing the customer's information.

Ways to Cooperate

Company B has a strategy of integrating both knowledge and production resources to be able to handle their customers needs, their cooperation is not intended for complementary resources and knowledge. Company B emphasized the importance of close customer relations and even tries to create cooperation with some of their customers. They have, for example, purchased printing equipment in joint-ownership with a customer. However, they have also created alliances with companies that offer similar services and products to be able to utilize each others production capacity when needed. This involves mostly production resources such as printing and finishing. According to the respondent this type of cooperation requires that several companies are a part of the alliance since the lack of available resources is often a phenomenon that happens to many of the companies in the industry at the same time.

The geographic location of the alliance partners was less of a problem. Although, in some cases, especially when discussing digital printing and fast delivery times, the location is important since the alliance partner need to be close to the customers to make fast deliveries possible.

The respondent emphasized the importance of personal contact. Company B even terminated cooperation with one of their partners, when their contact moved to another company. Instead they started cooperation with this person's new employer. Even though the need to cooperate often comes from below in the organization, it is a management decision to decide upon alliance partners and secure the appropriate quality etc.

Resources and Use of Resource

The respondent believed that uniqueness is important in printing and the best way to create something that is perceived as unique is by customizing activities around their printing resources and create full service solutions for their customers. They want to *"find smart solutions together [with their customer], to produce e.g. personalized products"*. Controlling these strategic activities and also the resources they are based around are valuable according to the respondent. Cooperation in this area is not an alternative for Company B, and they either develop their activities in-house or procure and integrate them into their organization.

Company B was rather disappointed with the print quality that the digital printing presses produced and the quality of the actual presses. They first tried to utilize a depreciation time of five years, but now they feel they have to use a maximum of three years due to fast technological development.

The respondent felt that the use of personalized print is currently rather uncommon in Sweden, and that it is the customers' databases that are the largest obstacle for customers to start using variable data printing. Obsolete information and bad structure are, according to Company B's experience, quite common in customers' databases. This is the reason why Company B in many of their complete solutions for customers take control and handle the customer's databases as a part of the service.

Direct Control over Resources

Company B wants to do *“the majority of the added value in-house, but it is not sure that this is the case in five, or even in three years. It is possible that we [in the future] will use subcontractors to a larger extent, depending on how the market develops. Anyway, we will always have the ambition to work closely with the customer and, with the use of service solutions, be the one with customer contact.”*

As mentioned, Company B, stated that they have focused on creating services in connection to graphic production, which makes it possible for customers to choose different print providers. Company B currently owns their own printing equipment and they do not, however, think that this behavior will have a negative effect on their print production, since they believe customers to be unstructured in the way they work and therefore rather choose full service concepts. Having printing resources, both conventional and digital, is seen, by the respondent, as an important issue if competitive advantages in the printing market is desired. They believed it to be a trust issue, since they do feel that it is hard to hand over the responsibility for printing to alliance partners. *“As long as real people are our customers, they will be rather unstructured and this means that there will be no time to use partners.”*

Discussion

This paper provides two examples of how strategic alliances are used in the printing industry to create competitive advantage for its actors. The case companies were chosen for their obvious similarities, such as size and company structure. However, during the study more similarities became clear such as strategic goals, how they handle the market and to some extent how they are positioning for the future. Even though these similarities, the way they internally and externally are strategically structuring to meet future demands are to some extent different. In this chapter these differences in handling and utilizing alliances will be discussed.

According to theory, alliances are created when the actors believe that they can get an added value by being a part of the alliance (e.g. Faulkner, 1995; Gulati et al., 2000; Jarillo, 1988). This is also the case for the investigated companies in this study, as they believe that by cooperating and engaging in different types of alliances, they can achieve a better result than working on their own. It should be noted that even though the cooperations illustrated in this paper have different purposes, both companies have retained contact with their customers.

It was the intention to enhance customer satisfaction that convinced them to engage in alliances. Either by extending their business to offer a wider array of complete services (Company A), or by being able to ensure additional capacity, whenever needed, of resources already present in the company (Company B). The main reason for cooperation, in both cases, was gaining access to different kind resources.

The case companies believe that they can perform better on the market by utilizing alliances (cf. Rothaermel, 2001). When analyzing how the case companies structure their businesses, their vision for success is consistent with the findings of Rothaermel et al. (2006), as they are combining vertical integration with various

kinds of cooperations. Vertical integration in the digital printing industry has been deemed as an important success factor in earlier research (Mejtoft, 2006).

The major difference between the cooperations of Company A and Company B can partly be described by the degree of dependence between the companies and their partners. Company B has digital printing equipment, but also cooperations that ensure them (and their partners) additional production capacity whenever needed. Since they have digital printing in-house, they are not totally dependent on their cooperations to ensure delivery to their customers. Company A, on the other hand, was more dependent on their cooperation in digital printing than Company B, as they have developed services for their partners printing equipment. The results also confirm this difference in dependence since Company A more clearly states the importance of long-term trust and commitment in the alliances (e.g. Jarillo, 1988; Medcof, 1997; Morgan & Hunt, 1994; Ring & van de Ven, 1992). According to the respondents, trust and commitment are closely related to the employees involved in the alliance (Child et al., 2005).

In accordance with the literature (Faulkner, 1995; Whipple & Frankel, 2000), the respondents thought that the corporate culture and the size of the companies in an alliance was important. One of the respondents stressed the differences when working with companies of significantly smaller size. Larger companies often regard a situation with different perspectives of e.g. how investments should be made, agreements when cooperating and demands from owners. Nevertheless, the company might be, in some cases, less important than personal chemistry. This was exemplified by both companies, as they stated that, in many cases, the actual persons are more important than the company behind.

It should be noted that the need for dedicating human resources (Child et al., 2005) may increase in importance, the more strategic the alliance becomes. As mentioned earlier, Company A decided to use alliances to gain access to new resources and knowledge. It was also this company that stresses the importance of dedicating human resources to nurture alliances, and that information is important to maintain trust and consequently commitment in the alliance.

When acting in a dynamic market a company always takes risks, this is also the case when cooperating with others (e.g. Jarillo, 1988; Morgan & Hunt, 1994; Ring & van de Ven, 1992). In the cases illustrated in this paper, the risk-taking between the companies is different. Company A has chosen to have more strategic alliances which imply that the risk is more focused to the actual alliance. On the other hand, Company B has the knowledge and basis for their production of digital printing in-house. This concentrates the main risk inside the company and not in the alliance.

The level of risk in these cases are different, and so are the ways they try to handle it. Company A focused a lot of effort on creating trust and commitment in their alliances. This is done both by dedicating human resources and by formal agreements between the partners. To lower the risk in an alliance the respondent always tries to formulate their intention in written agreements between the different parts. The agreements should cover all aspects of the cooperation, especially the economic issues, and even include how the partnership should be ended if one part wants to contract out of the alliance. Company B on the other hand has strategically

chosen to limit their capacity of e.g. production equipment to a reasonable capacity, and cooperate to increase this capacity when needed. This limits the risk in ownership. Theoretically it should be easier to cooperate to gain access to new resources when the resources are plentiful in supply. This is the case in the printing industry, which, in this case, limits the risk for Company A.

Even though cooperation with other companies that can provide resources for production and render it possible to enhance customer satisfaction, both companies in this study emphasize the importance of cooperations with customers. Working close to lead-users is a way for these companies to try to predict future customer value (D'Aveni, 1994; Thomke & von Hippel, 2002; von Hippel, 1986).

Hypercompetitive Behavior and Alliances

As has been discussed in the theoretical framework, many external conditions that Faulkner (1995) deems important for alliances to be formed touch upon those of a highly dynamic environment (Bourgeois & Eisenhardt, 1988; D'Aveni, 1994), e.g. turbulence in markets, fast technological development and short product life-cycles. Both companies tend to work in a hypercompetitive manner, since they are striving to work broader than just the printing sector and thereby change the rules of competition in the industry by for example offering non-printed solutions to their customers. Further on, they are focused on always maintaining customer contact and trying to deliver a high customer value by working close to their customers. However, one major difference between the two is their approach to printing sector.

Although Company A and B are quite similar, their strategic directions with respect to printing resources do diverge. While Company B believes that the actual control over the printing resources are crucial for their future survival, Company A has deemed the future to be in providing services where the actual output can be indirectly controlled through alliances in order to move more quickly between different services. Consequently, the vision of Company B is clearer set on outputs that can be produced in the traditional printing industry and preferably at the companies own production facilities. Company A on the other hand has set a more customer centric focus, which, according to the respondent, might lead the company to exit the traditional printing industry in the future. Although Company B has a more traditional vision, they emphasize the importance of long-term cooperation with their customers, which, according to respondent, might lead them to reevaluate their strategic path in the future depending on customers needs.

Introducing a hypercompetitive-like behavior often means accelerating the competition in the industry and moving the industry into, what D'Aveni (1994) notes as, a hypercompetitive state. The degree of hypercompetition and its existence in different industries has been discussed and there are empirical data that both support (e.g. D'Aveni, 1999; Thomas, 1996; Wiggins & Ruefli, 2002) and give reasons to question (e.g. Gimeno & Woo, 1996; Makadok, 1998; McNamara et al., 2003) the shift to a hypercompetitive state. Previous research (Mejtoft, 2007) suggests that some companies in the printing industry tend to work according to the principles stated by D'Aveni (1995) to handle a hypercompetitive market. If this is

the general case in the printing industry is still left to investigate. Nevertheless, the competition in cost/price and quality is hard (Birkenshaw, 2004; Smyth, 2006) and it can be noted that a transition into service oriented companies, by integration, is taking place (Mejtoft, 2006).

Having dynamic capabilities is important when acting in a hypercompetitive environment (Teece et al., 1997). In the case of Company A, alliances created an opportunity to act more hypercompetitively by offering them the ability to move faster to market, maintaining customer contact and gaining control of resources and knowledge without direct ownership of digital printing equipment. This is consistent with the findings of Lee (2007), that suggests that alliances might decrease the time to market. This makes it possible to better catch the opportunities of the market. However it was the recent strategic decision by Company A to purchase digital printing equipment that had negative effects on cooperation. Having direct control is quite a traditional way of working in the printing industry, and basically it is a step “backwards” to a more static way of competing that often made cooperation end in dissolution. Nevertheless, owning digital printing equipment became a great opportunity for Company A, when the value creation zone changed (Collis & Montgomery, 1995; 2005). Even though scarcity of digital printing has decreased due to more companies acquiring the technology, appropriability and demand increased for Company A (Figure 2). Appropriability mainly owing to decreased costs from the printing press manufacturers and demand due to applications and smart solutions developed during cooperation.

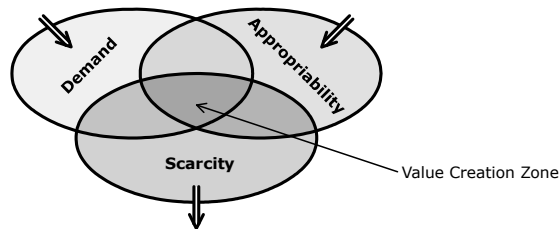


Figure 2. Changes of the value creation zone of digital printing Company A
(After Collis & Montgomery, 1995, p. 120).

Even though purchasing the digital printing equipment, in this case, can be seen as a less dynamic way of competing, it may also be regarded as opportunistic behavior by Company A, which leads trust to fail and commitment to the alliance to decline. Although not purposely, this behavior leads the alliance to fail, which is consistent with the findings of Gulati et al. (2000), that suggest that a more opportunistic behavior on the market reduces the ability to maintain successful alliances. In other words, Company A used the alliance to learn from the partner, a so-called learning race (Gulati et al., 2000; Jarillo, 1988).

This situation is consistent with the findings of Bleeke & Ernst (1995), that suggest that an alliance that consists of equally strong companies with complementary resources is the type of alliance most probable to be successful. However, when Company A procured digital printing equipment the status quo shifted and became

an alliance between competitors (e.g. Hamel, 1991), which is an alliance likely to end in dissolution (Bleeke & Ernst, 1995).

Due to the fast technological development of e.g. electronic publishing and the convergence of the media industry, the competition in the printing industry has become harder and is not only in-industry competition any longer. These industry changes have put pressure on individual companies and the need for a wider selection of services and products is evident. This has created a need for integrating additional activities in the value system, which has been identified as important in the digital printing industry (Mejtoft, 2006). This paper illustrates that strategic alliances can, in many cases, offer the means to obtain the advantages of vertical integration without the need of investing in development, resources and competence (Jarillo, 1993).

Conclusions

The case companies' primary reason to cooperate was to gain access to resources that could enhance customer satisfaction and to retain customer contact, which is important to be competitive in a dynamic business environment. This paper illustrates that strategic alliances and cooperations can be used in different ways and being part of an alliance can be regarded as successful and something worth nurturing. However, the more strategic an alliance becomes, the more important factors as trust, commitment and human resources become for the success of the alliance.

Creating cooperations that aim towards ensuring additional capacity is important in an industry, such as the printing industry, that is still largely focused on production. However, as the case companies illustrate, cooperating to gain indirect control over a partners resources is a way of being able to serve customers and to explore new business areas.

Hypercompetitive behavior, like being too opportunistic, clearly can have drastic negative effects on an alliance. Even though alliances can be an enabler to ensure working faster and more dynamic in the first place. This was illustrated by Company A, as they, during the phase of expansion in the digital printing business, cooperated in the areas of competence and physical resources to expand their business. When the opportunity availed it self to profit from the actual production and not only the services, they chose to purchase their own equipment. Utilizing alliances in this manor made it possible to act more dynamically and quicker on the market but also resulted in the failure of the alliance.

The competitive situation in the industry has made it important to offer full service solutions to customers including digital and conventional printing as well as complementary services in the value chain and additional services such as Internet solutions. Strategic alliances can offer the means to obtain advantages of a vertically integrated company without the need of investing in additional resources and competence, and the risk associated with such a strategy.

Further Research

The participating companies in this case study are two large graphic arts companies in Sweden. By studying these companies it has been possible to gain knowledge about how alliances are used in the dynamic business environment of the printing industry. However, the majority of printing houses in Sweden are small and medium sized companies. Even though the competitive situation for these companies is quite similar, since they are acting on the same market, their approach to cooperation and alliance may differ. Thus, a continuation of the investigation of the importance of alliances in the printing industry should include and focus on small and medium sized printing houses.

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Paper V

Positioning in the Printing Industry
- Differentiation in Terms of Price, Lead Time, Print Quality and Flexibility

Paper originally presented at *iarigai's 34th International Research Conference* in Grenoble, France, September 2007. Paper published in *Advances in Printing and Media Technology*, Vol. 34.

Positioning in the Printing Industry - Differentiation in Terms of Price, Lead Time, Print Quality and Flexibility

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Keywords: strategy, differentiation, flexibility, commercial printing

Differentiation and adding value to the printed product is regarded as important in the low margin, highly competitive commercial printing industry of today. However, there exists a trade-off between the service level and the price the customer has to pay. This quantitative survey study of 136 commercial printing houses sets out to investigate how they are positioning themselves and how they perceive the demand from the customers with respect to price, lead time, print quality and flexibility.

In summary the results presented in this paper propose that the commercial printing houses perceived a demand from customers to provide a commodity product with only small differences between price, lead time, quality and flexibility. However, the results also indicate that the printing houses want to sell a more differentiated and customer centric product with focus on flexibility and quality. Although positioning seemed to be independent of printing technology, it was possible to notice that digital printing houses perceived a lower price pressure from the market. These results suggest that using digital printing to enhance customer value was successful since the digital printing houses felt that their customers did not have as high demands for low prices as customers to conventional printing houses.

1. Introduction

According to Bunch & Gould (1996, p. 3/1), businesses that seek success have to “overcome the challenges of very demanding customers seeking high quality, low cost products, responsive to their specific and rapidly changing needs”. The commercial printing industry is in general considered as a low margin industry, with declining prices, and the competition is regarded as fierce (Birkenshaw, 2004; Smyth, 2006). Lately, differentiating and adding value to the printed product and becoming a service provider have become widely discussed issues in the printing industry (e.g. PODi, 2003; PODi, 2006; Romano, 2004). In a production company there exists a trade-off between the level of service and the price the customer has to pay. According to

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Porter (1996, p. 69), “*positioning trade-offs are pervasive in competition and essential to strategy. They create the need for choice and purposefully limit what a company offers*”. There also exists a trade-off between cost and service/quality (e.g. Brandenburger & Nalebuff, 1996; Herer et al., 2002; Porter, 1980) in a supply chain and Stigler (1939) and Rudberg & Wikner (2004, p. 446) propose that a high level of flexibility can only be achieved at the expense of a higher cost, “*customers have to choose one before the other; low price (productivity) or specific needs (flexibility)*”.

To be successful in a changing industry environment, a producing company has to consider the critical success factors - *price, quality* and *time* (Blocher et al., 1999; Tan, 1998). Furthermore companies need flexibility in order to adopt to changing customer needs (Sharifi & Zhang, 1999). Therefore, the four factors *price, time, quality* and *flexibility*, are all important when discussing a supplier-customer relationship. The question is how a company should position itself since there is a trade-off between these factors.

1.1 Research Objective

This study sets out to investigate how commercial printing houses are positioning themselves and how they perceive the demand from customers with respect to *price, lead time, print quality* and *flexibility*. Further this study aims to explore the perceived level of competition in the printing industry.

2. Theoretical Framework

The goal of the generic strategies defined by Porter (1980) – *cost leadership, product differentiation* and *market focus* is to obtain and sustain competitive advantages. These classic strategies may work well until competitors have copied or outmaneuvered them, which may make them less successful in a dynamic environment (D’Aveni, 1994). In the theory of competitive strategy, the sustainability of differentiation depends upon continued perceived customer value and the lack of imitation from competitors (Porter, 1985). However, to be able to continuously deliver value that the customer appreciates, one option is to focus on what Schumpeter (1942/1975, p. 83) refers to as “*creative destruction*”. Collis & Montgomery (1995, p. 124) describes it as “*in a world of continuous change, companies need to maintain pressure constantly at the frontiers - building for the next round of competition*”.

In today’s competitive industry environments, it is becoming more difficult to accomplish sustainable competitive advantages (e.g. Dierickx & Cool, 1989; Thomas, 1996; Wiggins & Ruefli, 2005). The opinions on what strategic path for a company to choose are diversified, and there is no general consensus for how a company should act in order to maintain competitive advantage (Sharifi & Zhang, 1999). Williams (1994, p. 245) states that “*strategies are inherently self-destructive and thus cannot yield sustainable rents*”. Companies acting in a dynamic business environment have to be agile in spotting new opportunities, developing short cycle strategies and abandoning old cash cows, thus being flexible in meeting customers’ current and future needs (e.g. Brown & Eisenhardt, 1998; D’Aveni, 1994; Sanchez, 1995).

According to Narver & Slater (1990) this should be a major goal for companies producing commodity products.

When the general business environment becomes more complex, Evans (1991, p. 85) suggests that *“strategic flexibility is at a premium [sic] when the rules by which a game gets played are redefined, or when the nature of the game itself changes”*.

2.1 Strategic Flexibility and Flexibility in Production

Strategic flexibility (e.g. Aaker & Mascarenhas, 1984; Evans, 1991; Goldhar et al., 1991; Harrigan, 1985; Johnson et al., 2003; Sanchez, 1995) is a concept with multiple dimensions and can be defined as *“the capability of the firm to proact or respond quickly to changing competitive conditions and thereby develop and/or maintain competitive advantage”* (Hitt et al., 1998, p. 26). Teece et al. (1997, p. 516) define dynamic capabilities as *“the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”* and this is essential when acting in a dynamic market. Eisenhardt & Martin (2000, p. 1106) suggests that *“dynamic capabilities are necessary, but not sufficient, conditions for competitive advantage”*. The organization and its capabilities are interlinked and Volberda (1996) suggests that being able to have dynamic capabilities is dependent on other factors such as having a flexible organization form.

Two main aspects of strategic flexibility are stressed in the literature - resource deployment and competitive actions (D’Aveni, 1994; Eisenhardt and Martin, 2000; Fombrun and Ginsberg, 1990; Miller et al., 1996; Williams, 1994). A high flexibility in strategic actions and internal and external capabilities that are dynamic are, as been described, essential for a company that wants (or needs) to act on a dynamic market. However, strategic flexibility has to be put into a context of producing value in a product or service for the company’s customers. Sanchez (1995) and Slack (1983) emphasis the importance of flexibility in production, to be able to increase the possibility to produce products that customers really want. Sanchez (1995, p. 143) further suggests that product flexibility is *“more relevant to product competition in dynamic markets”*. This is also stressed by Chang (1993) who proposes that flexibility in manufacturing is a way of protecting the company against uncertainty in future market conditions and fluctuations in customers’ taste. The importance of flexibility in manufacturing can be exemplified in the success of the Sony Walkman in the 1980s. Sony created a system to support small design and technological changes, making it possible to launch a large variety of different products in rapid succession. This was possible due to understanding customers’ needs and a *“system of flexible manufacturing so that it could make money on small production runs”* (Sanderson and Uzumeri, 1995, pp. 779).

As has been discussed above, a flexible production to create unique customer solutions is an important ability in becoming a customer-centric company and is an essential part of having high strategic flexibility. However, being able to serve customers to their liking in respect to lead time and product quality is also of great importance.

2.2 Delivery Lead Times and Product Quality

Reducing lead times is important in many logistic systems, and is also a source of competitive advantages (e.g. Tan, 1998). In accordance with Aitken et al. (2002, p. 62), lead time is defined as *“the time taken from a customer raising a request for a product or service until it is delivered”*. Reduced lead time is also an important part of the lean manufacturing approach that derives from the Toyota Production System (TPS) (e.g. Liker, 2004; Liker & Morgan, 2006). Having short lead times has been deemed as a major order winner and a way of creating short term competitive advantages (Stalk & Webber, 1993).

The quality of a product or service is important in almost every industry (e.g. Normann, 2002), which has been highlighted by the many different concepts that have evolved for improving quality, such as e.g. Total Quality Management (TQM) and ISO9000 (e.g. Conti, 1999; Zhu & Scheuermann, 1999). Even though these concepts are organization wide and do not in detail guarantee the quality of the end product, they can be used to ensure that high quality business processes have been used. Regarding quality, the most noticeable experience for the end user is the actual product quality, and Cooper (1995) emphasizes the strategic importance of high quality products. Day (1999, p. 173ff.) states that *“boosting quality is now seen as the surest route to creating superior customer value”* and further suggests that high quality is profitable.

When business focus is on the end user, Johansson et al. (1993) suggests that the total customer value can be aggregated as cost, lead time, quality and service. In this paper, the term price will be used instead of cost, since it is the connection between the producing company and the customer that is investigated (e.g. Cooper, 1995). Also the term flexibility will be used to specify the product flexibility in creating unique services to the customers. Consequently, *lead time, quality and flexibility* will be regarded in contrast to the trade-off (e.g. Brandenburger & Nalebuff, 1996; Herer et al., 2002; Rudberg & Wikner, 2004) in respect to *price*.

3. Methodology and Study Design

3.1 Population and Sample

This paper is based on a subset of data from a larger survey study of 136 Swedish commercial printing houses carried out during the spring and early fall of 2006. The questionnaire was sent out by letter to 300 companies, which were randomly selected Swedish commercial printing houses from the members' list of the Swedish Graphic Companies' Federation (GFF). It should be noted that this list is not a complete list of all commercial printing houses in Sweden, which limit the possibilities to generalize the results to the whole Swedish commercial printing industry.

An alternative to this list could be e.g. extracted from the telephone directory or a financial information database. However, these other alternatives did not, according to the authors, provide a list with sufficient accuracy. Consequently, the authors believe the list used to be the best directory to constitute the basis for this survey

investigation of Swedish printing houses. Although the used list is not complete, it does, according to GFF, include companies covering at least 80% of the volume of invoiced sales of printed commercial products in Sweden (K. Flick, *GFF*, personal communication, January 25, 2007). Hence, the results should give a good indication of the situation in the Swedish commercial printing industry. CEOs or vice managing directors made up 82% of the respondents. The rest of the respondents were persons responsible for marketing, production or logistics.

The data in the study has been separated and analyzed in different categories depending on the printing technology used at each company (Table 1). The categories used were: *all printing houses*, *printing houses with digital printing* and *printing houses with only conventional printing*. The other categories *printing houses with only digital printing*, *printing houses with both conventional and digital printing* and *printing houses with conventional printing* were also analyzed, but without any interesting results. For a printing house to be regarded as using a specific printing technology in production, it should constitute at least 10% or more of the total production.

Table 1. Relative share of printing houses in the survey study according to printing technology used.

	Relative Share
Digital Printers:	39.0% (53)
Only Conventional Printers:	61.0% (83)
All Printers:	100% (136)

3.2 Questionnaire Design

The questionnaire was designed to obtain information about the respondents' ranking of *price*, *lead time*, *quality* and *flexibility* with respect to how the printing houses perceive the demand from the customers and how they have differentiated their offer. The questionnaire was based on closed questions, with the purpose of measuring opinions. Data was collected using numeric rating scales where the end categories were labeled with appropriate options (Saunders et al., 2003). Two different scales were used, a 10-point numeric rating scale from 1 to 10 when rating opinions about e.g. perceived pressure. When rating opinions about e.g. differentiation, an 11-point rating scale from -5 to +5 (including 0) was used to capture how the companies had chosen to differentiate themselves in relation to, their perceived, market average. However, the companies' ranking of how they had chosen to differentiate themselves does not necessarily reflect on how they actually performed in relation to the market average, because the respondents may have different perceptions about numerical values (Churchill and Brown, 2004). Furthermore they may tend to set high values when they are evaluating their own performance (Robson, 2002), which was indicated in this study by respondents having a better performance on all factors (besides price) compared to the perceived market average. However, since the purpose was to evaluate the different factors against each other the problem identified by Robson (2002) was not an issue in this case.

All questions were in Swedish, since the questionnaire was completed by Swedish printing houses. To ensure the validity of the questionnaire, an initial pilot testing (Saunders et al., 2003) was performed with three printing houses. Some questions were changed and new questions were formulated according to comments made by the respondents in this pilot test.

3.3 Data Collection and Analysis

Since this survey was constructed as a self-administrated survey, a covering letter, explaining the survey, was enclosed in the letter to each respondent (Saunders et al., 2003). The respondents had the choice of responding either by post or through a web interface. The companies that did not respond to the initial survey were reminded by email and/or telephone. While collecting data from the sample, it was found that some of the companies did not meet the research requirements of this study, and they were subsequently omitted. The response rate was calculated, in accordance with the Council of American Survey Research Organizations (CASRO, 1982; Wiseman & Billington, 1984) as:

$$\text{Total response rate} = \frac{\text{Total number of responses}}{\text{Total number in sample} - \text{Ineligible}}$$

Out of a total of 300 companies, 46 were found to be ineligible and 136 eligible companies responded, which constituted a total response rate of 54%. Out of all companies, only six were not possible to reach by personal communication (i.e. telephone or email), implying that practically all ineligible companies in the sample have been identified. The reason for having so many ineligible companies (46) was that the database contained some companies that did not currently own any printing equipment, but were interested in the commercial printing business. In most cases they were working with activities closely related to this business, such as prepress or finishing.

About half of the answering respondents posted their answers without any reminder, whereas the other half sent their response after being given a reminder. According to Armstrong & Overton (1977) people who respond late are assumed to be comparable with non respondents. In general, no major differences between the two groups were found, thus giving an indication of no significant differences between respondents and non-respondents.

The sample (136 companies) was large (>30) and approximately normally distributed (Keller, 2005), whereby the t-distribution was used to calculate confidence intervals and p-values. Since the sample also covered a large portion of the studied population (428 companies) a Finite Population Correction Factor (FPCF) was used when calculating the standard deviations for the mean values (e.g. Andersson et al., 2002, p. 257; Keller, 2005, p. 399).

$$\text{FPCF} = \sqrt{\frac{N-n}{N-1}} \quad \begin{array}{l} N = \text{Population size} \\ n = \text{Sample size} \end{array}$$

The significance between different categories in the dataset has been analyzed using an independent sample t-test using a 95% confidence level. The significance of differences between the factors price, lead time, quality and flexibility were

determined using a paired sample t-test. Since six comparisons had to be made to find possible significance between the four mean values, the confidence level was adjusted using the Bonferroni adjustment method (e.g. Keller, 2005). The Bonferroni adjustment stated the confidence level to be set to 99.17% for each t-test, in order to avoid Type I errors (falsely get a significant difference) and implied a 95% confidence level in total. However, using the Bonferroni adjustment might increase the risk for Type II errors (not observing a significant difference) (Keller, 2005). Due to this, the p-values for factors not showing any significant differences were also investigated without the Bonferroni correction, and in this case none showed any significant difference either. Further the correlation between the fraction of digital printing used in a company against perceived market competition and perceived price pressure was tested. SPSS 15 and Microsoft Excel 2003 were used for the statistical analysis.

A survey study typically gives a good overview over a large population (e.g. an industry), while it is more difficult to get a deeper understanding of specific research questions. To get deeper understanding it is preferable to use in-depth case studies of a few selected companies. However, since the aim of this study was to investigate the positioning of the commercial printing industry, the use of a survey should be regarded as the preferable method. As mentioned earlier, the aim of this survey was to capture opinions of the respondents. Peoples' opinions are, however, always subjective and do not necessarily correspond to reality, which is a limitation of any study concerning the capture of opinions.

4. Results and Discussion

In this chapter the results from the survey study will be presented along with a discussion of the interesting results.

4.1 Positioning of Printing Houses

The printing houses have differentiated their business towards service related factors, such as having a high level of flexibility, good print quality and short lead times (Figure 1). Thus they have primarily focused on giving their customers a high level of service and enhancing customer satisfaction. This increased level of service has been accomplished at the expense of higher prices to their customers (e.g. Brandenburger & Nalebuff, 1996; Herer et al., 2002; Rudberg & Wikner, 2004). Previous research shows that dynamic strategies and a focus on delivering a high customer value are important to be successful, especially in the digital printing industry (Mejtoft, 2007). However, it should be noted that there were no significant differences (Table 2) at the 95% confidence level between companies with and without digital printing in their positioning with respect to flexibility, which is the factor ranked the highest by the printing houses in this study (Figure 1). Neither was there any difference regarding the other factors, which means that their positions on the market, in respect to these factors, are quite similar.

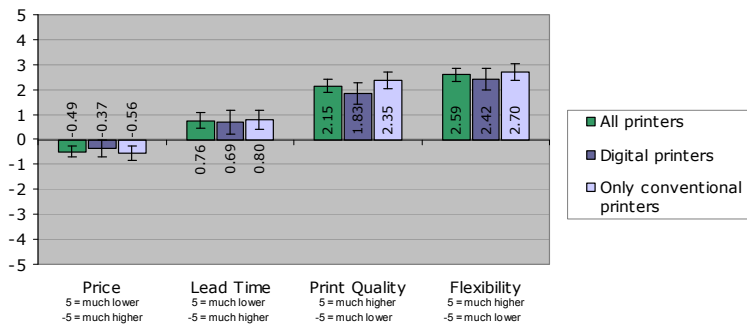


Figure 1. Positioning of the printing houses compared to the industry in general (mean values with a 95% confidence interval).

Table 2. Significance of differences between digital printers and only conventional printers in respect to position.

	Price	Time	Quality	Flexibility
Mean difference:	0.196	-0.113	-0.527	-0.277
t:	0.855	-0.363	-1.963	-1.031
Degrees of freedom:	132	132	132	130
Significance (2-tailed):	.394	.717	.052	.304

There are no significant differences between means at a 95% confidence level.

It should be noted that there were no differences in position for lead times between digital and conventional printers. This is interesting since fast deliveries are something that many digital printing houses regard as important for their business. Further, as can be noted in Table 2, the difference in position regarding quality was very close to showing significance at a 95% confidence level. This result illustrates that digital printing houses tended to regard their own position in quality lower than the conventional printing houses. This result was expected because the print quality of conventional printing technology (in this case mostly offset) is today generally regarded as a “norm”.

4.2 Perceived Market Demand and Market Competition

It is possible to notice a quite clear difference in how commercial printers have positioned themselves (Figure 1) compared to how they perceive market demand (Figure 2).

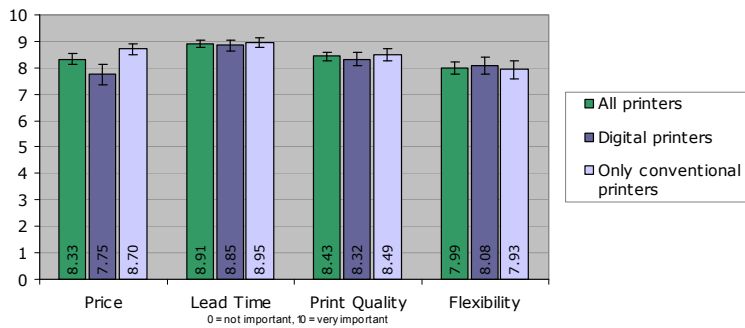


Figure 2. Perceived demand from the market (mean values with a 95% confidence interval).

The printing houses believed that the foremost demand from customers was short lead times, while low prices and high print quality were only second to short lead times. The printing houses have deemed it important to position for a high level of flexibility (Figure 1) even though they do not feel that this is a major demand from their customers (Figure 2). Flexibility was, when investigating all printers, subordinate to both lead time, print quality and for only conventional printers also price. Having a high level of flexibility has been considered important when acting in any highly dynamic market (e.g. Brown & Eisenhardt, 1998; D'Aveni, 1994; Sanchez, 1995). However, the results indicate that the printing houses perceived that their customers are demanding a commodity product.

High flexibility and quality are factors that should enhance the possibility to create a high level of customer satisfaction. The printing houses, in general, are differentiating themselves by providing a high level of service to the customer, which can be a way to escape the commoditization of the printed product (e.g. D'Aveni, 1994; Porter, 1985).

Table 3. Significance of differences between digital printers and only conventional printers in respect to perceived demand from customers.

	Price [#]	Time	Quality	Flexibility
Mean difference:	-0.944	-0.103	-0.173	0.149
t:	-4.216	-0.757	-0.955	0.610
Degrees of freedom:	87	134	134	133
Significance (2-tailed):	.000*	.451	.342	.543

* Significant difference between means at a 95% confidence level.

[#] Based on unequal variance of means, all other calculations based on equal variance.

An interesting result from this study is how the different respondents believed that their customers valued the price factor. There was a significant difference (Table 3) between the pressure digital printing houses and conventional printing houses perceived from their customers regarding the pricing of their products. Printing houses that had digital printing felt a lower price pressure than those without digital printing. This result suggests that differentiating towards a higher level of customer

service when using digital printing to add value to the products is a successful concept. These printing houses feel that their customers did not have as high demands for low prices as the customers to conventional printing houses.

The market competition in the commercial printing industry has in general been deemed as fierce (Birkenshaw, 2004; Smyth, 2006). This statement is further strengthened by the results from this study, where the printing houses have regarded the market competition as very high (Figure 3).

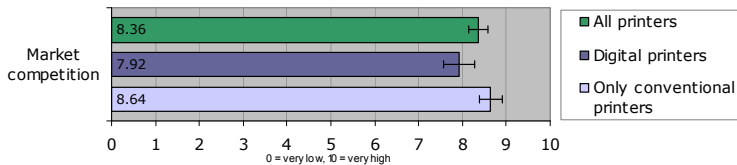


Figure 3. Perceived market competition (mean values with a 95% confidence interval).

Even though both digital printing and conventional printing houses regard the market competition as high, it is possible to notice a significant difference between the two categories. Companies that use digital printing perceived a significantly lower competitive situation on the market than those using only conventional printing technology (Table 4).

Table 4. Significance of differences between digital and only conventional printers in respect to perceived market competition.

	Market competition
Mean difference:	-0.715
t:	-3.276
Degrees of freedom:	133
Significance (2-tailed):	.001*

* Significant difference between means at a 95% confidence level.

It is also possible to notice a negative medium correlation (in accordance with Cohen, 1977, pp. 79-81) of approximately -.3 between the share of digital printing used in production and the perceived market competition. The same is true for the correlation between the share of digital printing used in production and the perceived demand from customers on providing low prices. Hence, the use of digital printing tends to make the perceived price pressure and market competition lower. This further strengthens the evidence of digital printing having a positive effect, from the printing houses point of view, on the competitive situation and product pricing.

4.3 Strategic Positioning

It is easy to argue that to satisfy customers' needs the printing houses should have a focus that is similar to the demand from the market, which is not the case according to the results from this study (cf. Figure 1 and Figure 2). However, the printing

industry has a high, or even fierce, level of competition (Figure 3), largely based on price (Birkenshaw, 2004; Smyth, 2006). This situation does not favor companies active in the industry. However, by shifting focus towards a service oriented organization it should be, in theory, possible to increase the value of the product and accordingly the price. This is what Porter (1980) refers to as having a differentiation approach instead of cost leadership approach or when D'Aveni (1994) discusses to escape the cost-quality area and focus on e.g. timing and know-how. Both the conventional printing houses and the digital printing houses have a similar strategic position (Figure 1). However, it is possible to distinguish in this study that digital printing houses perceived a lower pressure from the market regarding the price and a slightly lower competitive situation. These results indicate that even though the focus is similar, digital printing houses are more successful in their strategic position in having a higher level of service since they can charge a higher price.

5. Conclusions

The positioning regarding price, lead time, print quality and flexibility of the companies and pressure from the market are quite similar regardless of the printing technology used. Previous research (Mejtoft, 2007) has indicated that working closely with customers and being flexible towards their demands, strengthens the possibilities for a successful relationship with their customers and their ability to be competitive. This paper further strengthens this view by illustrating that even though the demand for flexibility is perceived to be significantly lower than e.g. print quality and lead time issues, it is the flexibility that is the differentiating factor that the companies are most intensely focusing on. This result suggests that companies are starting to become aware of the importance of being flexible to satisfy customers' needs, even though customers do not yet value this action.

Although this positioning seemed to be independent of printing technology, it was possible to notice that digital printing houses perceived a significantly lower price pressure from the market and market competition. This result proposes that using digital printing to enhance customer value was successful since these printing houses felt that their customers did not have as high demands for low prices as the customers to conventional printing houses.

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Vertical Integration and Profitability: Experiences from the Commercial Printing Industry

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Keywords: corporate strategy, printing industry, profitability, vertical integration

This quantitative survey study investigates the degree of vertical integration in the Swedish commercial printing industry and examines the affect of vertical integration on profit. The results show that vertical integration is commonly used both by digital and conventional printing houses. The study concludes that vertical integration is important due to the strategic importance of controlling a large part of the value system. The study indicates that the level of vertical integration has no significant impact on profitability. Nevertheless, one explanation, for the high level of vertical integration, could be the strategic aspect of acquiring possibilities to expand the business.

Introduction

In the early stages of an industry it is often necessary to produce different kinds of intermediate products, since it can be hard to get suppliers to share the risk. Later on, if the industry matures and volumes increase, a common development is specialization, which means that different companies in the value chain produce different parts of the final product offer (e.g. Chandler, 1962; 1977; Harrigan, 1984; Stigler, 1951). Hence, the natural development is vertical disintegration. One example is the early printing industry from which not only the modern printing industry has developed but also producers of products such as ink, paper, etc. (Young, 1928). However, having the total value chain, starting from original to printed information, internally is still regarded as strategically important in the printing industry, especially within the digital printing industry (e.g. Mejtoft, 2006a; Mejtoft & Packmohr, 2008; Packmohr & Mejtoft, 2008).

Lowering the cost of transactions by integrating activities in the value system has been discussed a lot since the ground-breaking work of Ronald H. Coase (1937), who argues that a company integrates to avoid costs for market exchange. It is important to analyze the company's boundaries to determine the trade-off between integrating activities in the company, sourcing them through market transactions or forming strategic alliances (e.g. Adelman, 1955; Faulkner, 1995; Gulati, 1998; 2007; Harrigan, 1983b; Jarillo, 1988; 1993; Perry, 1989; Porter, 1985). Another common

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argument for choosing vertical integration is gaining competitive advantages (e.g. Harrigan, 1983b; Porter, 1985). By being vertically integrated it is possible to control a larger part of the value chain and, hopefully, deliver a high perceived customer value. Connecting different products or services together and delivering them as packages, so-called bundling, has become very popular lately. In the media production industry, it is important to deliver full service solutions, both vertically (e.g. from idea to finished product) and horizontally (e.g. different distribution channels, like print, electronic publishing etc.). According to Nalebuff (2004) bundling is a way of raising the entry barriers for competitors.

The idea behind the success of vertical integration has been discussed and challenged many times. Christensen et al (2001, p. 76) clearly state their view on the future of vertical integration as: *“Once a modular architecture and the requisite industry standards have been defined, integration is no longer crucial to a company's success. In fact, it becomes a competitive disadvantage in terms of speed, flexibility, and price, and the industry tends to dis-integrate as a consequence”*. Not withstanding these arguments, earlier research within the printing industry and especially the digital printing industry has suggested vertical integration as an important strategy for reaching success (Mejtoft, 2006a). By backward vertical integration digital printing houses may be able to produce input that is suitable for their presses, that is short runs and variable data productions. This research is consistent with the notion of Porter (1980, p. 318) that states *“by gaining control over the production of key inputs, the firm actually may be able to differentiate its product better... if integration allows the firm to receive inputs with particular specifications, it may improve its final product or at least distinguish it from competitors”*.

Vertical integration is important and one of first diversification strategies considered (Harrigan, 1985b) and even though vertical integration has been, and still is, used to gain cost and competitive advantages, the opinions of the impact of vertical integration on profits differ (e.g. Bowman, 1978; Buzzell, 1983; Maddigan & Zaima, 1985; Reed & Fronmueller, 1990; Rumelt, 1974).

Research Objective

The aim of this study is to investigate the degree of vertical integration in the printing industry and to examine how differences in integration affect profit in the Swedish commercial printing industry.

This paper draws upon the theoretical framework provided by Harrigan (1983a; 1984) and previous findings regarding integration in the printing industry (Mejtoft, 2006a). The paper contributes to our understanding of vertical integration and proposes a simple framework for analyzing the industry structure with respect to vertical integration. Earlier research (Mejtoft, 2006a; 2006b) has indicated that vertical integration is favorable for digital printing houses to support their business. This study will further investigate potential differences between printing houses using digital printing and those using only conventional printing with respect to vertical integration aspects.

Literature Review and Theoretical Framework

This chapter introduces a brief literature review regarding vertical integration. The main thought behind vertical integration is to reduce or eliminate market transactions. Porter (1980, p. 301) suggests that *“to find the strategically appropriate extent of vertical integration for the firm requires balancing the economic and administrative benefits of vertical integration with the economic and administrative costs”*. Harrigan (1983b) proposes two major reasons to why a company should consider vertical integration; internal benefits and costs, and effects on competitive posture.

A company performs different types of activities that add value to its products or services*. The added value constitutes how much a specific company or activity contributes to the value of a product (Porter, 1985). In the 1980's Porter (1985) popularized the concept of the value chain, which can be used to understand potential sources of competitive advantages on a company level. To be able to produce a product, a company usually takes part in a larger stream of activities, a so-called *value system* (Porter, 1985). This involves not only the value chains of a specific company but also the value chains of a company's suppliers (and their suppliers, and so on) and the company's buyers (and presumably extended to the buyers of their products, and so on). A value system can therefore describe how activities in different companies interact to create value to a product. Even though Porter (1985, p. 34) emphasizes the importance of constructing value chains on a company level, the importance of considering the value system is still recognized as *“gaining and sustaining competitive advantages depends on understanding not only a firm's value chain but how the firm fits in the overall value system”*. Day & Wensley (1988) state that a competitor-centered focus together with a focus on internal activities and costs may obscure opportunities with vertical linkages with other value chains in the industry value system.

Behind every decision regarding value adding activities, that have to be performed in the value system to produce the end product, managers basically have to ask themselves whether the activities should be (1) purchased on the market, (2) performed by a partner in a cooperation or (3) performed internally within the company (e.g. Child et al., 2005; Gulati, 2007; Faulkner 1995; Harrigan, 1983b; Williamson, 1975; 1985). Specialization is in many cases successful, especially when there are cost advantages from large scale production (e.g. Faulkner, 1995). However, when specializing on a certain activity, it is most often necessary to interact with other companies to be able to produce the end product. Simplified, this can be done either by buying on the market, i.e. a *market transaction*, or by tying a closer relationship with another company by some form of *cooperation* (e.g. Child et al., 2005; Faulkner, 1995; Gulati et al., 2000; Jarillo, 1988). Vertical integration, on the other hand, is an important part of corporate strategy since it is one of the most frequently adopted growth strategies (Chandler, 1977). According to Porter (1980, p. 307) *“vertical integration can improve the ability of the firm to differentiate itself from others by offering a wider slice of value added under the control of management”*. Decisions regarding whether a company should make (integrate) or buy (cooperate or buy over the

* The word *product* will be used from now on to cover both *products* and *services*.

market) usually remain for a long time once made (Hill, 2000) and because of the strategic importance of these decisions, the choice of strategy regarding vertical structure is most often a reflection of long-term visions made by the company's founder or chief executive officer (CEO) (Beal & Yasai-Ardekani, 2000; Harrigan, 1985b; Schein, 1983).

Faulkner (1995) has developed a simple matrix framework illustrating when each of the different strategies regarding institutional arrangements are most successful. Depending on an activity's strategic importance and the company's skill in performing the activity, the choice is to buy over the market, make (integrate) or cooperate through an alliance (Figure 1).

Strategic importance of activity	High	Alliance	Make	Make
	Medium	Alliance	Alliance	Make
	Low	Buy	Buy	Buy
		Low	Medium	High
		Competence compared with the best in the industry		

Figure 1. Buy, cooperate or make, depends on the competence and strategic importance of the activity (After Faulkner, 1995, p. 15).

There has been a great deal of research on these different strategies over a long period of time and at the end of the day there are two major factors to take into account when deciding on strategy for a company's institutional arrangement; transaction costs and competitive posture (e.g. Coase, 1937; Harrigan, 1983a; Williamson, 1985; Gulati, 2007; Jarillo, 1993; Porter, 1980; 1985).

The concept of transaction costs was introduced in the literature by Coase (1937) in his seminal work *The Nature of the Firm* and has further been developed in the literature since then by e.g. Williamson (1971; 1975; 1985; 1991a; 1996). Transaction costs are costs that occur when an economic exchange is made and are the costs for managing a relationship. These are costs not for the actual production but for the "problems" that are connected with procurement of the activities from an external company. If the cost for internally performing an activity (IC) is higher than the sum of the cost for buying from an external producer (EP) and the transaction cost (TAC), the activity should be purchased from an external company instead of being integrated in-house (i.e. $IC > EP + TAC$) and vice versa. Specialization usually renders a company's cost for a certain activity to be low, due to learning and large scale advantages. Therefore, it is likely that an external producer can provide certain activities, that are needed in a value chain, less expensively than the cost for producing internally ($EP < IC$). The probability for ending up this situation is particularly high when the competition is strong (e.g. Balakrishnan & Wernerfelt, 1986; Harrigan, 1985b). Consequently, purchasing from the market can improve the *technical efficiency* as it lowers the cost of production. In contrary vertical integration improves the *agency efficiency* as it lowers the transaction costs. Hence, the level of the transaction cost is important to consider (Jarillo, 1993); if transaction cost is high,

vertical integration should be considered, and if transaction cost is low, buying might be a successful strategy. Nevertheless, one problem with transaction costs is that it is often difficult to separate and measure as well as locating how the transaction costs are distributed between partners (Blois, 1990; Dow, 1993).

Vertical Integration

There are many definitions of vertical integration and whether a company is to be regarded as vertically integrated or not. An early definition by Adelman (1949, p. 27) states that a company is vertically integrated whenever it *“transmits from one of its departments to another a good or service which could, without major adaptation, be sold in the market”*. A more strict definition is suggested by Perry (1989, p. 185) as he states that *“a firm can be described as vertically integrated if it encompasses two single-output production processes in which either (1) the entire output of the ‘upstream’ process is employed as part or all of the quantity of one intermediate input into the ‘downstream’ process, or (2) the entire quantity of one intermediate input into the ‘downstream’ process is obtained from part or all of the output of the ‘upstream’ process”*. Consequently, vertical integration arises when a company integrates activities to produce its own inputs and/or take care of its own outputs, in order to increase its power in the marketplace (e.g. Adelman, 1955; D’Aveni & Illnitch, 1992; Harrigan, 1983b; Hirsch, 1950; Jarillo, 1993; Mahoney, 1992; Perry, 1989; Porter, 1985). This definition, with the addition that the activity integrated is under majority ownership control, is used in this article.

The vertical integration between activities plays a major role in strengthening a company’s position to obtain competitive advantages and makes it possible to exploit some of the benefits gained by performing more value added services and broadening the specific company’s value chain (Porter, 1985). As identified by Harrigan (1984), a company may benefit from reduced costs by avoiding time-consuming tasks, improving coordination between activities, differentiation of products and assuring supply. Gaining access to the end-user by integration is a way for new products to penetrate a mature market since it is possible, for a producer, to show the products’ superiority (Harrigan, 1985b). There are also many possible negative consequences that may strike companies that choose a strategic path of vertical integration, common in the literature are; (1) increased internal and fixed costs which raise the exit barriers, and (2) decreased flexibility (e.g. D’Aveni & Ravenscraft, 1994; Harrigan, 1985b; Porter, 1980). How costs and profits are allocated along the value chain might also become unclear when vertical integration becomes more common (Gadiesh & Gilbert, 1998). Williamson (1991b, p. 83) suggests a conservative approach to vertical integration as this is the *“organization form not of first but of last resort – to be adopted when all else fails. Try markets, try long-term contracts and other hybrid modes, and revert to hierarchy only for compelling reasons”*.

As has been suggested by Perry (1989), a company can engage in backward and/or forward vertical integration into neighboring activities in the value system (Figure 2) and turn these activities into new business units. Nevertheless, being vertically integrated does not necessarily mean a total transfer between all integrated stages in the value chain (Harrigan, 1983a; 1984; 1985b; MacDonald, 1985; Perry, 1989). There can be differences in both the number of integrated stages and the degree of internal transfer in each stage.

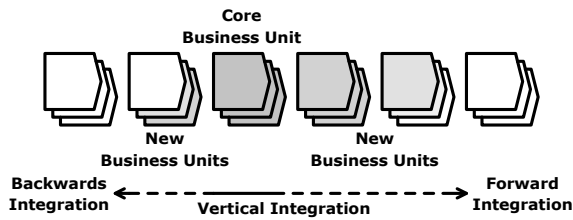


Figure 2. Backward and forward vertical integration into neighboring activities in the value system.

The dimension of vertical integration can differ depending on conscious or unconscious strategic decisions made by the company. Harrigan (1983a; 1984; 1985b) defines four dimensions of vertical integration; stages, breadth, degree and form. These represent the number of integrated *stages* (or activities) in the value chain, the *breadth* (number of sub activities) of each integrated activity, the *degree* of internal transfer between different activities in the value chain and the different *form* of ownership or control that is applied to the different activities.

When companies are “backward or forward integrated but rely on outsiders for a portion of their supplies or distribution” (Harrigan, 1984, p 643), they are adopting an approach denoted *tapered integration* (e.g. Kessler & Stern, 1959; Porter, 1980; Harrigan, 1983a; 1985b). According to Porter (1980, p. 319) tapered integration can “yield many of the benefits of integration... while reducing some of the costs”. Parmigiani (2007) and Rothaermel et al. (2006) have found indications of positive effects on companies when combining vertical integration with outsourcing and cooperation with partners. The major benefits are due to synergy effects when combining complementary resources from an external partner with internal resources at the company. This illustrates that combining and weighting the positive effects of several different strategies may create successful company structures (e.g. Sirmon, et al., 2007).

Furthermore, to benefit from vertical integration it is important to take advantage of both existing knowledge and at the same time let new knowledge in the company evolve (Kazanjian & Drazin, 1987). Since the learning of new knowledge will be more complicated when new markets and process technology are introduced in the company, the success of integration will be less likely the farther away from the core business the vertical integration takes a company (cf. Figure 2) (Peyrefitte et al., 2002).

Why do Companies Integrate Vertically?

Harrigan (1983b, p. 3) suggests that vertical integration gives companies “superior control” over the business environment and gives companies “improved ability to forecast cost or demand changes”. Early research in vertical integration by e.g. Malmgren (1961) and Williamson (1971; 1975) indicate that market uncertainties can create incentives for a company to integrate in the value system. According to Malmgren (1961, p. 402-403) “activities which tended to fluctuate, causing fluctuations in prices and outputs in the market, could be integrated and balanced against one another and thus reduce the fluctuations in required information”. Accordingly, Arrow (1975) suggests that vertically integrated companies may reduce their uncertainty regarding information on input supply compared to non-integrated companies.

Consequently, vertical integration has often, historically, been a necessity in emerging industries to be able to assure input into the production process since it can be hard to convince external suppliers to share the risk in the industry (Chandler, 1962; 1977; Harrigan, 1984). One example is the automobile industry in the beginning of the 1900's, in those days Ford developed their own components to build and sell low priced and reliable automobiles to the greater public (Nugent & Hamblin, 1996). However, over time the automobile industry matured and the initial uncertainties decreased. This caused external suppliers to increase their interest in delivering parts to the industry, which turned institutional arrangement away from vertical integration (Harrigan, 1984).

Wide spread vertical integration in an industry may create entry barriers and excess profits for established firms (e.g. Bain, 1956; Higgins, 1999; Nalebuff, 2004; Porter, 1980; Williamson, 1975). By integrating and controlling the supply of inputs needed in production, it is possible for established firms to increase the amount of capital needed for new entrants, since it only will be possible to enter the industry by investing in more than one step in the value chain. In the same way vertical mergers may change the competition in an industry and make it less attractive to be nonintegrated. On the other hand, in a study of companies in the forest product industry, D'Aveni & Ilinitch (1992) found that companies that were vertically integrated had a higher risk of bankruptcy than nonintegrated companies.

Whether vertical integration will be advantageous or not is largely dependent on the industry environment (Chandler, 1962; Livesay & Porter, 1969) and the choice of integration should be adjusted to changing conditions in the industry environment (Harrigan, 1986b). When looking at forward integrating activities from production onward, such as sales and distribution, cooperation with external partners usually has a cost advantage as long as there are competing companies to choose from (Day, 1999). Strong competition makes it, in general, strategically advantageous to rely less on vertical integration and shift the risk to outsiders (e.g. Balakrishnan & Wernerfelt, 1986; Harrigan, 1985b). One example is the highly competitive pharmaceutical industry where companies have gained superior performance using strategic alliances (Rothaermel, 2001). In the same way it is unlikely that companies possessing bargaining power over their suppliers should integrate, since bargaining power can be used to shift risk in ownership to external companies, which can be used as low cost suppliers (Harrigan, 1985b; Porter, 1974). On the other hand, a steady increase in demand does often imply that more activities should be integrated (Harrigan, 1985a). Nevertheless, the approach on how to structure a company in an industry is often similar between different competing companies in an industry. DiMaggio & Powell (1983) show that a successful strategy may become legitimate in an industry and thereby adopted by other companies active in the same field.

The actual profit gained from being vertically integrated is in general hard to measure (e.g. Bowman, 1978; Maddigan & Zaima, 1985; Nugent & Hamblin, 1996). Research done by e.g. Bowman (1978) and Buzzell (1983) conclude that a plot of vertical integration against profitability creates a U-shaped curve, where the least profitable area is between highly vertically integrated and highly specialized. In general, previous research on the profitability of vertical integration provides inconclusive results, by supporting vertical integration being profitable (e.g.

Bowman, 1978; Buzzell, 1983), being non-profitable (e.g. Rumelt, 1974) and having no effect on performance (e.g. Reed & Fronmueller, 1990). Concurrently, Maddigan & Zaima (1985) conclude that the results regarding the profitability of vertical integration are largely dependent on how the measurements are done.

Methodology and Study Design

This paper is based on data from two separate sources; a survey of Swedish printing houses' internal activities, carried out during the spring and early fall of 2006 and financial data from the years 2003-2006, extracted from the Swedish national database Affärsdata (2008). The financial data contained data published in the annual reports posted by the companies. The survey of the printing houses is based on a subset of data from a larger survey study of 136 Swedish commercial printing houses carried out during the spring and early fall of 2006. The questionnaire was sent out by letter to 300 companies, which were randomly selected Swedish commercial printing houses from the members' list of the Swedish Graphic Companies' Federation (GFF). It should be noted that this list is not a complete list of all commercial printing houses in Sweden, which limits the possibilities of generalizing the results to the whole Swedish commercial printing industry. An alternative to this list could have been e.g. extracted from the telephone directory or a financial information database. However, these other alternatives did not, according to the authors, provide a list with sufficient accuracy. Consequently, the authors believe the list used to be the best directory to constitute the basis for this survey investigation of Swedish printing houses. Although the used list is not complete, it does, according to GFF, include companies covering at least 80% of the volume of invoiced sales of printed commercial products in Sweden (K. Flick, GFF, personal communication, January 25, 2007). Hence, the results should give a good indication of the situation in the Swedish commercial printing industry. CEO's or vice managing directors made up 82% of the respondents. The rest of the respondents were persons responsible for marketing, production or logistics.

All questions were in Swedish, since the questionnaire was answered by Swedish printing houses. To ensure the validity of the questionnaire, an initial pilot test (Saunders et al., 2007) was performed with three printing houses. Some questions were changed and new questions were formulated according to comments made by the respondents in this pilot test.

The data in the study has been separated and analyzed in different categories depending on the printing technology used at each company. The categories used were: *all printing houses* (136 companies), *printing houses with digital printing* (53 companies/39.0%) and *printing houses with only conventional printing* (83 companies/61.0%). The other categories: *printing houses with only digital printing*, *printing houses with both conventional and digital printing* and *printing houses with conventional printing* were also analyzed, but without any interesting results. For a printing house to be regarded as using a specific printing technology in production, it should constitute at least 10% or more of the total production.

Study Design and Analytical Framework

Integration of activities in the value system can take many different forms (Figure 3), and do not necessarily have to be sequential. Although Harrigan (1984; 1985b) suggests several different dimensions of vertical integration, this study takes its point of departure in the number of integrated steps in the value system. Whether an activity in the value system is integrated or not determines the possibility for a company to either transfer a specific order internally or externally via market contract or alliance partner. If the activity is not integrated, it has, by definition, to be carried out externally. Consequently, this study has a prerequisite in the strategic importance of having an activity internally.

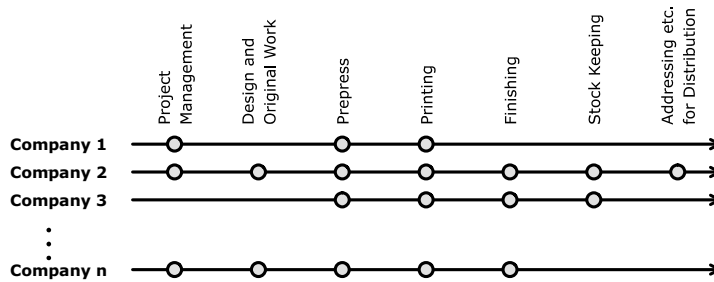


Figure 3. Integration in the printing industry.

The form of ownership used to control the integrated activities is frequently discussed in the literature (e.g. Grossman & Hart, 1986; Harrigan, 1983a; 1984; 1985b). Harrigan (1985b), for example, states that an activity could be under control even without ownership and should consequently be regarded as vertically integrated. Nevertheless, ownership is important to exercise control over resources and in this study the term *integrated* is used for activities that are under internal majority ownership control. Activities under other types of control, such as strategic alliances, are not considered to be integrated, since they are not under direct company control.

Earlier research (Mejtoft, 2006a; Mejtoft & Nordin, 2008; Mejtoft & Packmohr, 2008; Packmohr & Mejtoft, 2008) has determined that a common practice in the printing industry is taper integration, which will balance the competitive posture of vertical integration with the benefits of avoiding lock in effects. This study therefore proposes a simple framework to determine the level of integration in the value system by calculating the *Vertical Integration Level (VIL)* as:

$$VIL = \frac{\sum_{i=1}^n (Activity_i)}{n} \quad Activity_i = \begin{cases} 1, & \text{Activity integrated} \\ 0, & \text{Activity not integrated} \end{cases}$$

In the framework, *Activity_i* represents the additional activities in the value system, excluding the core activity (in this study, the printing activity). The number of activities (*n*) increases depending on how detailed the value chain is divided. In this

study the activities are chosen to represent the common activities in print media production (Figure 3). Hence, the Vertical Integration Level can yield a number from 0 (not integrated) to 1 (fully integrated). The Vertical Integration Level can thereafter be matched with other conditions or key figures such as company specific profitability data or other industries. The calculated Vertical Integration Level key figure gives an indication of the use of integration as a strategy in production. It does not, however, describe a company's structure or workflow.

The data from the survey study were extended with financial key figures, for each company, from the financial database Affärsdata (2008). Two profitability key figures*; profit margin (Profit or loss before appropriation of profits and taxes / Net sales revenue) and profit margin before depreciation (Profit or loss before depreciation / Net sales revenue) have been used to investigate the profitability of the printing industry in relation to vertical integration. To avoid any extraordinary fluctuation, a four year average (2003-2006) of the key figures has been used.

The difference between the categories in the dataset has been analyzed using an independent sample t-test using a 95% confidence level. The significance of differences between factors was determined using a paired sample t-test. SPSS 15 and Microsoft Excel 2003 were used for the statistical analysis.

The use of a four year average could however affect the results since some of the companies could have acquired (or sold) their digital printing equipment during this period, this has not been taken into account in this study. In the Swedish printing industry the major movements into the digital printing market were during 2000, which makes the effect of this problem less significant. However, using only the data for 2006 does not change the result of the study.

Data Collection and Analysis

Since the survey was constructed as a self-administrated survey, a covering letter, explaining the purpose of the study, was enclosed in the letter to each respondent (Saunders et al., 2007). The respondents had the choice of responding either by post or through a web interface. The companies that did not respond to the initial survey were reminded by email and/or telephone. While collecting data from the sample, it was found that some of the companies did not meet the research requirements of this study, and they were subsequently omitted. The response rate was calculated, in accordance with the Council of American Survey Research Organization's guidelines (CASRO, 1982; Wiseman & Billington, 1984).

Out of a total of 300 companies, 46 were found to be ineligible and 136 eligible companies responded, which constituted a total response rate of 54%. Out of all companies, only six were not possible to reach by personal communication (i.e. telephone or email), implying that practically all ineligible companies in the sample have been identified. The reason for having so many ineligible companies (46) was that the database contained some companies that did not currently own any printing equipment, but were interested in the commercial printing business. In most cases

* For a more extensive overview of the key figures, see e.g. FAR SRS (2008a; 2008b).

they were working with activities closely related to this business, such as prepress or finishing.

About half of the answering respondents posted their answers without any reminder, whereas the other half sent their response after being given a reminder. According to Armstrong & Overton (1977) people who respond late are assumed to be comparable with non respondents. In general, no major differences between the two groups were found, thus giving an indication of no significant differences between respondents and non-respondents.

The sample (136 companies) was large (>30) and approximately normally distributed (Keller, 2005), whereby the t-distribution was used to calculate confidence intervals (CI) and p-values for differences between mean values. Since the sample also covered a large portion of the studied population (428 companies) a Finite Population Correction Factor (FPCF) was used when calculating the standard deviations for the mean values (e.g. Andersson et al., 2002; Keller, 2005).

A survey study typically gives a good overview over a large population (e.g. an industry), while it is more difficult to obtain a deeper understanding of specific research questions. To acquire a deeper understanding it is preferable to use in-depth case studies of a few selected companies. However, since the aim of this study was to investigate the level of vertical integration of the commercial printing industry, the use of a survey should be regarded as the preferable method.

Results and Discussion

Previous research (Mejtoft, 2006a) suggests that vertical integration plays an important roll for succeeding in the printing industry, especially for the digital printing industry. The results from this study further show that the use of vertical integration is common in the printing industry.

Vertical Integration

In Figure 4 the integration, in terms of percentage of companies having a certain activity integrated, has been illustrated. As the population has been selected based on companies being part of the printing industry (i.e. having some kind of printing technology), all companies have printing integrated. It is possible to visually observe that the overall degree of integration in the printing industry is high. Furthermore, the results also show that there are no significant differences between digital printers and conventional printers at a 95% confidence level (Table 1).

Since the companies in this study were chosen due to them being printing houses, most revenues, naturally, originate from printing. To be able to investigate the impact of vertical integration it is important to calculate the contributing part of the integrated services in the total revenues. The total revenues from all integrated services at the respondents' companies accounted for, on average, 23.2% ($n = 102$) of the total revenues. There were no differences between digital printers (23.2%, $n = 39$) and conventional printers (23.3%, $n = 63$).

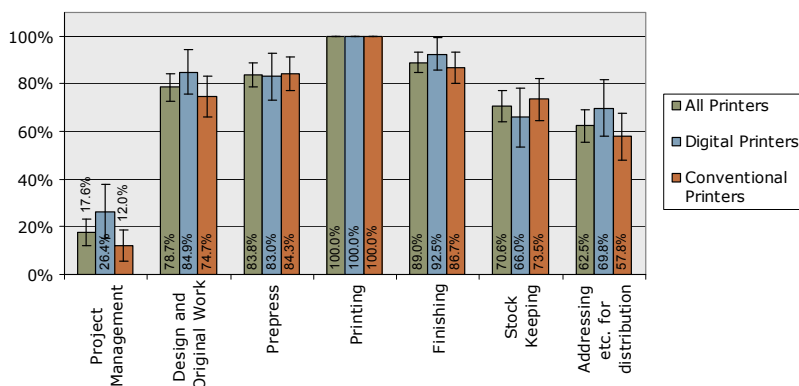


Figure 4. Vertical integration in the printing industry presented as percentages of the companies that have integrated each step of the value system.

Table 1. Significance of differences between digital printers and conventional printers in respect to integration.

	Proj. Man.	Design etc.	Prepress	Finishing	Stock Keeping	Addressing etc.
Mean difference:	0.144	0.102	-0.013	0.057	-0.075	0.120
t:	1.397	0.952	-0.129	0.608	-0.656	1.025
Degrees of freedom:	134	134	134	134	134	134
Significance (2-tailed):	.165	.343	.898	0.544	0.513	.307

No significant differences between means at a 95% confidence level.

Earlier research (Mejtoft, 2006a; Mejtoft & Nordin, 2007; 2008; Mejtoft & Packmohr, 2008) has shown that even though vertical integration is a way of creating competitive advantages, it is important to combine vertical integration with cooperation to level competitive and cost advantages, so-called taper integration. An important explanation is that cooperation increases flexibility within the industry. In other words, to avoid a lock in to internal resources, which vertical integration can cause (Porter, 1980), it is common, in the printing industry, to be taper integrated rather than fully integrated (e.g. Mejtoft, 2006a; 2006b; Mejtoft & Packmohr, 2008). Porter (1980, p. 320) states that taper integration “*may actually increase coordination costs in situations in which products produced by outside suppliers and the internal unit must match exactly*”. However, this is not a problem in the printing industry since de facto standards as e.g. Adobe pdf made exchange of material with external partners in the preprinting activities easier and a lack in input from outside suppliers only results in lower coverage on the printing units. Furthermore, the capacity of the integrated units decreases the further away from the core business unit it is (Mejtoft, 2006a), since integration is less likely to be successful far way from the core activity (Peyrefitte et al., 2002). By investigating the integration curve in Figure 4 it is possible to notice that this study is in consistence with earlier research (cf. Peyrefitte et al., 2002) as fewer companies have integrated activities farther away from the core business.

In retrospect to the model developed by Faulkner (1995) illustrated in Figure 1, it appears as if most companies regard activities close to their core business in the value system as strategically important for their business, and this is why they have decided to integrate these activities. This can be interpreted as the companies regard themselves as the activities are of high strategic importance (the upper part of Figure 1). Consequently, the companies in this study avoid market transactions and, depending on the degree of competence, primarily integrate or cooperate through alliances to perform the activities in the value system. This is consistent with earlier research on strategies in the printing industry (Mejtoft & Nordin, 2008; Mejtoft & Packmohr, 2008), that suggest a combination of vertical integration and cooperation to be the way the printing industry has chosen to organize itself.

Taking the strong competitive situation in the printing industry in consideration (e.g. Birkenshaw, 2004; Mejtoft & Viström, 2007; Smyth, 2006), there is an inconsistency with other researchers such as Balakrishnan & Wernerfelt (1986), Eisenhardt & Schoonhoven (1996) and Harrigan (1985b) who suggest that unstable competitive conditions should encourage a lower degree of transfer from internal units. However, there is more to this discussion. The printing industry is an industry with low bargaining power due to the commoditization of their product (e.g. Birkenshaw, 2004; Smyth, 2006), which makes the industry vulnerable to bargaining from others (Harrigan, 1985b; Porter, 1974). By vertical integration it has been possible for the industry to gain some of the power back and increase the probability of profit. This will be further discussed later on in this section. It should be noted that there is no correlation between the level of vertical integration and the size of the companies (both regarding turnover and number of employees). This implies that the need of being vertically integrated is strong within the industry and it is not only larger companies that follow this strategy.

Level of Integration

The total Integration Level (VIL_{total}) in the Swedish commercial printing industry is 0.670 (Table 2) (for definition, see the section *Methodology and Study Design*). This implies that the industry has chosen to integrate many of the adjacent activities in the value system.

Table 2. Integration Level (VIL) in the Swedish Commercial Printing Industry.

	All Printers			Digital Printers			Conventional Printers		
	Total	Back-ward	Forward	Total	Back-ward	Forward	Total	Back-ward	Forward
Mean value:	0.670	0.600	0.740	0.704	0.648	0.761	0.649	0.570	0.727
Std. dev.:	0.192	0.209	0.259	0.218	0.241	0.290	0.207	0.222	0.285
95% CI:	0.032	0.035	0.044	0.060	0.066	0.080	0.045	0.048	0.062
No. of resp.:	136	136	136	53	53	53	83	83	83

Furthermore, the levels of backward vertical integration ($VIL_{backward}$) and forward vertical integration ($VIL_{forward}$) have been measured and calculated (Table 2). These results indicate that there is a significant difference ($p = .018$) between the levels of backward and forward integration according to the included activities. In other words, the industry has chosen to have a higher level of integration forward in the value system than backward. Integration forward is done to speed up the delivery times from print to end user, and backward integration is carried out to be able to control the input to the press and backward integration becomes important to create new business opportunities (Mejtoft, 2006a). However, it should be noted that this is true for the separation of the value chain done in this study, any other separation of the value chain in activities might give other results. This study therefore indicates that even though control over the input (by e.g. project management) is important for the printing industry, this is done by a significantly smaller portion of the industry (17.6%) than the other studied activities. A remark is that backward integrated activities are largely based on human resources, e.g. project management and original work. Forward integrated activities, on the other hand, are based on investments in production equipment, such as finishing etc.

Previous research (Mejtoft, 2006a), has deemed it important for digital printers to integrate backward to ensure appropriate input to the digital printing units. Even though the results from this survey study show that digital printers have a high level of backward integration (Table 2), there are no significant differences ($p = .359$) in this respect between digital and conventional printers (Table 3). There is, however, a tendency of a difference in how many companies that provide project management between digital printers (26.4%) and conventional printers (12.0%), even though this is not statistically significant ($p = .165$). This may be an indication that the introduction of new technology, such as digital printing, needs a better control of input for printing houses to be able to produce more suitable jobs for digital printing.

Table 3. Significance of differences between digital printers and conventional printers.

	Total integration	Backward integration	Forward integration
Mean difference:	0.056	0.078	0.034
T:	0.691	0.921	0.362
Degrees of freedom:	134	134	134
Significance (2-tailed):	.491	.359	.718

No significant difference between means at a 95% confidence level.

The level of integration in the commercial printing industry can be compared with that of a neighboring industry, the packaging printing industry*, where

* This investigation was conducted in parallel and had a census selection of an equivalent list of the packaging printing industry as for the commercial printing industry and consisted of 84 packaging printing houses (out of which 59 were found eligible). In total 27 companies responded, which yielded a response rate of 46%. The data presented here regarding the

$VIL_{total} = 0.407$ ($n = 27$, $\sigma = 0.245$), which is significantly lower than for the commercial printing industry. Furthermore, even though lower, the same pattern regarding backward ($VIL_{backward} = 0.309$, $\sigma = 0.276$) and forward integration ($VIL_{forward} = 0.556$, $\sigma = 0.320$) can be noticed for the packaging printing industry as the commercial printing industry. Out of the total revenues at the packaging printing houses, on average, 7.6% came from integrated services. This is about one third of the corresponding revenue share for the commercial printing industry. This could be explained by longer production runs in the packaging printing industry. Nevertheless, previous research (Viström & Mejtoft, 2007) shows that shorter runs are also expected in the packaging printing industry in the future. Hence, vertical integration might be more important in the future to maintain revenues.

Earlier research (Mejtoft, 2006a; 2006b) has suggested that vertical integration is favorable for digital printers to support their business and contribute to the introduction of new technology in the industry (cf. Carlton, 1979). The differences between digital printers and conventional printers have been investigated in this study. However, even though the VIL (total, backward and forward) has a tendency of being slightly higher for digital printers than for conventional printers, there are no significant differences between the two groups (Table 3). If the integration level is weighted with the percentage of revenues from integrated services, the results still indicate no significant differences between digital and conventional printers. The same is true for the other measured values in this study; no significant differences regarding integration could be noticed between companies using digital printing and those using only conventional printing technology.

Integration and Profitability

As has been described in the literature, the effect of integration on profitability is both an important and debated issue (Bowman, 1978; Maddigan & Zaima, 1985; Nugent & Hamblin, 1996). In this study a four year average of two separate profitability key figures, profit margin (PM) and profit margin before depreciation (PMd) have been used to investigate the profitability of the printing industry in relation to vertical integration.

The overall profit margin in the commercial printing industry in Sweden has been illustrated in Figure 5. It has been rather stable over the years 2003-2006 and on average the profit margin has been 3.2% ($n = 129$). There were no significant differences between digital printers and conventional printers regarding profitability ($p_{PM} = .552$ / $p_{PMd} = .556$).

packaging printing industry is new, however, more detailed information regarding the design and method of this parallel study can be found in Viström & Mejtoft (2007).

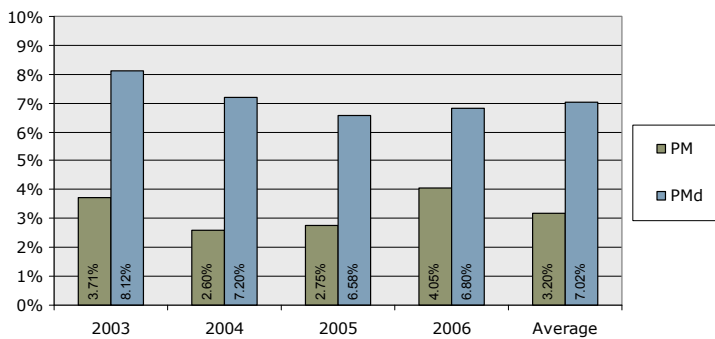


Figure 5. Profit margin (PM) and Profit margin before depreciation (PMd) in the Swedish commercial printing industry 2003-2006.

The results show that there was no correlation between VIL_{total} and the profitability key figures ($r_{PM} = .102$ / $r_{PMd} = .125$). The same was true for both $VIL_{backward}$ ($r_{PM} = .002$ / $r_{PMd} = .030$) and $VIL_{forward}$ ($r_{PM} = .148$ / $r_{PMd} = .159$). Consequently, the results from this study of the printing industry are in conclusion with previous research by e.g. Reed & Fronmueller (1990), which concludes that vertically integrated companies do neither perform better or worse than non-integrated companies. Furthermore, the profitability of using digital printing in production was examined with the same result.

Perry (1989) suggests a “vertical equilibrium” in the industry. By taking this discussion into account, the sample was split into two groups depending on the level of integration, one consisting of all companies with lower or equal VIL as the average and one with a higher integration level than the average. No significant differences between these groups could be found in this study on any of the two profitability key figures ($p_{PM} = .378$ / $p_{PMd} = .489$). This further strengthens the result of the VIL having no significant impact on the profitability of companies.

Nevertheless, there is more to this discussion on whether to be integrated or not. The results of this study indicate that vertical integration in the printing industry does not seem to increase, nor decrease, the profitability margin (α) of the companies. However, case studies have shown that being integrated is regarded as strategically important (e.g. Mejtoft, 2006a; Mejtoft & Packmohr, 2008; Packmohr & Mejtoft, 2008). It is important to remember that when a small privately owned company vertically integrates additional activities, it most often leads to increased revenues ($R + r$) compared to a company which is not integrated (R), which may make the total profit ($TP = \alpha \times (R + r)$) higher compared to if the same company was non-integrated ($TP = \alpha \times R$). In other words, the total profit increases, which may be seen as a driving force to integrate additional activities. Furthermore, the strategic importance of being able to decrease the lead times (Mejtoft & Viström, 2008) is largely dependent on having a high level of forward integration. The results show a medium correlation (in accordance with Cohen, 1977) between revenues from integrated activities and VIL . Nevertheless, the possibility of increasing revenues when integrating will be left for future studies.

Conclusions

The strategy of vertical integration is commonly used in the printing industry. Previous research (Mejtoft, 2006a) suggests that vertical integration plays an important roll in success in the printing industry and especially for the digital printing industry. This is due to the strategic importance of controlling a large part of the value system. Nevertheless, this study shows that the level of integration between digital and conventional printers did not differ.

Furthermore, this study indicates that vertically integrated companies do perform neither better nor worse than non-integrated companies. The results suggest that even though the feeling among CEO's at printing houses is that integration increases their possibility to keep their business running smoothly, it does not significantly influence the profitability. However, it is important to keep in mind that by vertical integration it is possible to expand the business. Even though the profitability key figures do not increase, the total profit will increase if the turnover increases. When most printing houses are small and privately owned, the idea of an increased total profit might be tempting, and this may lead to an increased level of integration. Nevertheless, the result from this study is that the level of integration has no significant impact on the profitability of companies.

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