STFI-PACKFORSK

KTH
VETENSKAP
OCH KONST

**KTH Computer Science
and Communication**

Thomas Mejtoft

# Strategies in the Digital Printing Value System

Thesis for the degree of Licentiate of Technology to be presented with
due permission for public examination and criticism in Room E2,
Lindstedtsvägen 3 at the Royal Institute of Technology, KTH,
on 17 November 2006, at 11:00.

Licentiate Thesis in Media Technology and Graphic Arts
Royal Institute of Technology • Stockholm • Sweden

Thesis for the degree of Licentiate of Technology to be presented with due permission for public examination and criticism in Room E2, Lindstedtsvägen 3 at the Royal Institute of Technology, KTH, on 17 November 2006, at 11:00.

Opponent: Prof. Richard Wahlund, Stockholm School of Economics

Dedicated to the ones who are always there,
without me having to ask.

# Abstract

The research objective of this thesis is to identify corporate strategies and strategic decisions in the digital printing business and to analyze how these have evolved due to the introduction of digital printing. This thesis comprises three separate studies, all based on qualitative case methodology. The first study is focused on digital printing houses and how their business strategies have changed due to their investment in digital printing production equipment. The second study concentrates on customers in the digital printing value system and how they experience the value they get from purchasing digitally printed products. In the third study, it is analyzed how a successful producer–customer relationship can create value for both parts in a dynamic and changing business environment.

The results indicate that vertical integration among digital printing houses is a valid strategy for overcoming problems related to digital printing, such as not being able to acquire orders suitable for digital printing. The main reason among customers to start using digital printing is the option of ordering short print runs which reduces stock keeping and discarded volumes. This application is the customers' most important perceived value. The use of more complex applications, such as variable data printing, is very modest, although many respondents say that they either want to start using customization in their print production or already have received some value from simpler variable data printing applications (e.g. addressing or changing logos and names).

The competitive environment in the printing industry is becoming increasingly dynamic and the printing industry is today influenced by a heterogeneous group of competitors and it is therefore important, for printing houses, to engage in hypercompetitive-like behavior. Working with speed, surprise, superior customer satisfaction and continually trying to shift the rules of the industry in the company's favor, is a strategy to maintain business viability and competitiveness. As a complement to the cost and quality focus, timing and know-how are becoming even more important in the industry when a company wants to satisfy customer needs.

The conclusion is that digital printing is used effectively and successfully when the main purpose is not to print. By striving towards non-printed solutions, digital printing becomes a natural output method when printed material is needed, since it is possible for the customers to order exactly what they want, when they want it, without any need for stock keeping. Vertical integration has helped digital printing houses acquire appropriate input for their printing presses. Horizontal integration into additional output channels, such as electronic publishing, is a natural development in the industry and provides support for the digital printing business.

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

# Preface

*"Man this is crazy, I hope I didn't brain my damage."*

– Homer J. Simpson[*]

Although, finishing this thesis is just the beginning, I have many friends and colleagues that have supported me and been there throughout this period, and at the end of the day, that is what really matters to me.

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 support, encouragement and enthusiasm while I was working on this thesis. I would in particular like to mention *my sister Sara* for the lovely paintings provided for this thesis, she can turn the vaguest idea of mine into a piece of art.

I would also like to express my appreciation to *my wonderful friends and colleagues in Örnsköldsvik* at STFI-Packforsk and Mid Sweden University's Digital Printing Center; *Åsa, Magnus, Malin, Jakob, Peter, Åsa, Hanna, Raul, Veronica, Clas, Bertil, Jenny, Johan, Jonas, Jerker, Nils, Lars, Ole* and *Mattias* for being there every single day.

I would like to dedicate a special thanks to my supervisor *Prof. Nils Enlund*, KTH, and my project manager *Dr. Marianne Klaman*, STFI-Packforsk, for valuable input to my research and for giving me the necessary resources to accomplish this research within the projects *Digital Printing Community* and *DigiPrint* at STFI-Packforsk in Örnsköldsvik.
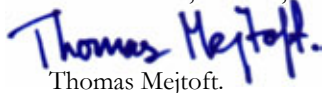
Last, but far from least, I would like to thank all the *external contacts* that have, unselfishly, participated anonymously in my strategy research. I owe it all to you...

Thank you all, you know who you are and I will always be grateful.

Bye for now!

Örnsköldsvik, Sweden, October 2006

Thomas Mejtoft.

---

[*] Quote from *The Simpsons, The Mysterious Voyage of Homer* (Keeler & Reardon, 1997).

# List of Papers

## 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. (2006). *Creation of Customer Value Using Digital Printing in a Dynamic Business Environment.* Submitted for publication.

# Content

# 1 Introduction

*"Does the manufacturer exist for the consumer or does the consumer exist for the manufacturer?"*

– Henry Ford[*]

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 the technology was popularized when Johann Gutenberg constructed the first real printing press. Since then many different printing technologies have been introduced. Today the predominant printing technology is offset lithography or colloquially just *offset* (Kipphan, 2001), and some other traditional or conventional printing techniques are *flexography*, *screen printing* and *rotogravure*. However, until *digital printing* was introduced in the mid 1990's, all printing technologies had something in common, the static printing form.

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. 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 the Internet have changed the way that information and marketing messages are pushed and pulled to customers. The new channels, with the global spreading of the Internet 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 e-mail, Internet and tele-marketing (Kotler et al., 2005).

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 this 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.

---

[*] Quote from *My Life and Work* (Ford and Crowther, 1922, p. 135).
[†] 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).

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 bankruptcy. 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). 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.

## 1.1 Digital Printing Technology

*"You can use this technology to do unbelievable creative things."*
                                                                – Frank J. Romano[*]

Traditional 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 is 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 tradition 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 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).*

---

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

Thomas Mejtoft • Royal Institute of Technology • 2006

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, metal etc.) to create customer value (PODi, 2003).

There are constant improvements in the speed of the 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 speed, and there is a tradeoff between them. In high speed, approximately 120-150 m/min, the suitable applications are letters and financial statements. 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 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).

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

## 1.2  Applications of Digital Printing

*"Any sufficiently advanced technology is indistinguishable from magic."*
– Arthur C. Clarke[*]

One of the drawbacks of printed communication before digital printing was the difficulty of achieving cost efficiency in smaller production volumes (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

---

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

companies Indigo and Xeikon introduced digital color printing with professional quality. 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 and variable data printing.

Digital printing is a more flexible and easy-to-use technology than traditional printing technology, such as offset. 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 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. The main applications of digital printing today are short runs, customization using variable data printing and distributed printing.

The cost for digital printing is considerably higher in larger volumes compared with traditional printing technology. In general, the big difference, when calculating cost per piece, between digital and traditional 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 (Figure 2) in respect to the length of the print run in comparison with the declining cost of traditional printing technologies (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), or so-called *print-on-demand*.
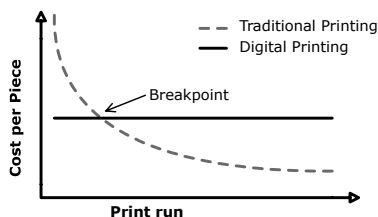


*Figure 2. Digital printing has very low fixed costs but higher variable costs.*

The technological development of both digital and traditional printing has been rapid, new and improved printing equipment and software are introduced with enhancements in both speed and print quality.

If an ordinary static document is to be printed, a breakeven point between the two printing technologies is possible to distinguish (Figure 2). But 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 traditional printing technologies. The variable cost of digital printing is constantly decreasing at the same time as the fixed cost of traditional printing has been reduced. This makes it difficult to declare a

Thomas Mejtoft • Royal Institute of Technology • 2006

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.

*Variable data printing* can be achieved in many different ways, and the most common in professional production is using a special variable data software. Simplified, these 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 (Peppers & Rogers, 1993).

The professional software outputs a format that is readable for the digital printing press. Many formats and languages for variable data printing are based on formats that make it possible for the RIP to just process each object (e.g. images) once and reuse these when they are occurring at several places in a document. This is in contrary to e.g. PDF (Adobe Systems Incorporated, 2004), 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 XML based free to use open specification of *Personalized Print Markup Language* (PPML). 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).


## 1.3   Market for Digital Printing

*"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[*]

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 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

---

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

the company. PODi (2003) also has identified direct mail as a medium that has advantages over electronic media in both reach and acceptance among recipients.

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 under this condition 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 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 costs 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 the possibility to produce small series or even one unique copy at a reasonable cost.

Overcapacity in 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 primary 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).

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 this overcapacity has resulted in continuing price reductions (Birkenshaw, 2004).

When a new technology, that changes the rules of the industry, is introduced, the strategic plan of the companies' active in the industry becomes important. By analyzing and investigating strategic changes and how these influence the customers

and suppliers in the digital printing value chain, it is possible to find factors that may be used to compete successfully on the market.

## 1.4 Research Objective

The research objective of this thesis is to identify corporate strategies and strategic decisions in the digital printing business and to analyze how these have evolved due to the introduction of digital printing. The value system of digital printing, its actors and customers will be studied in order to investigate and critically analyze the interplay between digital printing houses and their customers.

# 2 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[*]

This chapter describes the framework that constitutes the theoretical basis of the thesis. To illustrate the impacts on the printing industry, some practical examples have been incorporated in the theoretical framework.

According to Chandler (1962, p. 13), *"strategy can be defined as the determination of the long-term 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. The tradition of scholarship in strategy dates back to the writings of the famous 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.*

## 2.1 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 very popular and Porter (1985, p. 39) defines it as *"selling price less the cost of raw materials"*. A company performs different types of activities that contribute and add value to e.g. their products. 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 stresses that *"an industry- or sector wide value chain is too broad, because it may obscure important sources of competitive advantage"*.

---

[*] Quote from an interview with Stephen Hawking in *The Guardian* (Jha, 2005).
[†] The Zhou dynasty lasted between 1027-221 BC.
[‡] Quote from *Capital, Volume 1* (Marx, 1867/1930, p. 10).

A value system (Figure 3) 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).

Day and Wensley (1988) have a similar view as Porter (1985) 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).
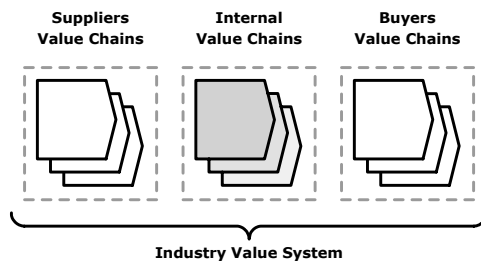


*Figure 3. A value system consists of many value chains.*

Thus, a value system includes value chains from the company, the company's suppliers and their suppliers, the company's buyer and their buyers etc. In Figure 3 the hypothetical construction of a value system is shown.

The principal value system for print media (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 thesis, a slightly altered and simplified value system (Figure 4), which has been developed during Paper 1 and 2, will be used to be able to understand the general strategic changes in the digital printing industry.



*Figure 4. The value system for the digital printing industry.*

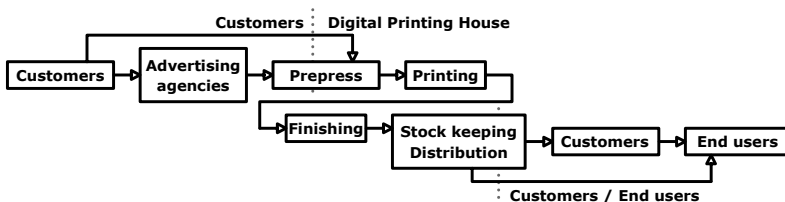In the digital printing aspect, Birkenshaw (2003, p. 12) states that *"print-on-demand can result in savings in the overall supply chain offsetting the higher production costs in production"*. Since the cost model for the digital printing technology is mainly based on low total cost on short-runs (Kipphan, 2001), 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 (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, 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.

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 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, so called *vertical integration* occurs.

## 2.2  Competitive Strategy

*"Those who win every battle are not really skilful – Those who render others' armies helpless without fighting are the best of all."*

– Sun Tsu[*]

Regarding competitive strategy, it is important to determine a company's position within its industry. Porter (1980) argued that there are three generic strategies that can be adopted to create sustainable competitive advantages and outperform other companies in the industry - overall *cost-leadership*, *differentiation* and *focus*. Basically a company should follow either cost-leadership or differentiation in a broad or narrow scope, which is in a particular focus (Figure 5). The generic strategies should be used to gain and sustain competitive advantages.

|  | Competetive Advantage | |
| --- | --- | --- |
|  | Lower Cost | Differentiation |
| Broad Target | **Cost Leadership** | **Differentiation** |
| Narrow Target | **Cost Focus** | **Differentiation Focus** |

*Competetive Scope*

*Figure 5. Porter's three generic strategies (After Porter, 1980, p. 39).*

Having efficient scale production advantages and being able to produce at a lower cost than your competitors gives a company cost-leadership. This often means minimizing costs in research and development, service, sales and administration and focusing on just the production and the production cost. Companies that adopt a strategic position by differentiation have, on the other hand, created a product, service 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 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).

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). 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 customer value delivered is higher than the cost leaders products (Figure 6).
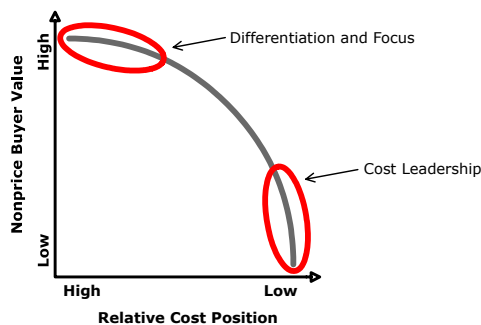


*Figure 6. The production frontier which shows the difference between differentiation and cost-leadership (After Porter, 1996, p. 62).*

Thomas Mejtoft • Royal Institute of Technology • 2006

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 traditional 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 large series, digital printing is more costly per print than traditional printing techniques (Figure 2) 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, digital printing with its ability to serve customer segments with value added services is better off used in differentiation or focus strategy.

> In Figure 6 it is possible to notice the successful strategic positions of digital printing (differentiation) and traditional printing (cost leadership).

### Critical Success Factors

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."*

For a producing company to be successful in a changing 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. The four factors – *cost, time*, *functionality,* and *quality*, are all important when discussing a supplier-customer relationship.

## 2.3  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[*]

Vertical integration occurs when a company chooses to produce its own inputs or take care of its own outputs, in order to increase that company's power in the

---

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

marketplace (Porter, 1985). That is an expansion of the company's business into areas that are at different points of the same production path. Harrigan (1983a) lists two major reasons why a company should consider vertical integration; internal benefits and costs, and effects on competitive posture.

Horizontal integration is on the other hand when a company expands into different products or services that are similar to the current ones. This can e.g. be a newspaper publisher that chooses to integrate additional channels like radio, television, the Internet etc.

A company can engage in backward or forward vertical integration into neighboring activities in the value system (Figure 7) 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 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).
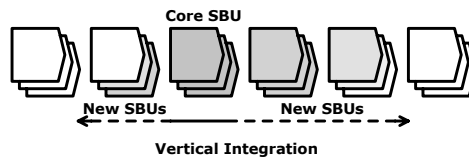


*Figure 7. Backward or forward vertical integration into neighboring activities in the value system.*

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).

An illustration of successful vertical integration is the Carnegie Steel Company, founded by Andrew Carnegie in the 1870's and later on became US Steel. Carnegie Steel, which first consisted only of a steel mill, became more or less immune against competition and industry dominant in almost all areas connected to steel manufacturing. They choose to integrate backwards 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. (WQED, n.d.).

The integration between activities plays 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 (Porter, 1985). The dimension of the vertical integration can differ depending on conscious or unconscious strategic decisions made by 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).

In previous research, it is shown 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, 1983b). 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 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).

## 2.4  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 – *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. In a fragmented, commoditized and over established market, 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

---

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

supply management the goal is to obtain the greatest total value of a product or service. This is achieved by close cooperation with suppliers to build supply networks that complete whole business processes of products or services (Anderson & Narus, 2004; Dobler & Burt, 1996).

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 8) to illustrate some fundamental forces that determine the level of competition in an industry – The internal competition in the industry, bargaining power of the buyers, bargaining power of the suppliers, threats from new entrants and the threat from substitutes.
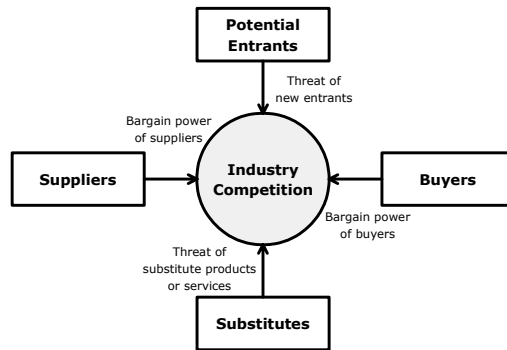


*Figure 8. Porter's Five Forces Framework (Porter, 1979, 1980).*

The Five Forces Framework (Figure 8) is presented to illustrate the importance of the customers in the competitive situation for a company, the other parts of this framework will not be further presented in detail. 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 (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 (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).

The speed, richness and reach of the Internet today provides 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.

Thomas Mejtoft • Royal Institute of Technology • 2006

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

Since customers often lack knowledge 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 (Porter, 1985).

> 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).

> The development of human resources at a digital printing house is vital, since it is important that the employees at the printing houses *"explain to the customers the added value of digitally printed documents"* (Politis, 2001, p. 390).

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. In Just-in-time manufacturing (JIT), known from e.g. the Toyota Production System (Liker & Morgan, 2006), *"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 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"*.

> With JIT and postponement in mind, 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, just as everything else in the production. By postponing the printing of e.g. the instruction manual, it would be possible to create customized manuals to the customized products produced.

> Viström (2004) 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 traditional and digital printing technology (Kipphan, 2001), where digital printed images, texts etc. are applied on pre-printed matters.

## 2.5  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 them (D'Aveni, 1994). 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. According to Schumpeter, *creative destruction* is the essence of 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"*, 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, p. 84) states that 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

The Resource Based View of the firm (RBV) (e.g. Collis & Montgomery, 1995; Wernerfelt, 1984) was the natural extension of the Porter framework (1979, 1980) and became dominant in the 1990's, and this 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"*.

Resources cannot be valued alone, but have to be put into a market context. Collis and 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. It is where all these meet that the *value creation zone* (Figure 9) 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

---

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

Thomas Mejtoft • Royal Institute of Technology • 2006

advantage. This is however becoming harder and harder to accomplish (e.g. Thomas, 1996; Wiggins & Ruefli, 2005) since the value creation zone is not static over time as the demand, scarcity and appropriability of a resource are changing factors.
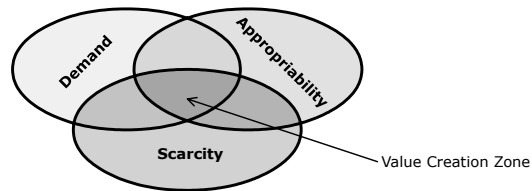


*Figure 9. Demand, Scarcity and Appropriability determine the value creation zone (Collis & Montgomery, 1995, p. 120).*

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 of the industry that threaten the value of a company's resources (Collis & Montgomery, 2005).


## 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. Thomas, 1996; Wiggins & Ruefli, 2005), and a hypercompetitive 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

---

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

disruption is disruption that creates a temporary possibility to serve customers in a superior way.

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 10). This means that they may have to cannibalize their own product and brands before their competitors do so.
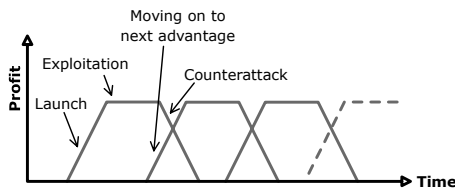


*Figure 10. Moving on to the next advantage before competitors launch their counterattack is important to survive in a hypercompetitive environment (After D'Aveni, 1994).*

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 (Figure 11) - *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).
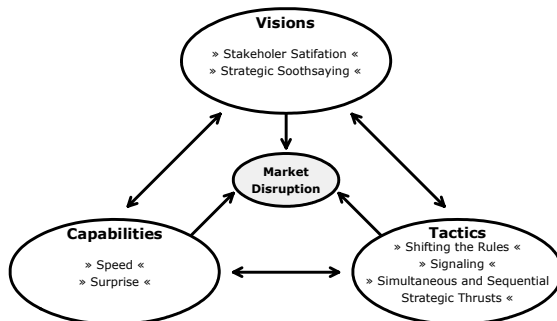


*Figure 11. The new 7S's Framework (D'Aveni, 1994, p. 248).*

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. 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).

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. Even though many researchers (e.g. D'Aveni, 1999; Thomas, 1996; Wiggins & Ruefli, 2002) have presented empirical data on a hypercompetitive shift, many others 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 (e.g. Bogner & Barr, 2000; Gimeno & Woo, 1996; McNamara et al., 2003) claim that hypercompetition is not a state but occurs in cycles. It is however 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).

## 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*

Among the *stakeholders* of a company, the shareholders should, in general, 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 the needs that a customer cannot articulate for. This is also 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).

---

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

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).

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 *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 even though the Swiss were first with the quartz technology, but did not have the vision to see the potential in this new technology (e.g. Glasmeier, 1991).

### Capabilities for Disruption

> *"Attack when they are unprepared, make your move when they do not expect it."*
> – Sun Tsu[*]

There are two basic capabilities for successful disruption of the status quo and creating temporary advantages – positioning for *speed* and *surprise*. Speed is necessary to be able to create one advantage after another and it becomes very important for staying 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 by *"catching the competitors off guard through an unexpected action"* (D'Aveni, 1994, p. 274). Nevertheless, once an advantage is recognized, competitors start to duplicate and to create an even better advantage 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) believe that introduction of new production technology changes the competitive landscape and may create "*gusts of 'creative destruction'*" (Pisano, 1990, p. 173). 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 catch your competitors by surprise and off guard (D'Aveni, 1994).

---

[*] Quote from *The Art of War* (Tsu, 500BC/1998, p. 74).

Thomas Mejtoft • Royal Institute of Technology • 2006

The microprocessor manufacturer Intel is an example of a company that has built its success on speed. Intel has, until the last couple of years, been 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

> *"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 Tsu[*]

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 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 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 (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.

> In the 1970's Xerox had, 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. Canon did not produce high volume copiers for copy shops but smaller copiers for office use. (Govindarajan & Gupta, 2001; van der Heijden et al., 2002).

> This attack from Canon was not head-to-head but rater 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).

---

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

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.

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.

# 3 Methodology

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

– Polonius[*]

## 3.1 Research Strategy

When conducting research on complex phenomena like strategy, based on both technology and decisions from employees in the company, case studies are a suitable methodology. This thesis strives to analyze what is really happening and to seek new insights in the studied problem. Saunders el al. (2000) define three principal ways of conducting exploratory research: a search of literature, talking to experts in the field and conducting focus group interviews. All these ways have been used when carrying out the research studies that form the basis for this thesis.

The research in this thesis is based on three qualitative case studies. Although a qualitative method was used to be able to gain deeper knowledge (Bell, 1999; Yin, 2003), a quantitative method, like a survey, would probably have given a larger amount of data. This data would however not be as extensive, from each respondent, as those collected with a qualitative approach (Saunders el al., 2000) and without the in-dept understanding that is necessary to study a complex and multifaceted phenomenon like business strategy and strategic changes.

## 3.2 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[†]

Qualitative case studies make it possible to gain deeper knowledge of the behavior behind the strategy used in the industry (Bell, 1999). 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:

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

---

[*] Quote from *Hamlet, Prince of Denmark* (Shakespeare, 1958/1604, p. 956).
[†] 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. 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 (Yin, 2003).

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 hypercompetitive to be able to capture temporary above average profits. 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). 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.

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. In Paper 1 and Paper 2 a multiple case design was used with representative cases for the digital printing industry and their customers.

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 (1994, p. 245) states that *"the purpose of [a] case study 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).

To keep an explorative view of the interviews the concept with focused interviews was used. This meaning 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 (Bell, 1999; Robson, 2002).

## 3.3  Grounded Theory

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

To be able 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 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.

When the first thoughts behind grounded theory were founded 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 chance of new findings and insights. However, the opinions have become divided about this approach to the literature (e.g. Glaser & Strauss, 1967; Goulding, 2002; Gustavsson, 1998) and initial theoretical knowledge before the empirical studies, may be vital to enhance the theoretical sensitivity. In these studies, literature reviews were conducted both before and after the empirical studies where carried out.


## 3.4  Questionnaires

*"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[†]

In Paper 2, a short survey was conducted in addition to the interviews. In the questionnaire, 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 previous chapter 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 el al., 2003).

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

---

[*] Quote from *The Nightmare Before Christmas* (Burton, Di Novi & Selick, 1993).
[†] Quote from *The Science of Supervillains* (Gresh & Weinberg, 2005, p. 33).

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 12).
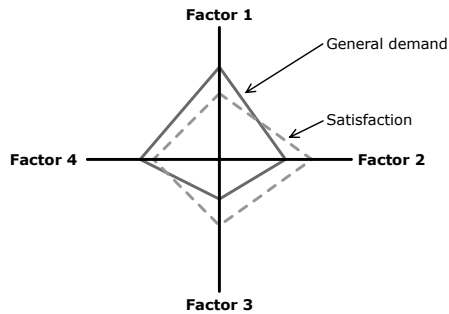


*Figure 12. A model of how the different factors are illustrated.*

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".

## 3.5  Case Companies and Respondents

*"I* SUPPOSE *every one who has spoken to or written for the public has wished at times that everybody would drop everything and just listen to him for a few minutes."*

– Andrew Carnegie[*]

The companies and respondents in all research projects in this thesis have been selected to be representative for the case and the reality. In Paper 1, the case companies came from different stages in the print media value system. They were selected to represent the following groups – companies who have been *active in digital printing only*, those with *both digital and traditional printing technology* and companies that had *both digital and traditional printing technology but choose to discontinue their investment in the traditional 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

---

[*] Quote from *The A B C of Money* (Carnegie, 1891, p. 723).

Thomas Mejtoft • Royal Institute of Technology • 2006

business development in the organization (Beal & Yasai-Ardekani, 2000; Harrigan, 1985; Porter, 1996; Schein, 1983). Collins and 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".* 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.

In Paper 2 the respondent companies were customers to digital printing houses in Sweden. The case companies where 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. In Paper 3, the two respondent companies were chosen to illustrate the shift into a more dynamic business environment.

None of the case companies and respondents in these three papers were the same, with exception of Customer 3 in Paper 2, which also constituted the Customer in Paper 3. Since Paper 3 is based on a critical case, the case was found in Paper 2. 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.

All interviews conducted in this thesis were carried out either at the respondent's company or at a place of their choice. They were held under calm conditions without any major disturbance or time pressure (Bell, 1999).

## 3.6  Study Time Frame

The case studies that constitute the basis of this thesis were done during the period from spring 2004 to spring 2006. For Paper 1, the interviews were carried out 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 during the period from summer 2005 to spring 2006.

# 4 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 results of this research project are presented in three papers that are included in the thesis. This chapter gives a brief summary of the results presented in each individual research paper. For a more thorough presentation of the results please refer to the complete papers at end of the thesis.
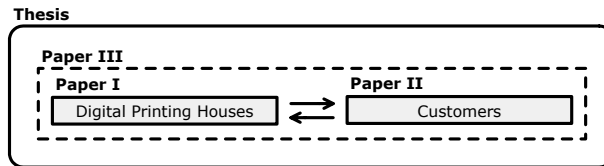


*Figure 13. Structure of this thesis.*

The first paper deals with questions regarding strategic changes in printing houses that have chosen to invest in digital printing (Figure 13). The second paper deals with how customers in the digital printing value system experience the value they get from purchasing digital printing. In the third, and final paper in this thesis, it is illustrated how a successful producer – customer relationship can create value for both parts in a dynamic and changing business environment.

## 4.1  Summary of Paper I:
### Strategies for Successful Digital Printing

In the first 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.

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

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.

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.

### 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 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.

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 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 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.

By vertical integration in the value system (Figure 14) 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.
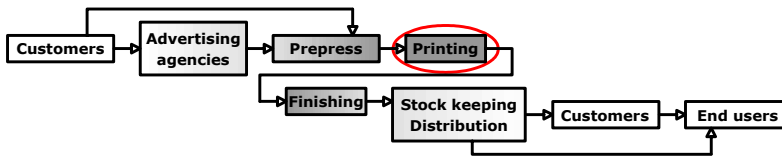


*Figure 14. Backward and forward integration from the printing SBU in the value system for digital printing.*

The companies in this study have lowered the risk in the integration by making the capacity of the integrated SBUs smaller than for the core SBU. Then the major risk is still in the core SBU (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 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.

Digital printing business differs from traditional 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 SBU 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.

## 4.2   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 8 focused interviews have been conducted 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 critical success factors (CSF) - 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 tradeoff 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 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.

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.

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*, 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. And the advertising agencies were also much more dissatisfied with digital printing in comparison with their demand.
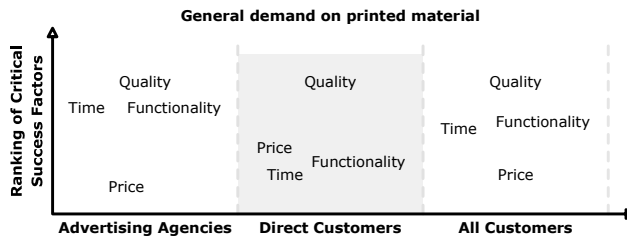


*Figure 15. Ranking of CSFs for the demand on printed material.*

*Quality* was the factor that customers deemed most important (Figure 15), but also the factor that they were least satisfied with in relation to their needs (Figure 16). *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.
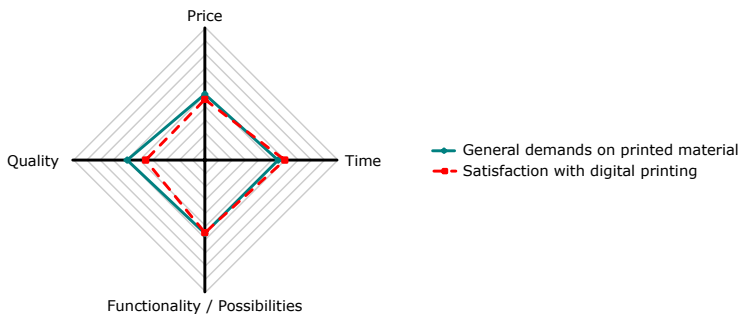


*Figure 16. Mean-centered average demands on printed material and satisfaction of all customers in the study.*

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.

## 4.3   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 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 hyper-competitive 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.

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 longsighted shareholder value. Today the Service Provider believe themselves 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 firms in the industry.

The Service Provider does not currently own any production equipment for digital printing, but only for traditional 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 SBU of traditional 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 (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 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 traditional 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. 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.

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 and services 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 9), 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 Discussion

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

– Alan C. Kay[*]

As mentioned in the previous chapter, the focus in this thesis is the internal industry competition in the printing industry and the industry's connection to the appropriate customers. The added customer value that is possible to achieve with digital printing includes services like print-on-demand and variable data printing. While variable data printing is very important for creating uniqueness within digital printing, on-demand printing is one of the most important and most widely used applications of digital printing today.

## 5.1  Vertical Integration and Digital Printing

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 digital printing since many of the problems originated from difficulties in acquiring jobs that was suitable for digital printing. The need of ensuring input and fast handling of output has led the companies to make strategic decisions to vertically integrate additional Strategic Business units, SBUs. This has been carried out both backwards to get customer contact and forward to e.g. take care of finishing in-house. The tendency for digital printing houses to engage in vertical integration (Figure 17) for expanding the digital printing industry is their natural way of evolving into a company that can efficiently support the major business models, like print-on-demand and variable data printing, of digital printing. By vertical integration, the customer-centric focus (Day & Wensley, 1988) becomes clearer and it will be easier to add appreciated customer value to products and services.
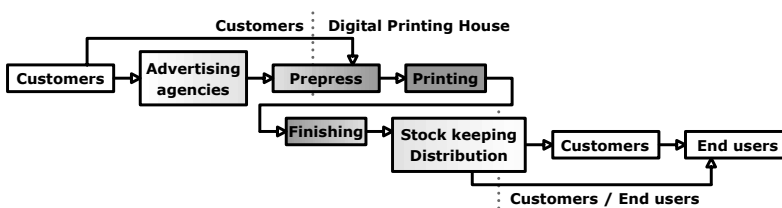


*Figure 17. Vertical integration of digital printing houses in the value system.*

---

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

Since there is often a lack of knowledge from the customers' side about what new technology can offer (Porter, 1985), it is important for suppliers to gain customer contact. Since the respondents believed that advertising agencies do not fully understand how to utilize the new technology, many printing houses strive towards increasing their share of direct customers to solve this problem. Backward integration through incorporated prepress and even simpler original work, made it possible for digital 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 educate and influence the customers to take advantage of the uniqueness of the technology.

In the eyes of the customers, the printing technology hardly ever matters as long as the end result is as expected (Romano et al., 1999). This makes it important for printing houses that choose to work directly with end 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 a digital printing house can accomplish when it makes the strategic decision to integrate vertically.

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. Nevertheless, it should be noted that the results shows that the integrated SBU often has lower capacity (Figure 18) and the capacity deciles with the distance from the core business. This implies that the largest capacity is in the original core SBU, which is natural since the theory (Peyrefitte et al., 2002) states that the further away from the core business the vertical integration takes a company, the less likely the integration is to succeed.
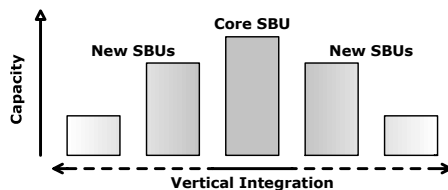


*Figure 18. The capacity becomes lower for integrated activities further away from the strategic core.*

Despite problems finding suitable jobs for the digital printing unit, overcapacity and price-cutting among the traditional printing houses are factors that the respondents experience as the biggest threat against the digital printing business. Since the breakeven point between using digital and traditional printing is continuously decreasing, there has been a need for exploiting more complex services like variable data printing to avoid competition with traditional printing houses and 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. The part of total production used for variable data printing is still very low. Using the Internet as a production channel for variable data printing is a way of increasing

accessibility, by making easy-to-use variable data printing solutions for the customers.

According to the theory a low degree of competition favors vertical integration (Balakrishnan & Wernerfelt, 1986; Harrigan, 1983b), this is not however the case in the printing industry (Birkenshaw, 2003; PODi, 2003). The results however indicate that vertical integration has been used to gain competitive advantages and enables companies to launch new products on the mature market (Harrigan, 1983a, 1985).

## 5.2 Perception of Value Received from Digital Printing

As mentioned earlier, the results in Paper 1 indicate that 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 intermediaries. In Paper 2, the direct customers do believe that companies with supporting activities can provide a more accurate and value added services than companies that are specialized. 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. This has led to a procurement or supply management (Anderson & Narus, 2004; Dobler & Burt, 1996) relationship between the printing house and the direct customer. On the other hand, the advertising agencies try to purchase different steps in the digital printing value system separately in order to cut costs.

Closer customer relationships are also a way for a supplier to increase the switching cost (Porter, 1980, 1985, 2001) of a product or service for the customer by offering training and education on a specific solution. This finding is consistent with previous research (Evans & Wurster, 1997) that suggests that as switching costs decrease it is important to find new ways of generating customer loyalty. Important in this discussion is that customers in general also believe that maintaining long-term relationship with their print service provider is important.

When studying whether digital printing is of satisfaction for the customers in their print production, it is noticeable that digital printing does not achieve a result that the 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 demand.

The print quality issues seem to become more prominent when simpler applications like short runs are the main use for digital printing. This since other printing techniques (e.g. offset) can be used to produce the same output, even though at a higher cost. When more complex digital printing applications, like variable data printing, are used, print quality issues are of less importance.

## 5.3  Interplay between Producers and Customers

One of the main problems in the introductory period of digital printing was the huge gap between what the printing houses were able to offer and what the customers actually demanded. According to the results from Paper 1 and 2, this can be noted from both the printing houses and the customers. It is only lately that the gap between offers and demand has been closed.

Basically the printing houses began their journey in the field of digital printing by offering what the printing press manufacturers said would give the presumed biggest customer value – variable data printing. Knowledge about what digital printing offered was too poor among the customers which resulted in lack of sales at the printing houses. The early adopters have expressed their early problems selling variable data printing in terms like: *"You have beaten yourself bloody against this wall all the time"*. The gap between offers from printing houses and customer demand was too large at the zero point for digital printing in the mid 1990's (Figure 19). When the customers did not buy their key services, the printing houses were "forced" to sell simpler services like producing short runs to avoid bankruptcy. Even though these services can be seen as simpler and less complex, the level of complexity should not be mixed-up with customer value. Customer value at each point of time is greatest where the customers perceive it to be. In this case the short runs created customer value and not the variable data printing. However, the perceived customer value does of course change over time.
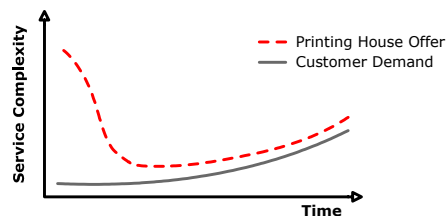


*Figure 19. An illustration of the development of the gap between customer demand and the printing house offer regarding the services connected to digital printing.*

By giving the customers what they want it is possible to form a tight supplier – customer relationship, which results in increased switching costs (Evans & Wurster, 1997) for customers and opportunities for printing houses to influence the customers to make use of more complex service like variable data printing. Migrating from simpler services to ones that are more complex is actually what the customers have done, because short runs and print-on-demand were the main reasons why digital printing became an option for their printed matters. But, over time more complex services have been introduced and now the customers believe that they benefit and value from different kinds of variable printing, mostly simple applications like changing logos, addressing etc. The services have been gradually adjusted to better fit the customers' needs.

---

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

Thomas Mejtoft • Royal Institute of Technology • 2006

By striving towards a tighter supplier – customer relationship, it is not only possible for the supplier to educate the customer on how to take advantage of the possibilities with the technology but also possible to learn from the customers as indicated in Paper 3. By better understanding customer needs and obtaining superior stakeholder satisfaction, competitive advantages can be reached. What many of the companies in the printing industry have learned was that *digital printing is not just a machine, but also a way of thinking*. This has to be conveyed to their customers and throughout the internal organization. Learning from the customers and using customers for product development corresponds with previous results discussed by Magnusson (2003).

## 5.4  Important Success Factors in the Competitive Digital Printing Environment

*"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\*

The research problem in this thesis has been considered from both the producer's (printing house) point of view and from the customer's angle. During the research study, the following factors were prominent.

### Value Added Services

When digital printing technology was introduced, it was a technology with lower speed, higher cost and a poor print quality in comparison with existing technology. Even if all these factors have changed for the better, these statements are more or less still true. According to the theory (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 in general 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 traditional printing houses, following a low cost strategy, by offering value added services using a differentiation strategy. Increased customer value can be achieved by vertical integration (Harrigan, 1983a, 1984, 1985) in the digital printing value system. By integration, it is possible to influence the customers and help them to take advantage of opportunities with digital printing.

The value creation zone (Figure 9) is not static over time as the demand, scarcity and appropriability of a resource are factors that change (Collis and Montgomery, 1995). Unfortunately, in the case of 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

---

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

increasing but the ability to appreciate the value of the printed product is still lacking since print is regarded as a commodity product (Birkenshaw, 2003). Although in combination with other resources, such as Internet ordering, electronic stock-keeping and automated customizations from databases, 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 and becoming more than a print provider.

## More than a Print Provider - a Service Provider

Instead of calculating and discussing print cost per page or piece with the customers, it is important to focus on the actual value possible for the customer to receive from the product. Even though the print cost per piece may be higher, digital printing might help decrease the total cost of the value chain of printed material and increase the potential revenues from the printed matters by e.g. raising the response rate (Broudy & Romano, 1999). By trying to convey the message of lowered total cost by printing on demand and increased revenues by customization to the customers, it is possible for digital printing houses to act more as a service provider for information services and customer relations than solely a print provider.

The ongoing and natural development towards more and more information created to be distributed in electronic channels, is not all bad for digital printing, but rather the contrary. Even if material is intended for electronic storing and distribution, 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 might increase its importance as a production technology.

Digital printing is one tool for printing houses to recapture 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 become a true service provider, a widened horizon is necessary.

## Hypercompetitive Behavior

The competitive environment in the printing industry is becoming increasingly dynamic and a hypercompetitive behavior (e.g. Bourgeois & Eisenhardt, 1988; Brown & Eisenhardt, 1998; D'Aveni, 1994, 1995a) among printing houses is becoming crucial to ensure future survival in this industry.

In accordance with the theory (D'Aveni, 1994) 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 know-how arena it is possible to control the future of the industry in a more successful manor since the fierce price competition in the printing industry is not healthy today. 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 of print.

It may be necessary to create disruption (D'Aveni, 1994, 1995a; Schumpeter, 1942) on the market e.g. by starting to offer several publication channels, even non-printed solutions, to customers as complements to the printed services to gain and maintain customer contact. This may be necessary even for those companies that currently have advantages even though it means cannibalizing on the former core business, like traditional printing technologies. By shifting focus from production to customer contact, it is possible, as 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 results in Paper 3 indicate, just as the theory (D'Aveni, 1995a) states, that it is important to act with a hypercompetitive-like behavior and work with speed, surprise, superior customer satisfaction and continually trying to shift the rules of the industry to the company's favor to maintain business viability and competitiveness.

SM-06

# 6 Conclusions

---

*"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 out predecessors, not because we have keener vision or greater height, but because we are lifted up and borne aloft on their gigantic stature."*

– John of Salisbury[*]

The industry analyzed is a fragmented, over established and mature industry that has had new disrupting technology introduced and met new threats from the Internet and substitute products like non-printed media. To survive as an independent company in such an industry environment, business strategy and strategic thinking becomes important. This thesis has investigated and analyzed strategies and the interplay between digital printing houses and their customers. The research is focused around three studies that have been carried out to investigate the internal competition in the industry, and the customers as well as how they influence each other.

What this research study has shown is simple and could be expressed as follows - *digital printing is used most effectively and successfully when the main purpose is not to print*. This conclusion calls for some explanation:

Paper 2 exemplifies what happens when the focus is solely on print as the output channel. In this case, issues that directly compete with offset, like print quality and cost per printed piece, become important. This was illustrated in the results of the study, since the most important factor for the customers was the quality aspect, and this was also the factor that the customers where least satisfied with. Even though this result was the same for both advertising agencies and direct customers, it became evident in the interviews that many direct customers had visions based on all-electronic solutions and using more advanced variable data solutions in the future. These customers were also more satisfied with digital printing as a production technology. Further on, this implies that direct customers to digital printing houses are likely to use digital printing in a successful way.

Many printing houses are actively trying to increase their share of direct customers to use more of the unique features of digital printing. To satisfy direct customers, vertical integration into neighboring activities in the value system has become necessary. Today it is important to offer full service solutions to compete successfully in the industry.

The results shown in Paper 3 about networking into digital printing do conform to previous findings in Paper 1 of vertical integration being a successful strategy for

---

[*] Quote from *The Metalogicon* (Salisbury, 1159/1955, p. 167), further information is available in *On the Shoulders of Giants, A Shandean Postscript* (Merton, 1965, p. 40).

digital printing. In this case the networking is between two vertically integrated companies that have specialized themselves on their respective value chain. This means that they are both partners and competitors at the same time. They are competitors in the periphery areas of the printing value system such as prepress, finishing etc. but not at their core strategic business unit (SBU), i.e. the printing.

Digital printing provides scope for itself when the goal is not to print at all. By having a total paperless vision, the natural output when printed material is needed is digital printing, since it is possible for the 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 commercial successful use of digital printing today, it is clear that it is becoming increasingly important to influence customers to start to take advantage of more complex and unique services of digital printing. The breakeven point between digital and traditional printing, when just focusing on short runs, is a gray area that is constantly expanding since digital printing is evolving towards longer print runs and traditional printing towards shorter runs. To avoid price competition from traditional printing, the use of different types of variable data printing has to increase.

Vertical integration has helped the digital printing industry to produce suitable input for their printing presses. The horizontal integration into additional output channels, like electronic publishing is a natural development in this industry to support the business with digital printing. To keep up with the increasing pace of industry development and increased competition from other industries with substitute solutions, it is important to treat the market more as one in a hypercompetitive state. By adopting strategies that focus more around speed and disruption it may be possible to compete successfully and change the competitive rules of the industry in the company's favor. This might have to be done even though it may mean cannibalizing on the traditional core business of the company.


## 6.1  Further Research

*"I usually don't like thinking about the future... I mean let's face it, you can't predict what's going to happen... But sometimes the thing you didn't expect is what you really wanted after all... maybe the best thing to do is stop trying to figure out where you are going and just enjoy where you are at."*

– John "J.D." Dorian[*]

This study is based exclusively on qualitative research and looks at the printing houses and their customers. This method and these case studies constitute a basis for further research, which is necessary to be able to draw conclusions that are more general. It is important to bear in mind that *"the purpose of [a] case study is not to represent the world, but to represent the case"* (Stake, 1994, p. 245), which makes it hard to draw general conclusions. Nevertheless, the contributions to the research community from this thesis should not be underestimated, since it analyzes and displays the situation in the industry and its development in both a theoretical and practical way.

---

[*] Quote from *Scrubs, My Fruit Cups* (Bakken & Whittingham, 2002).

To draw more general conclusions, additional studies of the industry have to be carried out. Below, some important and interesting areas for further research in this field are presented.

### Investigate More Players in the Value System

Further research in the field of business strategies in digital printing, should involve other parts in the digital printing value system. According to the results in Paper 1, the digital printing houses believe that the manufacturers of the digital printing presses do not fully support the business of digital printing. This implies that it is important to investigate how the *manufacturers* work with their customers, i.e. the digital printing houses.
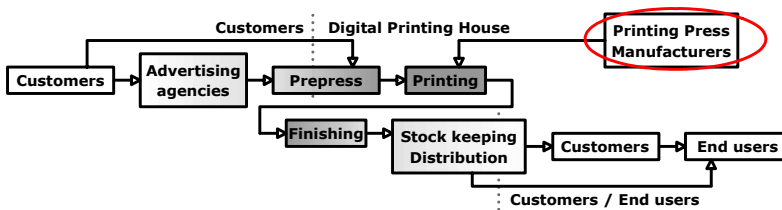


*Figure 20. Printing Press Manufacturers in the digital printing value system.*

### Alliances to Nurture Hypercompetitive Behavior

Further on, in the context of hypercompetitive behavior in the printing industry (discussed in Paper 3), business alliances (Figure 21) become important to ensure flexibility in gaining resources. It is therefore necessary to investigate how these *strategic alliances* influence the competition and flexibility in the digital printing industry.
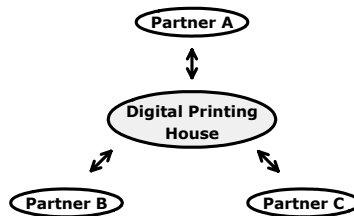


*Figure 21. Strategic alliances in digital printing.*

By investigating companies, that choose to co-operate with external partners instead of integrating digital printing technology into their companies, it is possible to study how alliances can strengthen and nurture a dynamic competitive behavior.

Through the case studies in-dept knowledge of strategies and strategic changes have been gained. By using the comprehensive information previously collected it is possible to construct and conduct an *industry wide survey* to verify and strengthen the findings in this thesis. This would make it possible to draw more generalized conclusions about strategic use of digital printing and how this technological change has affected the printing industry.

# Bibliography

*Act (SFS 1992:1528) on Public Procurement.* (1992). Retrieved October 14, 2005, from http://www.nou.se/pdf/louenglish.pdf

Adobe Systems Incorporated. (2004). *PDF Reference, fifth edition: Adobe Portable Document Format Version 1.6.* Retrieved August 27, 2006, from http://partners.adobe.com/public/developer/en/pdf/PDFReference16.pdf

Alderson, W. (1950). *Marketing Efficiency and the Principle of Postponement.* Cost and Profit Outlook, Vol. 3, No. 4, pp. 15-18.

Anderson, J. C., & Narus, J. A. (2004). *Business Market Management, Second Edition.* Pearson Education International.

Bakken, J. (Writer), & Whittingham, K. (Director). (2002). *My Fruit Cups, Episode S131* [Television series episode]. In B. Lawrence (Executive producer), *Scrubs.* NBC/Touchstone Television.

Balakrishnan, S., & Wernerfelt, B. (1986). *Technical Change, Competition and Vertical Integration.* Strategic Management Journal, Vol. 7, pp. 347-359.

Barney, J. B. (1991). *Firm Resources and Sustained Competitive Advantage.* Journal of Management, Vol. 17, No. 1, pp. 99-120.

Beal, R. M., & Yasai-Ardekani, M. (2000). *Performance implications of aligning CEO functional experiences with competitive strategies.* Journal of Management, Vol. 26, No. 4, pp. 733-762.

Bell, J. (1999). *Doing your research project, Third edition.* Open University Press.

Bettis, R. A., & Hitt, M. A. (1995). *The New Competitive Landscape.* Strategic Management Journal, Vol. 16, Special Issue: Technological Transformation and the New Competitive Landscape, pp. 7-19.

Birkenshaw, J. (2003). *Life Cycle Costing of Print on Demand Digital Printing of Books and Packaging Materials.* Proceedings of IS&T's DPP2003, pp. 12-13.

Birkenshaw, J. (2004, April). *The future of print on paper.* Prepress and print Technology, Pira International. Retrieved January 26, 2005, from http://pira.atalink.co.uk/pulp-and-paper/163.html

Blocher, E. J., Chen, K. H., & Lin, T. W. (1999). *Cost Management: A Strategic Emphasis.* Irwin/McGraw-Hill.

Bogner, W. C., & Barr, P. S. (2000). *Making Sense in Hypercompetitive Environments: A Cognitive Explanation for the Persistence of High Velocity Competition.* Organization Science, Vol. 11, No. 2, pp. 212-226.

Bourgeois, L. J., & Eisenhardt, K. M. (1988). *Strategic Decision Processes in High Velocity Environments: Four cases in the microcomputer industry.* Management Science, Vol. 34, No. 7, pp. 816-835.

Boyd, J. R. (1976, August 4). *New Concepts for Air-to-Air Combat.* Unpublished manuscript, United States Air Force. Retrieved August 20, 2006, from http://www.d-n-i.net/boyd/pdf/fast_transients.pdf

Boyd, J. R. (1986, December). *Patterns of Conflict.* Unpublished manuscript, United States Air Force. Retrieved August 20, 2006, from http://www.d-n-i.net/boyd/pdf/poc.pdf

Broudy, D., & Romano, F. (1999). *An Investigation: Direct mail responses, Based of color, personalization, database, and other factors.* Digital Printing Council, White Paper. Retrieved August 1, 2005, from http://www.gain.net/PIA_GATF/PDF/romano1.pdf

Brown, S. L., & Eisenhardt, K. M. (1998). *Competing on the edge, Strategy as Structured Chaos.* Harvard Business School Press.

Bucklin, L. P. (1965, February). *Postponement, Speculation, and the Structure of Distribution Channels.* Journal of Marketing Research, Vol. 2, No. 1, pp. 26-31.

Burton, T. (Producer/Writer), Di Novi, D. (Producer), & Selick, H. (Director). (1993). *The Nightmare Before Christmas* [Motion picture]. Touchstone Pictures.

Bäck, A., Juhola, H., & Lindberg, T. (1997). *Models to Support the Evaluation of the Application Potential for Digital Printing.* IS&T's NIP13, pp. 330-338.

Carnegie, A. (1889, June). *Wealth.* The North American review, Vol. 148, No. 391, pp. 653-665.

Carnegie, A. (1891, June). *The A B C of Money.* The North American review, Vol. 152, No. 415, pp. 723-751.

Carr, N. G. (2003, May). *IT Doesn't Matter.* Harvard Business Review, pp. 41-49.

Chandler, A. D. (1962). *Strategy and Structure: Chapters in the History of the American Industrial Enterprise.* The M.I.T. Press.

Christensen, C. (2001, April). *Making friends with disruptive technology: - an interview with Clayton M. Christensen.* Strategy & Leadership, Vol. 29, No. 2, pp. 10-15.

Clarke, A. C. (1973). *Profiles of the Future: An Inquiry into the Limits of the Possible, Revised Edition.* Harper & Row Publishers.

Collis, D. J., & Montgomery, C. A. (1995, July-August). *Competing on Resources: Strategy in the 1990s.* Harvard Business Review, pp. 118-128.

Collis, D. J., & Montgomery, C. A. (2005). *Corporate Strategy, A Resource-Based Approach, Second Edition.* McGraw-Hill/Irwin.

Cooper, R. (1995). *When Lean Enterprises Collide, Competing through Confrontation.* Harvard Business School Press.

Darwin, C. (1872). *The Origin of Species by means of Natural Selection, 6th edition.* John Murray.

D'Aveni, R. A. (1994). *Hypercompetition – Managing the Dynamics of Strategic Maneuvering.* FreePress.

D'Aveni, R. A. (1995a). *Coping with hypercompetition: Utilizing the new 7S's framework.* Academy of Management Executive, Vol. 9, No. 3, pp. 45-57.

D'Aveni, R. A. (1995b). *Hypercompetitive Rivalries – Competing in Highly Dynamic Environments.* FreePress.

D'Aveni, R. A. (1999). *Strategic Supremacy through Disruption and Dominance.* Sloan Management Review, Vol. 40, No. 3, pp. 127-135.

D'Aveni, R. A., & Ravenscraft, D. J. (1994). *Economies of integration versus bureaucracy costs: Does vertical integration improve performance?.* Academy of Management Journal, Vol. 37, No. 5, pp. 1167-1197.

Day, G. S., & Wensley, R. (1988, April). *Assessing Advantage: A Framework for Diagnosing Competitive Superiority*. Journal of Marketing, Vol. 52, pp. 1-20.

DiMaggio, P. J., & Powell, W. W. (1983). *The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields*. American Sociological Review, Vol. 48, No. 2, pp. 147-160.

Dobler, D. W., & Burt, D. N. (1996). *Purchasing and supply management, Sixth Edition*. McGraw-Hill.

Evans, P. B., & Wurster, T. S. (1997, September-October). *Strategy and the new economics of information*. Harvard Business Review, pp. 71-82.

Evans, P. B., & Wurster, T. S. (2000). *Blown to bits – How the new economics of information transforms strategy*. Harvard Business School Press.

Ford, H. J., & Crowther, S. (1922). *My Life and Work*. Doubleday, Page & Company.

Friedman, L. G., & Furey, T. (1999). *The Channel Advantage*. Butterworth-Heinemann.

Gadiesh, O., & Gilbert, J. L. (1998, May-June). *How to map your industry's profit pool*. Harvard Business Review, pp. 149-162.

Gennard, J., Ramsay, H., Baldry, C., & Newsome, K. (2000, September). *Strengthening social dialogue and cross-border trade union networks in the graphical industry, Final Report*. Centre for European Employment Research (CEER), University of Strathclyde.

Gilboa, R. (2002). *The Production Digital Printing Market: Opportunities and Trends*. IS&T's NIP18, pp. 134-138.

Gimeno, J., & Woo, C. Y. (1996). *Hypercompetition in a Multimarket Environment: The Role of Strategic Similarity and Multimarket Contact in Competitive De-escalation*. Organization Science, Vol. 7, No. 3, pp. 322-341.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory, Strategies for Qualitative Research*. Aldine de Gruyter.

Glasmeier, A. (1991). *Technological discontinuities and flexible production networks: The case of Switzerland and the world watch industry*. Research Policy, Vol. 20, pp. 469-485.

Goulding, C. (2002). *Grounded Theory, A Practical Guide for Management, Business and Market Researchers*. SAGE Publications.

Govindarajan, V., & Gupta A. K. (2001). *Strategic Innovation: A Conceptual Road Map*. Business Horizons, Vol. 44, No. 4, pp. 3-12.

Gresh, L. H., & Weinberg, R. (2005). *The Science of Supervillains*. Wiley.

Gustavsson, B. (1998). *Metod: Grundad Teori för ekonomer*. Academia Adacta.

Harrigan, K. R. (1983a). *A Framework for looking at vertical integration*. The Journal of Business Strategy, Vol. 3, pp. 30-37.

Harrigan, K. R. (1983b). *Vertical integration, outsourcing, and corporate strategy*. BeardBooks.

Harrigan, K. R. (1984). *Formulating vertical integration strategies*. Academy of Management Review, Vol. 9, No. 4, pp. 638-652.

Harrigan, K. R. (1985). *Vertical Integration and Corporate Strategy*. Academy of Management Journal, Vol. 9, No. 2, pp. 397-425.

Harrigan, K. R. (1986). *Matching vertical integration strategies to competitive conditions*. Strategic Management Journal, Vol. 7, pp. 535-555.

Håkansson, H., & Johanson, J. (2002). *A model of industrial networks.* In D. Ford (Ed.), *Understanding Business Marketing and Purchasing, An interaction approach, Third Edition* (pp. 145-149). Thomson Learning.

Jarillo, J. C. (1988). *On Strategic Networks.* Strategic management journal, Vol. 9, pp. 31-41.

Jha, A. (2005, September 27). *Return of the time lord.* The Guardian. Retrieved August 14, 2006, from http://books.guardian.co.uk/departments/scienceandnature/story/0,,1579384,00.html

Kay, A. C. (1993, March). *The early history of Smalltalk.* ACM SIGPLAN Notices, Vol. 28, No. 3, pp. 69-95.

Kazanjian, R. K., & Drazin, R. (1987). *Implementing internal diversification: contingency factors for organization design choices.* Academy of Management Review, Vol. 12, No. 2, pp. 342-354.

Keeler, K. (Writer), & Reardon, J. (Director). (1997). *The Mysterious Voyage of Homer, Episode 3F24* [Television series episode]. In M. Groening (Executive producer), *The Simpsons.* Fox Broadcasting Company.

Kipphan, H. (2001). *Handbook of Print Media, Technologies and Production Methods.* Springer.

Kirkpatrick, D. (1997, February 17). *Intel's Amazing Profit Machine.* Fortune.

Kotler, P., Wong, V., Saunders, J., & Armstrong G. (2005). *Principles of Marketing, Fourth European Edition.* Pearson Education Limited.

Kuchinskas, S. (2000). *One-to-(N)one?.* Business 2.0, Vol. 5, Issue 17, pp. 141-145.

Liker, J. K., & Morgan, J. M. (2006). *The Toyota Way in Services: The Case of Lean Production Development.* Academy of Management Perspectives, Vol. 20, No. 2, pp. 5-20.

Livesay, H. C., & Porter, P. G. (1969). *Vertical Integration in American Manufacturing, 1899-1948.* The Journal of Economic History, Vol. 29, pp. 494-500.

Lyson, K. (2000). *Purchasing and Supply Chain Management.* Pearson Education Limited.

Magnusson, P. R. (2003). *Customer-Oriented Product Development, Experiments Involving users in Service Innovation.* Doctorial dissertation, Stockholm School of Economics.

Makadok, R. (1998). *Can First-Mover and Early-Mover Advantages be Sustained in an Industry with Low Entry Barriers to Entry/Imitation?.* Strategic Management Journal, Vol. 19, No. 7, pp. 683-696.

Marx, K. (1930). *Capital, Volume 1* (E. Paul & C. Paul, Trans.). J. M. Dent & Sons Ltd. (Original work published 1867)

McNamara, G., Vaaler, P. M., & Devers, C. (2003). *Same as it ever was: The Search for Evidence of Increasing Hypercompetition.* Strategic Management Journal, Vol. 24, No. 3, pp. 261-278.

Mejtoft, T. (2004). *Current business models for Newsprint-on-demand.* STFI Report CW 249, STFI-Packforsk.

Mejtoft, T. (2005). *The Cost of Digital Printing in Newspaper Production.* STFI-Packforsk Report 111, STFI-Packforsk.

Merton, R. K. (1965). *On the Shoulders of Giants, A Shandean Postscript.* Free Press.

Morgan, R. F. (1996). *An Internet Marketing Framework for the World Wide Web (WWW).* Journal of Marketing Management, Vol. 12, pp. 757-775.

Peppers, D., & Rogers, M. (1993). *The One to One Future.* Currency Doubleday.

Peppers, D., & Rogers, M. (2000). *The One to One Manager.* Currency Doubleday.

Peyrefitte, J., Golden, P. A., & Brice, J. (2002). *Vertical integration and economic performance: a managerial capability framework.* Management Decision, Vol. 40, No. 3, pp. 217-226.

Pisano, G. P. (1990). *The R&D Boundaries of the Firm: An Empirical Analysis.* Administrative Science Quarterly, Vol. 35, No. 1, pp. 153-176.

PODi PPML Working Group. (2002, July 31). *PPML – Personalized Print Markup Language, Functional Specifications, Version 2.1.* Retrieved August 28, 2006, from http://www.podi.org/information/index.php?mode=viewspcpdf&for=developer& spId=1

PODi. (2003, January). *Best Practices in Digital Printing, Third Edition.* Caslon & Company.

Politis, A. E. (2001). *Competence of Human Capital for Digital Printing.* Proceedings of the IS&T's DPP2001, pp. 386-391.

Porter, M. E. (1979, March-April). *How competitive forces shape strategy?.* Harvard Business Review, pp. 137-145.

Porter, M. E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors.* Free Press.

Porter, M. E. (1985). *Competitive Advantage: Creating and Sustaining Superior Performance.* Free Press.

Porter, M. E. (1996, November-December). *What is Strategy?.* Harvard Business Review, pp. 61-79.

Porter, M. E. (2001, March). *Strategy and the Internet.* Harvard Business Review, pp. 63-78.

Porter, M. E., & Millar, V. E. (1985, July-August). *How information gives you competitive advantage.* Harvard Business Review, pp. 149-160.

Robson, C. (2002). *Real World Research, Second Edition.* Blackwell Publishing.

Rockart, J. F. (1976, March-April). *Chief executives define their own data needs.* Harvard Business Review, pp. 81-93.

Romano, F. J. (2004, May 27). *Designing for Digital.* Speech presented for the Swedish Graphic Companies' Federation, Stockholm, Sweden.

Romano, F. J., Lee, B., Rodrigues, A., & Sankarshanan. (1999). *Professional prepress, printing, and publishing.* Prentice-Hall.

Roos, J., & von Krogh, G. (1996). *Managing Strategy Processes in Emergent Industries, The Case of Media Firms.* Macmillan Press.

Salisbury, J. (1955). *The Metalogicon* (D. D. McGarry, Trans.). University of California Press. (Original work published 1159)

Saunders, M. N. K., Lewis, P., & Thornhill, A. (2000). *Research Methods for Business Students, Third Edition.* Prentice Hall.

Schein, E. H. (1983). *The Role of the Founder in Creating Organizational Culture.* Organizational Dynamics, Vol. 12, pp. 13-28.

Schumpeter, J. A. (1942/1975). *Capitalism, Socialism and Democracy.* Harper Perennial.

Serwer, A. E. (1997). *Michael Dell turns the PC world inside out.* Fortune, Vol. 136, No. 5, pp. 76-86.

Shakespeare, W. (1958). *The Complete Works of William Shakespeare.* Spring Books. (Original work published 1604)

Smith, G. (2004). *An evaluation of the corporate culture of Southwest Airlines*. Measuring Business Excellence, Vol. 8, No. 4, pp. 26-33.

Stake, R. E. (1994). *Case Studies*. In N. K. Denzin, & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 236-247). Sage Publishing.

Stern, L. W., & El-Ansary, A. I. (1992). *Marketing channels, Fourth Edition*. Prentice-Hall.

Stewart, T. A. et al. (2003, June). *Does IT Matter? An HBR Debate, Letters to the Editor*. Harvard Business Review. Retrieved August 15, 2005, from http://harvardbusinessonline.hbsp.harvard.edu/b02/en/files/misc/Web_Letters.pdf

Sugimori, Y., Kusunoki, K., Cho, F., & Uchikawa, S. (1977). *Toyota production system and Kanban system Materialization of just-in-time and respect-for-human system*. International Journal of Production Research, Vol. 5, No. 6, pp. 553-564.

Svensson, G. (2003). *Consumer driven and bi-directional value chain diffusion models*. European Business Review, Vol. 15, No. 6, pp. 390-400.

Teece, D. J., Pisano, G., & Shuen A. (1997). *Dynamic Capabilities and Strategic Management*. Strategic Management Journal, Vol. 18, No. 7, pp. 509-533.

Thomas, L. G. (1996, May-June). *The Two Faces of Competition: Dynamic Resourcefulness and the Hypercompetitive Shift*. Organization Science: A Journal of the Institute of Management Sciences, Vol. 7, No. 3, pp. 221-242.

Thomke, S., & von Hippel, E. (2002, April). *Customers as Innovators, A New Way to Create Value*. Harvard Business Review, pp. 74-81.

Timmers, P. (1998, April). *Business Models for Electronic Markets*. Electronic Markets, Vol. 8, No. 2, pp. 3-8.

Tolkien, J. R. R. (1999). *The Hobbit or there and back again*. HarperCollins Publishers. (Original work published 1937 by George Allen & Unwin).

Tsu, S. (1998). *The Illustrated Art of War* (T. Cleary, Trans.). Shambhala Publishing. (Original work published around 500 BC)

van der Heijden, K., Bradfield, R., Burt, G., Cairns, G., & Wright, G. (2002). *The Sixth Sense: Accelerating Organizational Learning with Scenarios*. Wiley.

Viström, M. (2004). *Customised information on packaging – driving Forces and Logistical Aspects*. Licentiate Thesis, Royal Institute of Technology, Sweden.

von Hippel, E. (1986). *Lead users: A source of novel product concepts*. Management Science, Vol. 32, No. 7, pp. 791-805.

Voss, C. A. (1987). *Just-in-time manufacture*. Springer.

Waterman, R. H., Peters, T. J., & Philips, J. R. (1980, June). *Structure is not organization*. Business Horizons, pp. 14-26.

Welch, J., & Welch, S. (2005). *Winning*. HarperCollins Publishers.

Wernerfelt, B. (1984). *A resource-based view of the firm*. Strategic Management Journal, Vol. 5, No. 2, pp. 171-80.

Wiggins, R. R., & Ruefli, T. W. (2002). *Sustained Competitive Advantage: Temporal Dynamics and the Incidence and Persistence of Superior Economic Performance*. Organization Science, Vol. 13, No. 1, pp. 82-105.

Wiggins, R. R., & Ruefli, T. W. (2005). *Schumpeter's Ghost: Is hypercompetition making the best of times shorter?*. Strategic Management Journal, Vol. 26, pp. 887-911.

WQED. (n.d.). *Steel City, Manufacturing Metropolis: 1876-1945*. Retrieved September 8, 2006, from http://www.wqed.org/erc/pghist/units/WPAhist/wpa5.shtml

Yin, R. K. (2003). *Case Study Research, Design and methods, Third Edition*. SAGE Publications.

Some terms that are of great importance and are frequently used in this thesis will be defined below.

## Commodity Product

A commodity product is a product that is, in the eyes if the customer, interchangeable with competitors' product of the same type. Commodities are often sold primarily on the basis of price.

## Critical Success Factor (CSF)

According to Rockart (1979, p. 85) *"critical success factors thus are, for any business, 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."*

## Digital Printing

Digital printing consists of all the *"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).

## Digital Printing House

A digital printing house is a company that utilizes digital printing to produce printed material as their core or support business. A digital printing house has defined digital printing as their or one of their strategic business units (SBU).

## Traditional Printing

The term traditional or conventional printing technology has been used frequently in this thesis and included papers. Traditional printing is all printing technologies that are not digital printing technologies, e.g. offset, gravure, and flexography. In this thesis, offset is, in most cases, the technology that is referred to.

Traditional printing technologies do need some non-digital steps between the digital original and the finished, most often a printing plate, cliché or equal.

## Value System

A value system consists of many value chains in an industry and captures the complexity of the combination of different value chains. In this thesis the term value system is used to describe that many different companies can be involved in the creation of a product or service. A value system is in other words a value chain of many value chains (Figure 22).
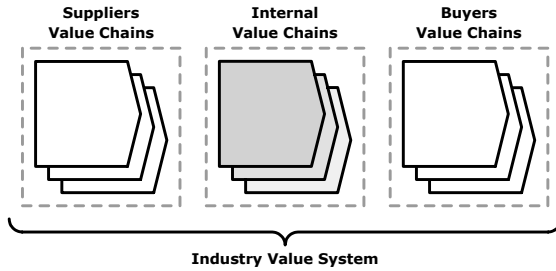


*Figure 22. A value system consists of many value chains.*

## Variable Data Printing

*"Since every copy [in digital printing] 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 mans that it is, in digital printing, possible to customize different copies in a print run to a specific individual based on different input variables - Variable Data Printing (VDP). 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"*. Figure 23 illustrates customized postcards printed with digital printing using variable data printing.



*Figure 23. Customized postcards printed with digital printing using variable data printing.*

## 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. (2006). *Creation of Customer Value Using Digital Printing in a Dynamic Business Environment.* Submitted for publication.

*Strategies for Successful Digital Printing*

# Strategies for Successful Digital Printing

Thomas Mejtoft

STFI-Packforsk/Royal Institute of Technology (KTH)

*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.*

---

Full text of this article is not included in this electronic version of the thesis. For further information, please refer to the journal or contact:

Thomas Mejtoft
thomas@mejtoft.se

# Paper II

*Perceived Satisfaction by Customers in the Digital Printing Value System*

# Perceived Satisfaction by Customers in the Digital Printing Value System

## Thomas Mejtoft

STFI-Packforsk/Royal Institute of Technology (KTH)

*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 where 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.*

---

Full text of this paper is not included in this electronic version of the thesis. For further information, please refer to the proceedings or contact:

Thomas Mejtoft
thomas@mejtoft.se

# Paper III

*Creation of Customer Value Using Digital Printing in a Dynamic Business Environment*

Paper submitted for publication.

# Creation of Customer Value Using Digital Printing in a Dynamic Business Environment

Thomas Mejtoft

STFI-Packforsk/Royal Institute of Technology (KTH)

*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 manor.*

*This study concludes that digital printing is used most 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.*

---

Full text of this paper is not included in this electronic version of the thesis. For further information, please contact:

Thomas Mejtoft
thomas@mejtoft.se

Thomas Mejtoft

# Strategies in the Digital Printing Value System