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New printing technology and pricing

Peter Hultén a,⁎, Magnus Viström b,1, Thomas Mejtoft c,2

a ESC Rennes School of Business, 2, rue Robert d’Arbrissel, 35065 Rennes, France
b STFI-Packforsk AB/Lund University (division of packaging logistics), STFI-Packforsk c/o Mittuniversitetet, SE-891 18 Örnsköldsvik, Sweden
c STFI-Packforsk AB/Royal Institute of Technology (KTH), STFI-Packforsk c/o Mittuniversitetet, SE-891 18 Örnsköldsvik, Sweden

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Abstract

This case study analyzes five Swedish printing houses’ pricing with respect to their investments in new printing technology. The new printing technology made it possible for the printing houses to market new products and services to meet the demand for shorter delivery times and full service solutions. Although this demand was apparent, the printing houses’ opportunities to capitalize on their investments depended on the characteristics of the market segment that they served. Findings indicate that the new printing technology made it possible to change prices when the new services reduced delivery time and costs, and when there were substantial differences between the new services and available substitutes. Thus, customers accepted new pricing when the utilization of the new technology resulted in financial gains and time reductions.

Keywords: Competition; Investments in new technology; Perception of value; Pricing

1. Introduction: price-driven markets and pricing problems

The globalization trend over the last decades has resulted in increased price competition. Clearly, removals and reductions of trade barriers, improved communication technology, and swift logistics have made it attractive for firms in Europe and in the U.S. to outsource production to countries with low labor costs. Most industrial markets are, therefore, more price competitive than they were a decade ago (Christopher & Gattorna, 2005; Solberg, Stöttinger, & Yaprak, 2006; Voeth & Herbst, 2006). Also, the competitive landscape is influenced by technological advancements (Smith, Sinha, Lancioni, & Forman, 1999) with change as a constant challenge for those in charge of technology management (Danaher, Hardie, & Putsis, 2001). The far-reaching effects of the new production technology are apparent in concepts like mass customization (Jacob, 2006), and on-demand production (Wind, 2006). Thus, while most industrial markets are increasingly price-driven, technological advancements are important in creating competitive advantages. However, although technological advancements create new product features, it might be difficult to adjust pricing so that it reflects the value of the new features (e.g. Jenster, Hayes, & Smith, 2005, p. 175; Lancioni, Shau, & Smith, 2005). In particular the problem of making such price adjustments indicates in markets characterized by intense competition and price pressure. Under such market conditions supply exceeds demand, which makes it possible for customers to benefit from new value-added features without having to pay for them. Consequently, as competition intensifies, it becomes problematic for suppliers to make prices reflect the value-added of new products and services.

The challenges associated with investments in new technology, competition and pricing are apparent in the printing industry. Nagle and Cressman (2002) presented an interesting example of a printing company, which was committed to quality work and high levels of customer service. Despite this commitment, it was hard for the printing company to set prices so that they reflected the value of their services. According to Nagle and Cressman (2002), besides competition, the reason why pricing remained unchanged...
was that managers viewed the printed products as commodities, with services merely as “value-adds.” Thus, competition in the market and the managers’ view on printed products affected the printing company’s pricing, and hence, its profitability.

The purpose of this paper is to analyze how five Swedish printing houses have been able to capitalize on their investments in digital printing technology. With the investments in new digital printing equipment, the printing houses have tried to obtain competitive advantages through upgraded products and services. Compared to conventional printing technology, digital printing makes it possible to reduce delivery times, print shorter series, and increase customization of the printed products (Mejtoft, 2006). Also, a difference is that costs per printed copy are relatively high with digital printing, which makes it necessary for the printing houses to adjust their pricing of products and services. Thus, new pricing is needed to capitalize on the investment in the new printing technology. However, due to competition from printing houses in low cost countries, the competitive climate has intensified with over capacity and price pressure characterizing the printing business (Birkenshaw, 2004; Mejtoft, 2006; Smyth, 2006). Given these market conditions, it is of interest to study whether the five printing houses’ investments have resulted in changed pricing.

This paper makes a contribution to our understanding of aspects that affect firms’ opportunities to capitalize on investments in new technology in markets characterized by intense competition. Although it is well known that intense competition and price pressure affect firms’ opportunities to capitalize on their investments, it is of interest to find empirical evidence, and discuss how these aspects are reflected in firms’ pricing. Practitioners may find this paper interesting since attention is directed at aspects affecting pricing of products and services made possible through investments in new production technology.

2. Background

2.1. Price and pricing challenges

It is common knowledge that price is the only variable of the marketing mix that generates revenues; all others involve expenditures (Rao, 1984). Therefore, the price decision is perhaps the most significant among the decisions of the marketing mix. Also, as suggested of Gummesson (2004), pricing is maybe the most important aspect of value creation. At the right level, prices contribute to profits and competitive advantages. However, as observed by Garda (1983), among general managers of industrial firms, uneasiness about pricing is more the rule than the exception. In the same spirit, the studies of Smith et al. (1999) and Lancioni (2005a) highlight the fact that managing prices is not an easy task in today’s competitive markets. Similar observations are made by Forman and Hunt (2005) who noted that the uncertainties associated with the current dynamic environments make pricing decisions difficult. Clearly, rapid changes in information systems, proliferations of product lines, and advances in technology are but a few of the elements that make development of pricing strategies difficult (Forman & Hunt, 2005). Furthermore, the challenges associated with pricing have increased with the internationalization of business over the last decades (e.g. Bolton & Myers, 2003).

When looking at the challenges facing managers in charge of pricing we find that, from the manufacturer’s perspective, price communicates certain levels of quality that give certain positions to the product (Méndez, Oubina, & Rubio, 2006). According to Shipley and Jobber (2001), the high complexity of pricing is why many firms apply standard operating procedures such as cost-based pricing to simplify the tasks involved. The study of Mochtar and Arditi (2001) discusses two problems associated with cost-based pricing. First, there is a possible risk of under-pricing, which may harm profitability. Ultimately, under-pricing involves risk of great losses, which may threaten the survival of firms. The second risk is over-pricing, which may cause firms to lose bids to offers with more attractive prices.

According to Potter (2000), effective use of the pricing tool in a price sensitive market requires flexibility and market knowledge. Managers’ learning how to estimate price levels in the market is facilitated by contacts and negotiations with customers, and through information about competitors’ prices (Nagle & Cressman, 2002). In this sense, contacts with customers generate information of great value for identification of appropriate price levels. Firms that offer services with frequent customer contacts will, therefore, have an advantage in the setting of appropriate prices. This view is supported of Voss, Parasuraman, and Grewal (1998), who suggested that price-performance inconsistencies may be easier to detect in service than in product contexts. Products and services that offer less frequent contacts with customers, on the other hand, adversely affect the setting of appropriate prices. Clearly, less frequent contacts make it particularly difficult to detect under-priced products, while overpriced products may indicate immediately when bids are lost to competitors. Consequently, as proposed by Avlonitis and Indounas (2006), managers responsible for setting prices are strongly advised to investigate all the aspects that may affect their companies’ pricing.

2.2. Value components and pricing

According to Lancioni (2005b), it is important that the prices that an industrial company charges reflect the value-added content of its products and services. Also, as suggested by Jenster et al. (2005), because the price reflects the customer’s perception of the value of a product or service, all other marketing decisions come together in the pricing decision. The studies of Sturts and Griffis (2005) and Mochtar and Arditi (2001) indicate that it may be particularly hard to assess the value of a service. The problems to make such assessments are based upon difficulties to estimate the value of expertise, creativity and quality (Sturts & Griffis, 2005). It is, therefore, important to determine what services customers deem valuable, what services they are willing to pay for, and to let these insights govern pricing (Sturts & Griffis, 2005).

The model of Smith and Nagle (2005) defines four value levels, which are: value in use, value in exchange, perceived value, and willingness to pay. The model, therefore, conceptualizes how competition affects customers’ perception of value, and hence, factors affecting pricing in a competitive market environment.

As shown in Fig. 1, value in use is the monetary value that a customer receives as a result of using the product or service. Production equipment, for example, may be sold at a price of
$20,000 while the company that purchases this equipment may earn $200,000 from selling the products it produces. Value in exchange, or economic value refers to a product’s objective monetary value to customers adjusted for competitive substitute products (Smith & Nagle, 2005). This value level builds on the notion that all price evaluations are comparative (e.g. Xia, Monroe, & Cox, 2004). The difference between value in use and economic value is not because value is lost. This value has been transferred to customers as a result of competing offers.

Perceived value, or market value, is what customers perceive the product to be worth. The market value is lower compared to the value in exchange, as customers may not be aware of all the benefits from using a specific product, at the same time as they compare the specific product with competing offers. The fact that customers may be comparing apples with oranges when comparing product offers, therefore, adversely affects their perception of value.

The price level “willingness to pay” is the price level that reflects the value that customers perceive the product to be worth combined with their financial situation (Smith & Nagle, 2005). In short, customers may be willing to pay higher prices for products and services, but lack financial means to do so. Also, different customers derive different value from the same product, which makes it difficult to define a general price level that reflects what customers are willing to pay (Choudhary, Ghose, Mukhopadhyay, & Rajan, 2005).

As shown in Fig. 1, the value in exchange, or economic value, consists of two components: differentiation value and commodity value. Differentiation value is based on the product’s competitive features, i.e. features that distinguish a product compared to similar products or substitutes. Commodity value represents the lowest value, as the value of such products is perceived as relatively equal in quality across all providers (Sturts & Griffis, 2005).

To sum up, the model of Smith and Nagle (2005) facilitates our understanding of the factors that adversely affect customers’ perception of value. According to Smith and Nagle (2005), a shortcoming of the model is that it does not reflect aspects that enhance customers’ value perception. It is suggested that efforts to raise customers’ value perception is particularly important in competitive markets. Thus, rather than lower prices to a level that reflects customers’ “poor” value perceptions, the supplier need to raise customers’ value perception (Smith and Nagle, 2005). Education of customers may, therefore, be needed for customers to realize a product’s true value. Also, according to Lanciali (2005a), factors that enhance customers’ value perception may reflect in tangible value-added components that customers can identify. An analysis of a company’s opportunities to capitalize on its investments in new production technology, therefore, needs to be sensitive to factors that enhance customers’ value perception.

3. Research methodology

The qualitative case study methodology was chosen to obtain an in-depth understanding of aspects that affected five Swedish printing houses’ opportunities to capitalize on their investments in new printing technology. According to Yin (1994), case studies are useful when the researcher starts from explorative questions such as ‘how’ and ‘why’. The exploratory nature of this study made this approach useful, as it looks into the printing houses’ adjustments of pricing to capitalize on their investments in new printing technology. In this sense, on a smaller scale, the applied approach resembles the qualitative study of Solberg et al. (2006) on pricing practices in exporting firms.

The respondents were top managers who provided a small, but comprehensive, indication of pricing practices in the five printing houses. Three of the printing houses worked in the commercial printing segment,3 and the other two worked in the packaging printing segment. The interviews focused on the following areas; current product offers and pricing practices, introduction of the new printing technology, and factors that affected customers’ value perceptions of the printing houses’ products and services. Each interview lasted approximately 1 hour, and was conducted during fall 2006. When appropriate, we complemented the interview data with additional information from secondary sources like industry reports, company information and annual reports. This secondary data provided important information of factors influencing the general business environment, and hence, pricing (e.g. Solberg et al., 2006).

Each printing house is presented separately while the empirical material has been analyzed with respect to the aspects that affected the printing houses’ opportunities to capitalize on their investments.

Fig. 1. Distinguishing between the types of value (from Smith & Nagle, 2005).

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3 The commercial print segment involves printing of books, magazines, leaflets, posters, etc.
in new printing technology. The analysis, therefore, highlights aspects that affected pricing and customers’ value perceptions, and the effects of the printing houses’ investments as the respondents perceived it.

The respondents accepted to participate in our study on our promise not to disclose confidential information about their companies’ prices and discounts. Prices and pricing policies are, therefore, described in general terms in the coming empirical section.

4. New printing technology and pricing in five Swedish printing houses

4.1. Printing house A

Printing house A operates in the commercial printing segment, and according to the respondent, this segment was characterized by tough competition. Clearly, the technological development intensified competition, as it became possible for printing houses from low cost countries to market their products on the Internet to customers in the local market. His general impression was, therefore, that the price pressure in the printing industry resulted in declining profit margins. The printing house where the respondent worked had a stable financial position, but he had heard colleagues in other firms express their doubts about their businesses’ future.

The printing house used cost-based pricing with a mark-up to meet the firm’s revenue objective. According to the respondent, this was the best way to calculate prices, as it was possible to make adjustments for increased production costs. Particularly it was increased costs for paper and other input materials that made such adjustments necessary. The mark-up part of the price was calculated with respect to volume, history, and assessment of customer value. The respondent did not mention any disadvantages with cost-based pricing. On the contrary, he said that cost-based pricing was the only reliable pricing method.

The digital printing equipment was purchased in 1997. In this sense, the printing house was an early adopter of the digital printing technology. However, the pioneering production methods caused problems during the introduction phase. Quality and efficiency improved gradually, and in 2001 the new production methods were fully integrated. By using the new printing technology, the printing house could offer new products, services, and shorten delivery times. Also, according to the respondent, their customers appreciated the full service solutions that the new technology made possible.

The new technology had not changed the pricing practice. When reflecting upon the price level, the respondent said that the profit margin for the new products and services had been good in the initial phase. At later stages, increased competition caused profit margins to decline. Judging from the respondent’s words, the digital print segment was under the same price pressure as other segments in the market. Also, it was clear that those who sold and marketed the digital printing equipment had been successful. The industry, therefore, suffered from over capacity with respect to products and services based upon the new printing technology.

When reflecting over aspects that impacted customers’ willingness to pay, the respondent mentioned quality, competition, and service content. Also, it was apparent that history and established business relations affected customers’ value perceptions. Thus, it was important to have a reputation as a reliable supplier. The respondent noted that, regardless of production technology, it was hard to change pricing of established products and services. For changes to take place there was a need for new product concepts. Also, he said that it was time to develop strategies to end the current price pressure.

Competition had changed from being mostly local to involve printing houses abroad. A regional perspective on business was, therefore, no longer relevant. The development in the market indicated that the printing industry had gone through the major steps in switching production technology. According to the respondent, further rationalizations seemed unlikely. What remained was redesign of services and development of new product concepts.

4.2. Printing house B

Printing house B operates in the commercial printing segment. The respondent’s general opinion about developments in the printing business was that profit margins had been declining. Current price levels were too low, and hence, not profitable. The respondent said that the reason for this was that too many companies were competing to fill their production capacity. Also, new printing brokers had entered the market, which resulted in increased price pressure. Clearly, tough competition and low profit margins made it difficult for small printing houses to develop their businesses. To survive it was necessary to have financial “muscles” and a product portfolio that offered “one-stop shopping” solutions. The need for such full service solutions was apparent, as a majority of the printing house’s customers had gone through a period of rationalization programs, which had reduced the number of people in the customers’ organizations. Thus, customers’ slimmed organizations made full service offers like “one-stop-shopping” a competitive advantage.

The printing house calculated prices on production costs (with a mark-up). This cost-based pricing was based on data from the financial management system. According to the respondent, the financial system provided solid information for pricing, and allowed for calculations of discounts with respect to the mark-up. As price levels had been steady, or declining, over the last seven-year period, the printing house operated on stable profit margins. Consequently, investments made during this period benefited customers, while the printing house carried all costs.

The printing house introduced the digital printing technology in the early nineties, which made it an early adopter of the new technology. According to the respondent, the general view at that time was that the digital printing technology would come to dominate the printing business. The investment in digital printing was thus based upon this forecast, and a growing demand for quick deliveries. Due to the competitive situation in the market, the printing house did not charge for a service feature like short delivery time. In other words, the investment in the new printing technology had not resulted in new pricing.

Discounts were dependent on order volume and customer history. To maintain its reputation as a serious business, the printing house did not negotiate with customers about prices. According to the respondent, repetitive orders from established customers, and
salesmen who could explain what the customers got for their money made the “no negotiate” posture possible. The printing house had been successful in building this profile, and the respondent thought that customers accepted their pricing policy. When explaining the aspects that impacted customers’ willingness to pay, the respondent said that the changed procurement behavior was an important aspect. The change concerned the fact that almost all companies and public institutions requested formal proposals. Preparing such formal proposals was time consuming. Also, such written offers seemed to increase price pressure in the market. However, these procurement procedures also took a lot of time and management capacity in customers’ organizations. Therefore, to manage their time constraints, it was rather common that customers placed orders without written offers. The printing house won such orders on good customer relations and a proven track record as a reliable supplier of printed materials. However, while it was apparent that the customers’ need for quick deliveries removed competition for a specific order, the general price pressure in the market continued to affect price levels. The profit margin for such orders, therefore, remained slim.

When presenting offers to customers it was important to explain the connections between the printed products and additional services of the printing house. According to the respondent, it was common that customers understood the value of such services only after visiting the printing house. Thus, it seemed as if the value-added services had to be shown to make customers aware of their value.

### 4.3. Printing house C

This printing house consists of two companies that produce packaging materials for the health care industry. The owners formed the “new” company in 2005, which invested in a digital printing press. This investment made the company a pioneer to adopt the digital printing technology in the packaging printing segment. The rationale behind establishing a new company was to meet the market demand for short production runs. As both companies are jointly managed, they are presented as one company (printing house C).

The respondents, who were managers in key positions, noted that printing houses in the food-packaging and health care segments had not been able to set prices at reasonable levels. Clearly, it was fear of loosing customers that kept prices at low levels. According to the respondents, they had not succeeded well in making customers aware of the value of their services and the costs associated with producing them. The problems to communicate value-added service features, therefore, made profit margins slim, which in turn, made it difficult to make new investments. Currently the profit margins for short production runs were very low, and to avoid too short series, the company set a minimum order quantity. Thus, it was clear that the respondents thought that something had to be done about the current price levels.

The company calculated its prices with respect to the order volume. These prices were based on average costs for the total volume sold per year with a mark-up. Judging from the respondents’ words, a problem with this pricing practice was that profit margins were getting lower for small orders, which was a growing segment. Clearly, this “short run” segment had been growing at the expense of the “long run” segment. Hence, profits were going down as result of the increased demand for short production runs. The respondents were aware of this problem and said that it was time to change their pricing.

The company invested in a digital printing press to be able to cope with the demand for short production runs. It took about 6 months after the purchase until the digital workflow was fully implemented. According to the respondents, the investment raised their awareness of the need to develop their pricing. The investment had, therefore, been a signal to calculate prices in a new way. However, the printing house was still evaluating its pricing method. The ambition with the new pricing method was to make prices reflect actual costs. The question was now whether customers would accept it. If so, it would be applied. So far, several customers had expressed their understanding for the reasons behind applying the new cost-calculation method.

According to the respondents, print quality and the service level were the most important factors for customers, while price came on third place. However, customers were (in general) not ready to pay for extended services. Clearly, it appeared as if customers expected to get such new services for free. The respondents’ view on the problem of having customers expecting free services reflects in the following statement:

One of the most important customers of our printing house started to use digital printing when being in acute need of a quick delivery. The winning of this order had been preceded by efforts to educate customers about the advantages of using digital printing. While it seemed like educational efforts worked well, unexpected reactions followed. What was unexpected was that the customer seemed afraid of having its employees requesting quick deliveries in future situations. As this would increase printing costs, this customer tried to minimize their ordering of such services.

### 4.4. Printing house D

Printing house D is a result of a merger between two companies in the commercial printing segment; a company with conventional printing technology, and a company with digital printing technology. Printing house D offers its services to advertising agencies and other companies in the region. The respondents were the two owners of the printing house.

The respondents’ general opinion about the pricing in the printing business was that price levels and profit margins were low. However, compared to conventionally printed products, they thought that the price level for digitally printed products was “quite fair”. According to the respondents, it was, therefore, possible to make profits from digitally printed products. The price level had been steady since the printing house purchased their digital printing equipment, while there had been a slight decrease in the costs for service and maintenance. Nevertheless, the respondents forecasted a trend with constantly declining prices also for the digitally printed products.

Printing house D used cost-based pricing with a mark-up. For this purpose it had bought special pricing software, which used...
parameters based on production costs and productivity combined with “standard parameters” that reflected the industry in general. The respondents said that the main benefit of cost-based pricing was that the printing house always knew whether an order was profitable or not. On the other hand, they thought that this way of calculating prices harmed their competitive position in the market.

Discounts were calculated on run length, and to some parts, on order volume. It happened that customers returned with competing bids and tried to negotiate a better deal. At such occasion, they went through the price estimates with the customers and explained how they calculated their prices. The printing house followed their pricing practice and did not negotiate with customers about prices. According to the respondent, the “no negotiate” policy was possible because many old customers had accepted their price levels.

The company acquired their digital printing equipment in the beginning of the 2000s, and judging from the respondents’ words, the technical problems during the first year were extensive. They were, however, satisfied with the support from the supplier of the printing press. Also, because they had conventional printing presses for backup, their customers never noticed their technical problems. The respondents said that the major impact of the digital printing technology on the printing industry was its user friendliness, and the fact that the technology was accessible to customers. “Today almost anyone can put together a simple brochure as a PDF document and send it to a printing house and make a short edition”.

According to the respondents, it was important to offer a complete range of products and services, since their customers wanted full service solutions from their supplier of printed materials. However, it was hard to get customers to accept being charged for the value-added services that the digital print press made possible. Short delivery time had actually become something that customers expected as standard, and almost all assignments were time critical.

4.5. Printing house E

Printing house E is a producer of packaging materials, primarily serving the food industry. The company was established in the mid-eighties to meet the increased demand in the market. The respondent said that printing house E got its competitive advantage from being flexible by adjusting its products and services to customer needs.

The pricing of printing house E was based on actual costs with a mark-up that was adjusted with respect to price levels in the market. According to the respondent, it was rather easy to estimate production costs for an order to be produced in the digital press, while it was more difficult to estimate of the costs for the work to prepare the print files before print production (prepress). The difficulties to estimate costs were due to uncertainties of how many adjustments were needed to attain a satisfactory result in the prepress. It was important for the printing house to be sensitive to the price level that customers accepted, as too high prices would result in lost orders. According to the respondent, printing house E priced its products and services higher than average in the market. This price level was possible because their customers appreciated the flexibility of their products and services.

The printing house was a pioneer in the packaging segment to invest in the digital print technology. However, it had taken printing house E about 1.5 year to fully incorporate the new printing technology. Judging from the respondent’s words, it took some time and testing before they had learned to operate the new equipment so that the materials it produced met their quality standards. Currently, the printing house used its digital printing press for short print runs of packaging prototypes. The digital printing press made it possible to make prototype packaging at low costs for customers, who were introducing new products in the market. The digitally printed test materials were directly applied in the customers’ packaging lines, and it became possible to fine-tune the print quality so that it fit the conventional print presses. Also, the digital technology made it possible to make quick adjustments when showing final packaging designs for retailers and test panels. According to the respondents, this approach saved a lot of time and costs, as there was no need to make printing forms when testing packaging designs. Clearly, such demonstrations of the benefits of the digital printing technology made customers understand that it was worth paying for the new services.

There had been internal discussions on how to set prices for the services that digital printing made possible. The reason for such discussions was that, in the beginning, the salesmen did not believe in charging the customers for such services. Clearly, the salesmen viewed digital printing as a mean to increase sales volumes. However, it immediately indicated that the benefits gained from digital printing were of major value to customers, and that they accepted that prices were set accordingly.

Aspects that influenced the current pricing were printing costs, customer size, and individual contracts. However, some of these contracts made it necessary to produce short print series in the conventional printing presses, which resulted in low profit margins. The respondent said that profit margins were pushed downward all the time, which made it necessary to make the business more effective. It appeared as if the number of small customers was decreasing, while the number of large customer was growing. As a consequence, customers gained bargaining power (due to size), which made profit margins decline even further.

4.6. Summary

The empirical material indicates that there were differences between the commercial printing segment and the packaging printing segment with respect to the factors affecting the current price levels. Also, the effects of the investments in the new printing technology appeared to differ between the two market segments. The major themes of the interviews are summarized in the tables below.

The investments in digital printing equipment have not meant that the printing houses ceased to use their conventional printing presses. On the contrary, the printing houses have kept on using their old printing presses to meet the demand for traditional products. The applied pricing method was, therefore, based upon traditional products and conventional printing techniques.

The respondents referred to their current pricing method as cost-based with a mark-up. Also, the respondents preferred this method. Considerations making cost-based pricing the preferred
method were fear of losing money, in case prices were set too low, and fear of lost orders, in case prices were set too high. Furthermore, the respondents’ statements revealed that they adjusted the mark-up part of their prices with respect to competition and customer value. However, in the packaging printing segment there were indications that change was under way in the printing house that offered services that provided direct benefits to customers.

5. Discussion

5.1. Factors affecting pricing and customers' value perception

This study indicates that pricing of new products and services is particularly difficult because of uncertainties with respect to customer price sensitivity and competitors’ reactions. This finding is, therefore, in accordance with Shipley and Jobber (2001) who highlighted such factors when describing the challenges associated with pricing of new products.

As suggested of Christopher and Gattorna (2005), the pricing principles a firm applies need to be in accordance with the characteristics of the specific market segment. The segment characteristics were important because although the commercial printing segment and the packaging printing segment had many things in common, they differed with respect to aspects affecting pricing and customers’ value perceptions.

There were several interrelated factors that affected pricing and customers’ value perception in the commercial printing segment (see Table 1). One such factor was the price pressure in the market. The printing houses’ “no negotiate” policy with respect to customers’ requests for price discounts was facilitated by efforts to educate customers about the benefits of their products and services. This observation is, therefore, consistent with the proposal by Smith and Nagle (2005), who suggested that companies should educate customers rather than lower prices. Also, the statements of the respondents from printing house B and D clearly indicated the need to demonstrate their products and services to make the value-added clear to customers. This finding is, therefore, in accordance with Lancioni (2005a), who highlighted the link between a firm’s prices and customers’ identification of value-added components.

Another important factor was time, which particularly indicated in the statements about the demand for quick deliveries. Thus, following the proposals of Boyaci and Ray (2003) and Ha, Li, and Ng (2003), this study indicates that time is critical factor that determines the relative value of products and services. The respondent from printing house B highlighted the time aspect when he described how companies and public institutions requested written offers, while it appeared as if the purchasers had no time for formal order procedures. The respondent from printing house D said that all assignments were time critical, and that short delivery time was something that customers expected. Thus, customers’ lack of time increased the number of last minute orders. Clearly, this development made a reputation as reliable supplier an important competitive advantage. Full service solutions, therefore, seemed to have a positive impact on customers’ value perception.

A possible explanation for the growing number of time critical assignments was earlier rationalization projects and ongoing efforts to increase efficiency in the customers’ organizations. The increased demand for quick deliveries and full service solutions, therefore, suggests that customers’ efforts to increase efficiency enhanced their perception of the value of availability. This finding is, therefore, in consistent with Lancioni (2005b) who suggested that availability is a value component. However, there are no indications in the empirical material that full service solutions made it possible to set higher prices. The reason why prices remained unchanged was the printing houses’ fear of losing customers. Full service solutions were thus important customer retention tools since they kept customers from searching for new suppliers as long as prices remained unchanged.

In the packaging printing segment, printing house C targeted the growing demand for short print runs (see Table 2). A problem with such short run orders was the low profit margin. What was

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<td>– Requests for written offers increase price pressure.</td>
<td>– The importance of having a reputation as a reliable supplier.</td>
<td>– No change of pricing.</td>
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<td>– A “no negotiate” policy.</td>
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<td></td>
<td>– The printing house is an early adopter of the new printing technology</td>
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<td>D</td>
<td>– A general price pressure in the market.</td>
<td>– A demand for full service solutions.</td>
<td>– The new printing technology fits the demand for full service solutions.</td>
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<td></td>
<td>– Customers expect extended services for free.</td>
<td>– Deliveries are time critical.</td>
<td>– No change of pricing.</td>
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<td></td>
<td>– A “no negotiate” policy.</td>
<td>– Profitable/“fair” prices for digitally printed products.</td>
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indicated in the empirical material was, therefore, that customers were not ready to accept higher prices for the costs associated with short print runs. The other printing house in the packaging printing segment, printing house E, had been successful in making customers accept new pricing for a new service that reduced costs and the time needed for printing of packaging prototypes. Thus, the printing house that could demonstrate the benefits of the new services was successful in making customers willing to pay for these services. Printing house C, whose upgraded products resembled established substitutes, could not make its customers accept changed pricing based upon short delivery time.

5.2. The printing houses’ opportunities to capitalize on their investments

The printing houses’ opportunities to capitalize on the new technology were dependent upon which market segments that the printing houses served (see Tables 1 and 2). In the commercial printing segment, the ability to capitalize on the new technology was affected by the price pressure that followed from competition in the market. Also, a majority of the printing houses in the commercial printing segment had access to digital printing technology. Therefore, there was little, or no, competitive advantage in offering products and services of the digital printing technology.

The respondents’ statements, which indicated a short-lived first mover advantage from the investments in the new printing technology, revealed that profit margins had declined with increased competition. The two printing houses that were early adopters in the commercial print segment were thus only able to keep a price premium during first years after the investments. Also, the printing house that was a late adopter of the new printing technology expected profit margins to decline as competition picked up. This finding is, therefore, in accordance with Smith et al. (1999), who suggested that firms in high technology industries are only able to maintain their price premiums for less than a year before competition forces them down. According to Smith et al. (1999), products may be introduced at skimming price levels to maximize profits, and then gradually lowered, as they become commodities and subject to competitive look-alikes. While there was no indication of the printing houses introducing new products at skimming price levels, prices were gradually lowered because of commoditization and competitive look-alikes. Thus, the development of the price levels for the products of the new printing technology followed the price development pattern observed by Smith et al. (1999).

The demand for short delivery times in the commercial printing segment resembles the effects of companies’ efforts to reduce the cash-to-cash cycle time highlighted in the study by Christopher and Gattorna (2005). As suggested by Christopher and Gattorna (2005), a customer segment characterized by a demand for urgent deliveries and price sensitive customers put pressure on companies in the value chain to develop “agile” value propositions. Clearly, the customers in commercial printing segment demanded such “agile” value propositions. What was indicated, therefore, was a change from the traditional demand for “lean” value propositions based upon economies of scale (Christopher and Gattorna, 2005) towards “agile” value propositions based upon short print runs and customized products. However, it was apparent that the competitive pressure and the price sensitive customers made the printing houses in the commercial printing segment keep the pricing principles that were based upon the “lean” value propositions.

In the packaging printing segment, it appeared as if digital printing offered first mover advantages. Both printing houses in this segment had defined “new service concepts”, while customers differed with respect to their acceptance of new prices for the upgraded services. The products of the printing house that experienced difficulties to capitalize on the first mover advantage were similar to available substitutes. The similarities with competitors’ offers, therefore, facilitated customers’ price comparisons (e.g. Xia et al., 2004), which adversely affected customers’ willingness to pay for the upgraded services. The printing house that succeeded in introducing new pricing was able to do so because, compared to available substitutes, the new services offered distinctive benefits with respect to time and costs, which customers valued.

The development in the packaging printing segment, therefore, resembles the innovative solutions segment described by Christopher and Gattorna (2005). Clearly, the investment in the new printing technology opened for development of creative solutions. However, as noted above, change of pricing was only possible when the when new products and services offered distinctive benefits to customers.

| Table 2 |

<table>
<thead>
<tr>
<th>Printing house</th>
<th>Aspects affecting pricing</th>
<th>Customers’ value perceptions were reflected in</th>
<th>Effects of the investment in the new printing technology</th>
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<tbody>
<tr>
<td>C</td>
<td>– The printing house was a pioneer in adopting digital printing.</td>
<td>– Print quality and a high service level are important to customers.</td>
<td>– A first mover advantage with respect to the growing “short run” segment.</td>
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<td>– Minimum order quantities.</td>
<td>– Customers seem to expect extended services for free.</td>
<td>– The investment creates an awareness of the need for changed pricing.</td>
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<td>E</td>
<td>– The printing house was a pioneer in adopting digital printing.</td>
<td>– Customers appreciate the flexibility of the printing house’s products and services.</td>
<td>– A first mover advantage through innovative solutions (prototype printing).</td>
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<td>– Some customers gain bargaining power based on the size of their order volumes.</td>
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<td>– Direct customer benefits from reduced delivery time and production costs.</td>
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<td>– Customers accept changed pricing for new products and services.</td>
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5.3. Managerial implications

This study has shown that a company’s opportunity to capitalize on investments in new technology is dependent on whether its customers can identify distinctive benefits from utilizing the products and services that the new technology makes possible. In the event such distinctive benefits are missing, any attempt to increase prices might make customers start searching for new suppliers. The printing house in the packaging printing segment that succeeded in introducing new prices was able to do so because the new printing technology offered solutions that reduced time and costs when customers utilized its services. Thus, new pricing is possible when there is a substantial difference between the new solution and available substitutes.

Furthermore, it is apparent that efforts to increase efficiency in customers’ organizations enhance the perceived value of availability and a reputation as a reliable supplier. Clearly, such efforts make customers appreciate the value of services that help them to meet their efficiency criteria. These customers are, therefore, likely to remain loyal to suppliers that offer products and services that help them manage the efficiency criteria that their companies have set. This effect was evident in the respondents’ statements about products and services aimed at helping customers to manage time and staffing constraints in their organizations. Thus, customers’ time and staffing constraints increase the perceived value of availability and quick deliveries.

6. Conclusions and proposals for future research

This study has shown new pricing is possible when there is a substantial difference between the new solution and available substitutes. This study’s findings are, therefore, consistent with Lancioni’s (2005a) observation, which suggested that products and services with tangible value-added allow industrial firms to set new prices.

Also, a conclusion drawn from this study is that the investments in the digital printing technology put the printing houses into a high technology sector. As suggested by Smith et al. (1999), product life cycles are shorter in high technology sectors than in low technology sectors. In this study, the short product life cycle was apparent in the rapid diffusion of the new technology, which made the new technology available to all firms’ in the printing business. Thus, the short-lived competitive advantage was a sign of the printing companies being affected by the short business cycles that govern high technology sectors. This study is, therefore, in accordance with the proposals of Smith et al. (1999) since the printing houses’ opportunities to capitalize on their investments in the digital printing technology were affected by the nature of high technology markets.

There are a number of limitations to this study’s findings. One limitation is that only five Swedish companies have been studied. Although most Western markets are relatively similar, it is unknown whether this study’s findings are applicable in other markets. For the purpose of generalization it could be of interest to conduct a quantitative study on aspects that affect firms’ opportunities to capitalize on their investments in new technology in highly competitive markets.

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References


**Dr. Peter Hultén** is Associate Professor at ESC Rennes School of Business. His research focuses on industrial marketing and international business.

**Magnus Viström** has a Master of Science degree in Industrial Engineering and Management (Linköping University) and a licentiate degree at the Royal Institute of Technology in Stockholm. His research interest is within the area of logistics, business applications and print quality aspects for digital printing.

**Thomas Mejtoft** has a Master of Science degree in Engineering Physics (Umeå Institute of Technology), a Master of Science degree in Business Administration and Economics (Umeå School of Business), and a licentiate degree at the Royal Institute of Technology in Stockholm. His research focuses on business strategy in digital printing.