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*A Satisfaction Study of Color Digital
Printing Presses in Taiwan*

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Executive Summary

The purpose of this research was to investigate the current situation of the digital printing business of Taiwan. A growing number of printing businesses have purchased digital printing presses in Taiwan. Digital printing technology is widely accepted in the industry. Drupa 2008 demonstrated that digital printing is now mainstream for professional printers, and they are confident in their decisions to invest in digital printing. The market is still in an early development stage and still needs continued investigation to understand its evolving situation.

Objectives

Our study was divided into three objectives for its first phase: (1) understand the current state of digital printing markets in Taiwan; (2) analyze a study of satisfaction among digital printing service providers about their digital presses; (3) understand the degree of satisfaction with sales representatives, maintenance, and technical services provided by digital printing equipment suppliers.

The second phase was comprised of personal interviews with certain digital printing services providers who owned at least two digital printing presses. The objectives of this phase were: (1) identify the business strategies of digital printing service providers along with the challenges to fulfill the needs of their customers; (2) recognize the most critical problems that digital printing service providers have had to overcome and solve.

Approach

This research had four major stages.

1. **Data Collection:** A data base was constructed of digital printing services providers using resources from the printing organizations, digital printing companies' official websites, and journals. This allowed the research team to determine which digital printing services providers were appropriate to participate in the study.
2. **Survey:** A survey questionnaire was developed and was sent to the digital printing services providers.
3. **Interview:** Face-to-face interviews were conducted with selected owners of the service providers owning at least two digital printing presses.
4. **Analysis of the Results:** After gathering the results from the survey questionnaires and the interviews, the key findings and conclusions were made.

Key Findings

1. The major digital printing services providers are not solely from the traditional commercial printing industry. Typical digital printing businesses focus on photo books, document printing, and copying.
2. Digital printing services providers were generally pleased with the performance of their digital presses.
3. Digital printing services providers were not happy with the overall performance of vendor sales representatives. However, they were satisfied with the post-installation service by technical support engineers.
4. On-line editing services providers used digital printing with photo book applications leveraging their expertise in information technology as an advantage to gain higher profits.
5. Business strategies for successful digital printing services must be tailored to meet their customers' needs.
6. Capital and operation costs are still major problems digital printing services providers face.

Major Implications of Conclusions of the Findings

1. Though copy shops and digital printing specialists are not professional commercial printers, but they compete in that market. Commercial printers are currently only a minor factor in the digital printing market of Taiwan.
2. The overall performance of the digital printing presses satisfied their owners, but there is room for improving overall performance.
3. Sales representatives and the technical support engineers should work together tightly as a team to provide the best quality service to the digital printing services businesses. Sales representatives should have more than just professional knowledge and skills, but also a proactive attitude when dealing with customers.
4. Photo books are one of the most popular digital printing products. Digital printing services providers should expand their offerings with more unique products in order to increase their profits and benefit more customers.
5. For digital printing services providers to survive in the near future, they should have well-thought plans, work to keep good relationships with customers and equipment providers, and seek ways to educate customers about new applications.
6. The costs of capital and operations will drop to some degree as the technology improves. Having high-quality internal management is essential at this critical moment in the market's development. Digital printing services providers should be ready at anytime to seize opportunities when costs move to new levels.

Research Objectives

Background

Digital printing is a comparatively new field in the printing industry in Taiwan. The market for digital printing is growing significantly and it should have our serious attention. The technology of digital printing is widely accepted by the professional printers after they visited DRUPA 2008. Since digital printing plays an important role in today's printing industry and print quality concerns have been an issue in the past, it is important to understand the current situation and to develop information about the potential of this market and its technology.

In addition, digital printing services in Taiwan still need promotional efforts supporting them. The print quality, unit cost, paper size, print speed, and so on, are no longer the concern they once were. More importantly, the digital printing technologies now have output characteristics that are close enough to lithographic quality that digital printing can expand its applications. It is easy to see that more and more professional printers are interested in digital printing in order to increase their revenues in such a competitive market. There is little information about digital printing in Taiwan and there is a significant need to understand this market.

Objectives

Our study basically had the following objectives: (1) understand the current state of digital printing markets in Taiwan; (2) analyze a study of satisfaction among digital printing service providers about their digital presses; (3) understand their satisfaction with the sales representatives, maintenance, and technical services provided by digital printing equipment suppliers.

Approach

We used many resources to identify digital printing services that owned presses sold by Fuji Xerox and HP.

There were two phases of the study: a mail survey and personal interviews. We sent the survey questionnaires to the digital printing service providers. There were 29 (41.4% return rate) valid survey questionnaires received out of 70 general survey questionnaires. Twenty-five of them used Fuji Xerox digital printing presses and 4 providers used HP Indigo digital printing presses.

In addition, the interview questionnaire was sent to select digital printing services providers to determine their willingness to be interviewed. There were six owners who accepted the invitation and had at least two digital printing presses.

Key Findings

In the study, we targeted digital printing services providers who owned mid-range to high-end color digital printing presses. To qualify for inclusion in the study, digital printing services providers had to own digital printing presses that were: (a) sheet-fed systems, (b) print speeds at least 50 pages per minute, (c) four-color (C, M, Y, and K inks) or more, and (d) print resolution exceeding 600 dpi. There are only two qualified digital printing press suppliers, Fuji Xerox and HP, in Taiwan. Both companies have official branch offices in Taiwan and provide complete sales and technical support. Other digital printing press providers are resellers or dealers and do not have the same degree of resources committed to the market. Therefore, the study was limited to only Fuji Xerox and HP owners. The digital printing presses in the study are iGen 3, DocuColor 8000, DocuColor 5252, DocuColor 5000, and DocuColor 6060 from Fuji Xerox and Indigo Press 5500 and Indigo Press 5000 from HP.

1. Current Business Status of Digital Printing Services Providers

According to our general research with equipment suppliers, there are nearly 100 high-end digital printing presses installed (color or B/W) in Taiwan. Fuji Xerox has been in the market the longest time and has the larger market. There were 29 digital printing services providers who participated in the study owning more than 40 digital printing presses in their companies. The total installed base of the study participants are: one Fuji Xerox iGen 3, four Fuji Xerox DC 8000, 12 Fuji Xerox DC 5252, nine Fuji Xerox DC 5000, three Fuji Xerox DC 6060, three HP Indigo Press 5000, and one HP Indigo Press 5500 (see Figure 1). Some of the digital printing services providers do have more than one color digital printing press, and many have black and white digital printing presses as well.

The 29 digital printing services provider surveyed can be divided as follows: (1) Copy Shops, (2) Commercial Printers, and (3) Digital Printing Specialists. Thirteen (45%) digital printing services providers are “Copy Shops,” 13 (45%) are “Commercial Printers,” and only three (10%) are “Digital Printing Specialists” (see Figure 1).

In Figure 2, the Fuji Xerox DC 5252 was very popular in the “Copy Shops.” “Commercial Printers” prefer the Fuji Xerox DC 5000, Fuji Xerox DC 5252, and HP Indigo Press 5000. Only one “Digital Printing Specialist” bought the iGen 3 (the most high-end of the digital printing presses in the study) and the other two purchased Fuji Xerox DC 5000 and DC 5252. Generally speaking, commercial printers reported a belief that the HP Indigo produces better quality or that it was closest to conventional offset printing. Furthermore, the cost of the HP Indigo was reported to be much higher than other digital printing presses. HP Indigo presses were all purchased by the commercial printers for fitting their short-run production business.

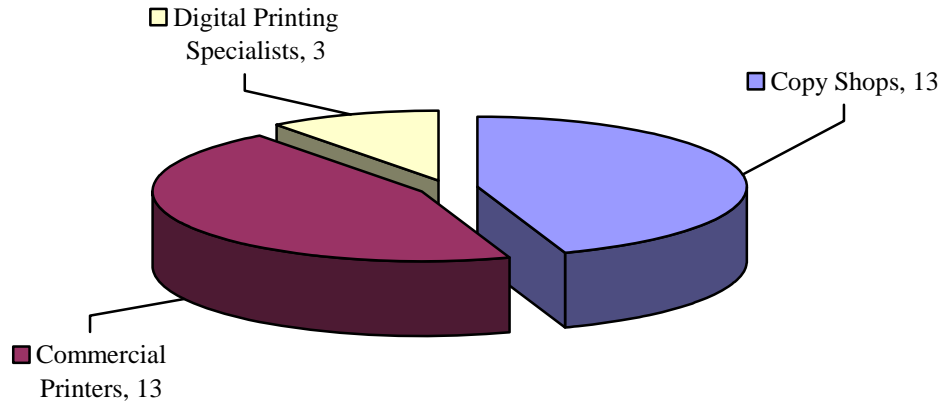


Figure 1: Numbers of the Different Kinds of Services Providers

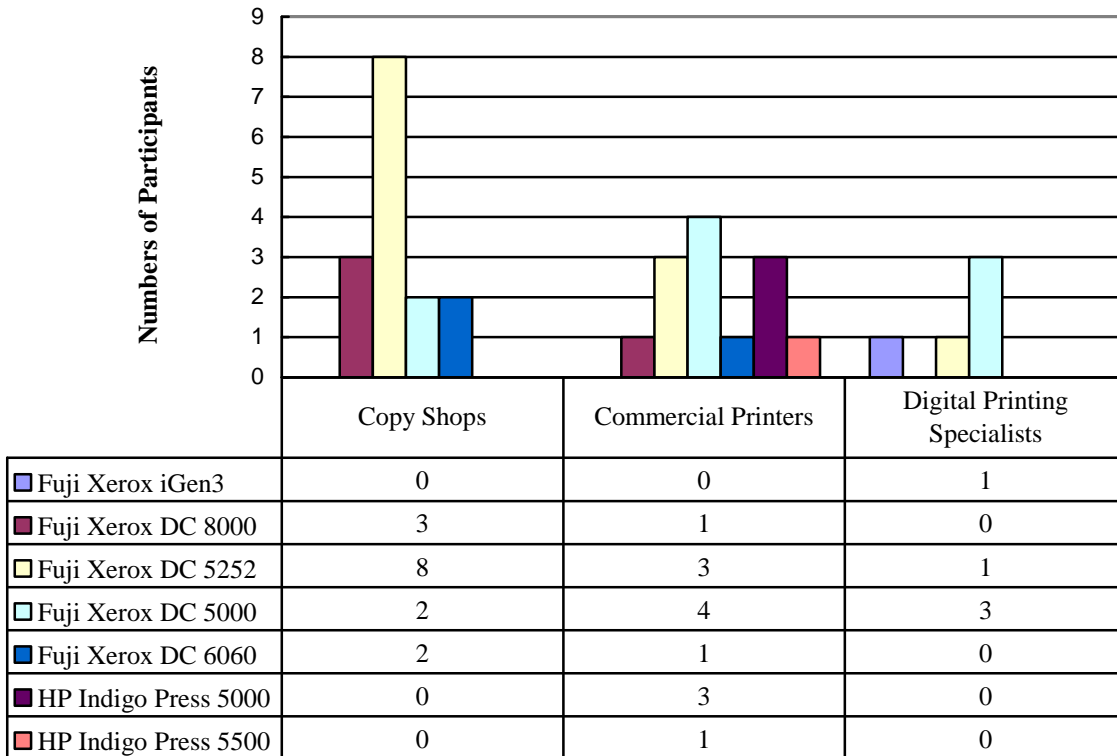


Figure 2: The Number of the Digital Printing Presses in the Services Providers (N = 29)

The numbers of employees within the surveyed companies were divided into five categories: (1) 1-5 people, (2) 6-10 people, (3) 11-15 people, (4) 16-20 people, and (5) more than 20 people. Seven of 13 (54%)

“Commercial Printers” had more than 20 employees in their company (see Figure 3). Six of 13 (46%) “Copy Shops” have “6 to 10 people” in the companies. “Digital Printing Specialists” are varied of the numbers of employees. The majority of companies (9 of 29, 31 %) have “6 to 10” employees. The employee size of digital printing services providers is not large when compared to other commercial printing operations.

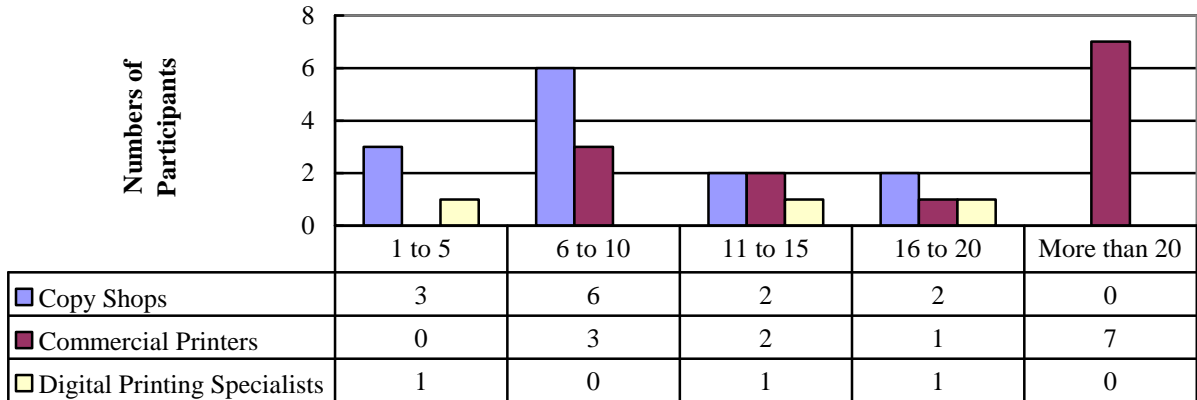


Figure 3: Numbers of Employees in Different Kinds of Services Providers (N=29)

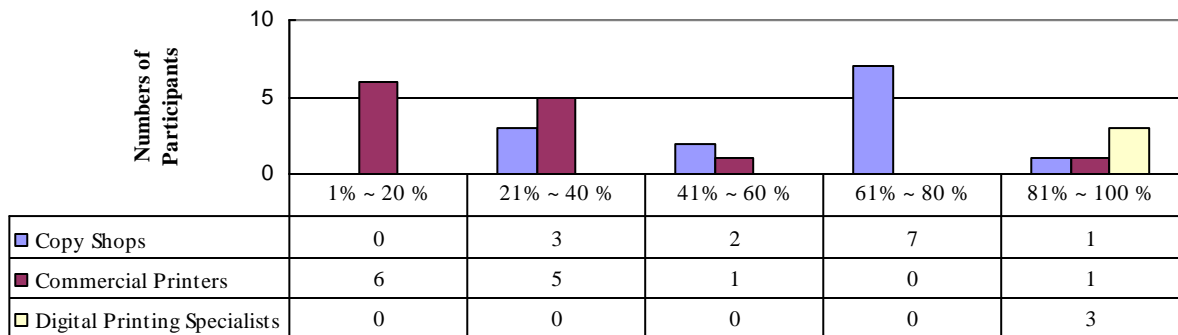


Figure 4: Percentages of the Overall Business Revenue in Digital Printing (N=29)

In the question of the “Overall Revenue,” there are five major business service segments: (1) Digital Printing Service, (2) Copying Service, (3) Traditional Offset Printing Service, (4) Large-Format Output Service, and (5) Other Services.

In the category of “Digital Printing,” the “Digital Printing Specialists” accounts for 81 -100 % of their revenues (see Figure 4). Eight of the 13 (62%) “Copy Shops,” have “Digital Printing Service” as more than 61% of their total business revenue. It is certain that “Digital Printing” plays a critical role in “Copy Shops.” It

would be expected that “Digital Printing Service Business” in “Digital Printing Specialists” and “Copy Shops” would be a more important revenue source than in “Commercial Printers.”

Since variable-data printing is one of the most unique applications in digital printing, we asked respondents to indicate how important it is. Figure 5 shows that the variable-data printing business is not very strong. Ten (77 %) of the “Copy Shops” as well as five (37%) of the “Commercial Printers” said that their VDP business was less than 20% of their total digital printing business. The majority of respondents are focusing on simple and short-run aspects of the non-VDP business. Only two “Digital Printing Specialists” claimed their VDP business was more than 61% of their digital printing business.

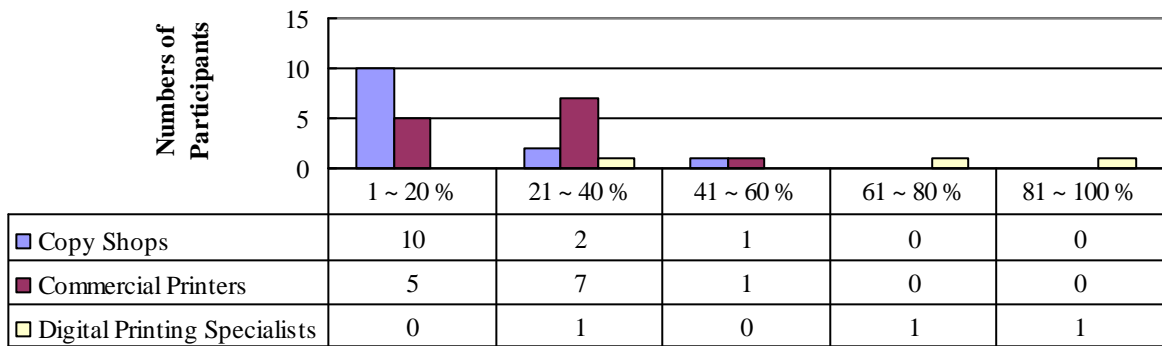


Figure 5: Percentages of the VDP in Digital Printing Business (N=29)

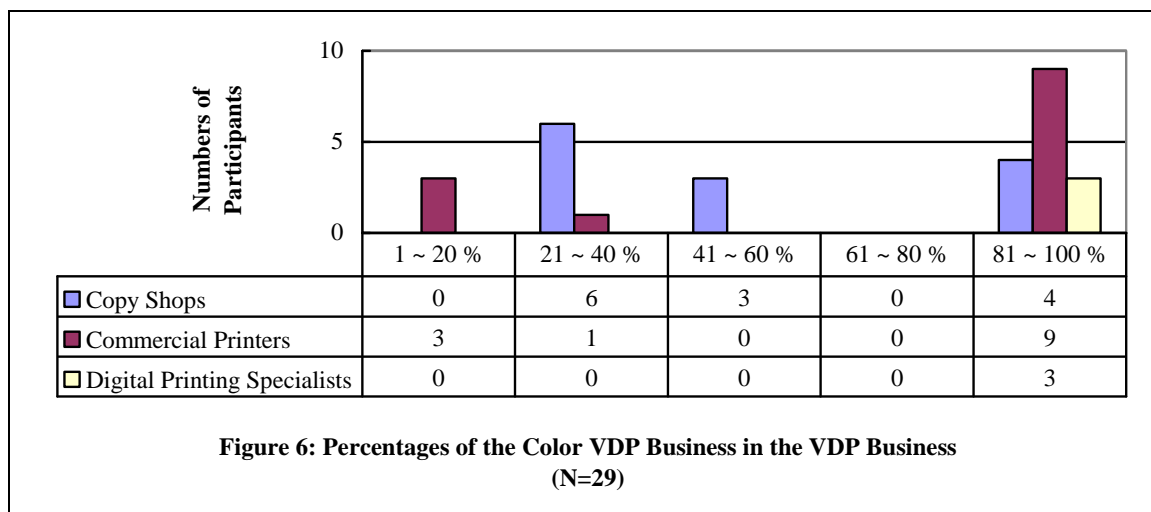


Figure 6: Percentages of the Color VDP Business in the VDP Business (N=29)

In terms of color VDP revenues, six “Copy Shops” said that it was 21 to 40% of the VDP business, three “Copy Shops” indicated it was 41 to 60% of the VDP business, and four “Copy Shops” responded that it was 81 to 100 % of their total VDP business (see Figure 6). We also learned that 69% (9 of 13) of the “Commercial Printers” have more than 81% of their VDP business as color VDP. There is no question that within the

“Digital Printing Specialists” that color VDP is between 81 to 100% of all the VDP business. Once customers became aware of VDP availability, 16 of 29 (55%) of the digital printing services providers said that their overall volume was dominated by color VDP.

Eleven “Copy Shops” mentioned that the non-VDP business had increased in the past three years (see Figure 7). Eight of 13 (70%) “Commercial Printers” have similar answers. “Digital Printing Specialists” also pointed out that their business was higher for the past three years. Two “Copy Shops” and two “Commercial Printers” said that their non-VDP business had decreased in the past three years. Only three “Commercial Printers” had flat non-VDP revenues in the past three years.

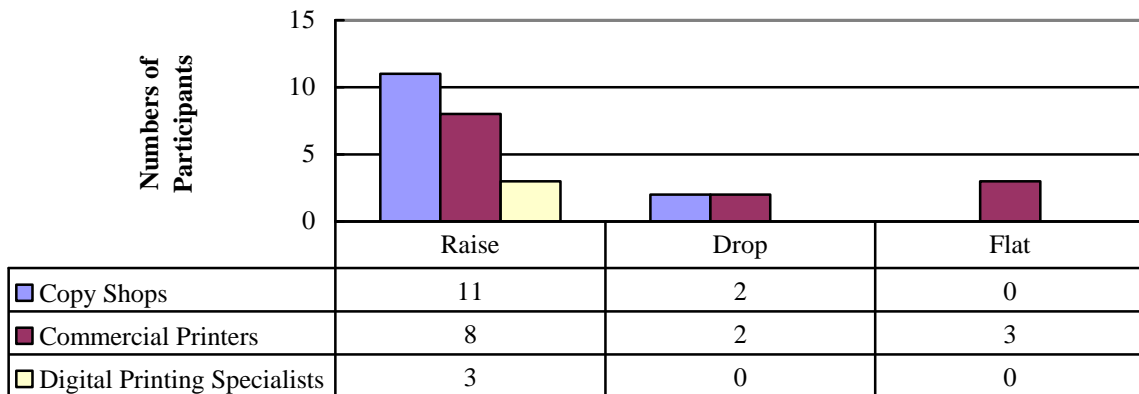


Figure 7: The Non-VDP Business Changed in the Past Three Years (N=29)

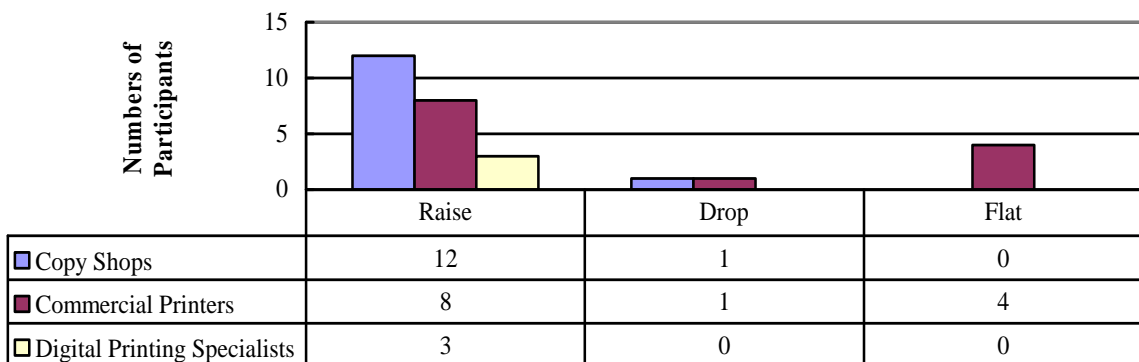


Figure 8: The VDP Business Changed in the Past Three Years (N=29)

The 12 “Copy Shops” indicated that their VDP business had increased in the last three years (see Figure 8). Eight of 13 (61.5%) of the “Commercial Printers” showed VDP business growing as well. Four

“Commercial Printers” said that their VDP business was flat. All “Digital Printing Specialists” stated their VDP business had increased in the past three years. Only one “Copy Shop” and one “Commercial Printer” reported that their VDP business dropped in the recent three years.

As the questionnaire results showed, there were 13 basic digital printing business application categories (see Figure 9). They were: (1) Business Cards and ID Cards, (2) Password and Serial Number, (3) Greeting Cards and Invitation Cards, (4) Labels, (5) Digital Proofing, (6) Brochures, Flyers, and Direct Mails, (7) Statements, Invoices, and Transaction Printing, (8) Calendars and Almanacs, (9) Periodicals and Magazines (10) Reports and Proposals, (11) Books, (12) Discourse [report] Printing, and (13) Photo Book and Artwork. For “Copy Shops,” the major digital business is “Proposal and Reports,” “Books,” “Brochures, Flyers, and Direct Mails,” and “Discourse Printing.” “Digital Proofing” and “Proposal and Reports” are the major digital printing business for “Commercial Printers.” The biggest digital printing business for “Digital Printing Specialists” is “Password and Serial Number.”

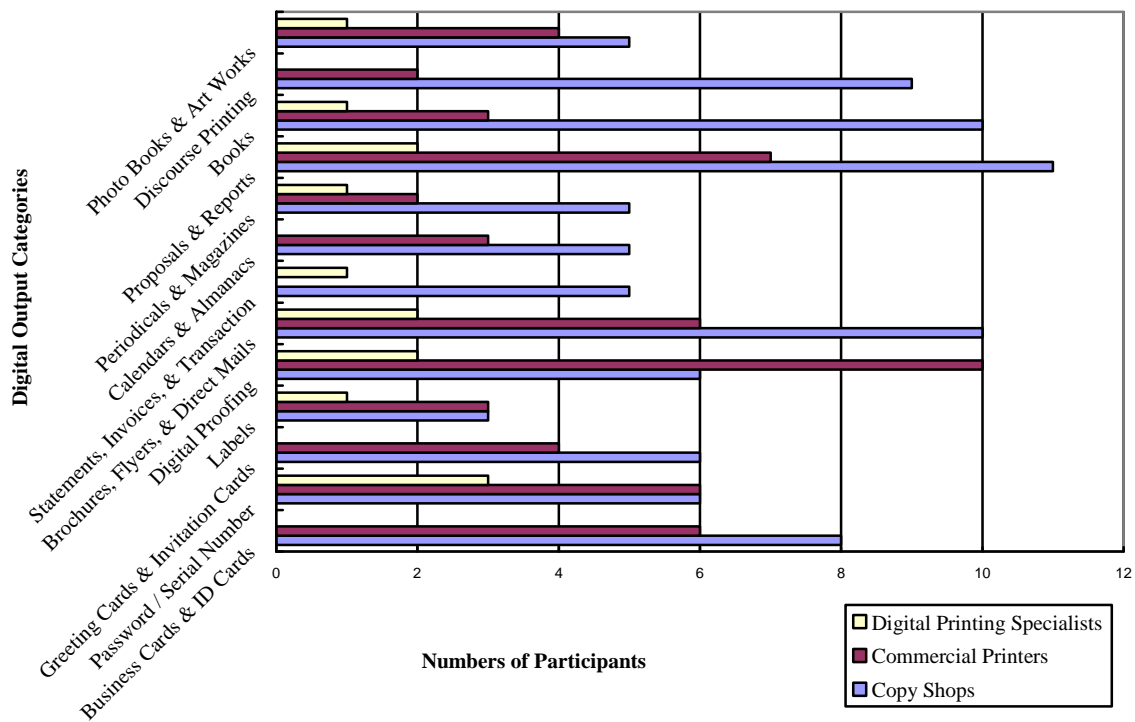


Figure 9: Digital Output Categories for the Digital Printing Services Providers
(N = 29)

Since efficiency is one of the major advantages of digital printing, there is a strong desire among customers to request jobs be finished within 24 hours. Eight of 29 (five from “Copy Shops” and three from “Commercial Printers”) digital printing services providers indicated that “81 to 100 %” of their digital printing business jobs must be finished within 24 hours. For five “Commercial Printers,” “21 to 40%” of their jobs needed to be

completed within 24 hours. Figure 10 shows that in the digital printing business of the eight “Copy Shops” 24-hour turnaround was in high demand (above 60% of their business).

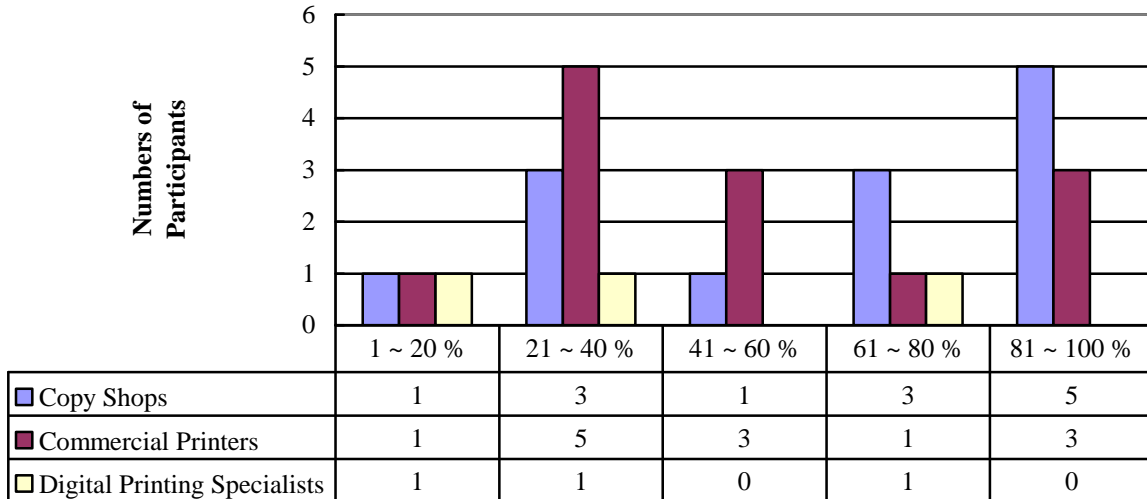


Figure 10: Percentages of the Jobs Must Be Finished Within 24 Hours (N=29)

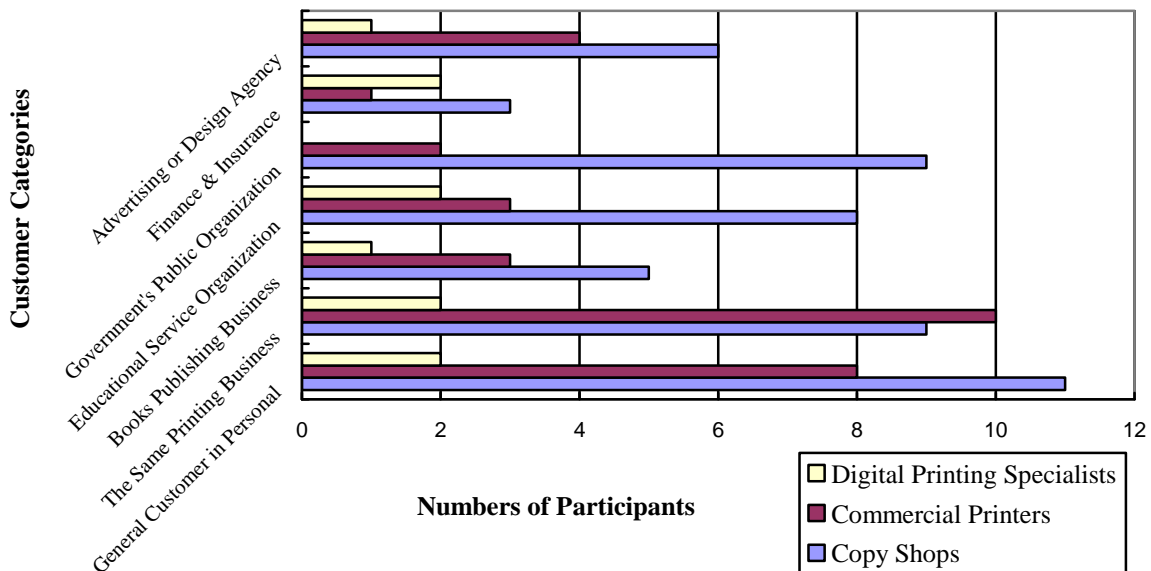


Figure 11: Percentages of the Primary Business Customers (N=29)

The primary business of digital printing services providers are: (1) General Customer in Personal, (2) The Same Printing workers, (3) Books Publishing Business, (4) Educational Service Organization, (5)

Government's Public Organization, (6) Finance and Insurance, and (7) Advertising or Design Agency. The top three primary businesses for “Copy Shops” are “General Customer,” “The Same Printing Business,” and “Government's Public Organization” (see Figure 11). For the “Commercial Printers,” “The Same Printing Business,” “General Customer,” and “Advertising or Design Agency” are the top three primary businesses. The main business categories for “Digital Printing Specialists” is not concentrated enough to break down specifically.

In print quantity, all the “Digital Printing Specialists” had reached an average of more than 50,001 sheets (A4 or letter size) per month (see Figure 12). For the “Commercial Printers,” 38.5% (5 of 13) of them had very low average print quantities per month (between 10,001 to 20,000 sheets) and only one reached a monthly print quantity above 50,001 sheets. Four of 13 (31%) “Copy Shops” had print quantities over 50,001 sheets and another four (31%) of “Copy Shops” reached a monthly print quantity of between 20,001 to 30,000 sheets.



Figure 12: The Average Monthly Print Quantity of the Services Providers (N=29)

Digital print services providers use several kinds of production software to support the digital printing presses, they are: (1) PrintShop mail, (2) XMPie, (3) iWay, (4) Prisma, (5) PrintNet, and (6) Your Truly Designer. A total of 15 digital print services providers did not use any production software at all (see Figure 13). “Printshop Mail” was the number one software that was used frequently by the digital printing services providers, especially for the “Copy Shops.”

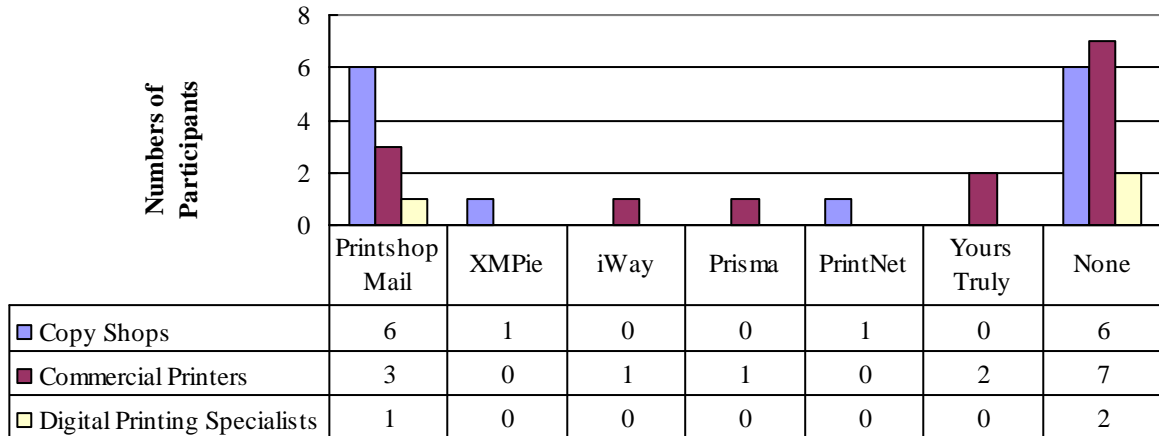


Figure 13: The Production Related-Software of the Service Providers Were Used (N=29)

With many years of digital printing in the marketplace, the question of whether digital printing services providers will purchase new digital printing presses is important. Eight of 29 (28%) will not purchase any digital printing presses in the future (see Figure 14). Eleven of 29 (38%) digital print services providers plan to buy a digital printing press. Ten digital print services providers will purchase a digital printing press between 2008 and 2010. Nine of 13 “Copy Shops” will buy digital printing equipment in coming years. “Commercial Printers” believe that the digital print business is increasing therefore there are 10 of them willing to purchase a digital printing press sometime in the unspecified future.

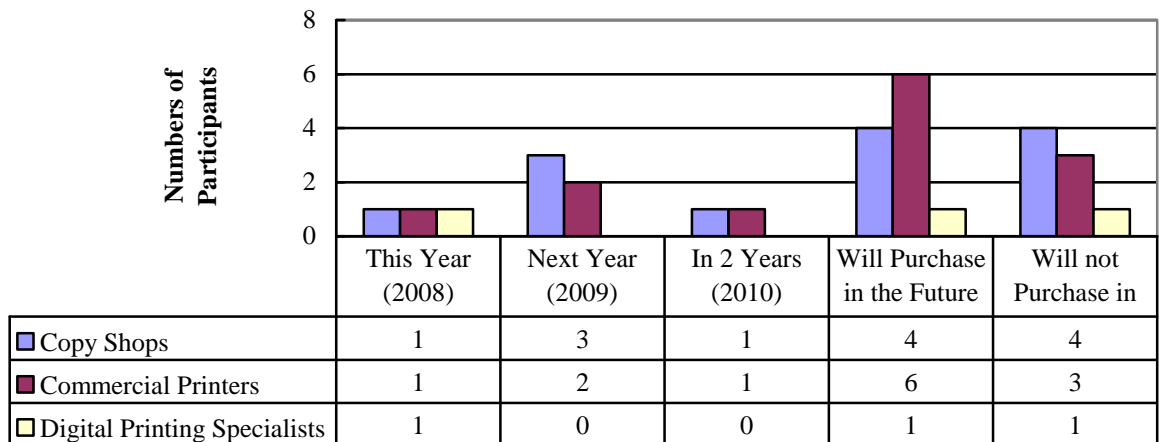


Figure 14: The Willingness of Purchasing Digital Printing Press in the Future (N=29)

2. Satisfaction Level of the Digital Printing Services Providers to the Digital Printing Presses

The second part of the survey questionnaire was about the satisfaction level of digital printing press owners. The ranges of satisfaction offered were: 1 = completely dissatisfied; 2 = somewhat dissatisfied; 3 = neutral; 4 = somewhat satisfied; 5 = completely satisfied. The press characteristics were: (1) Print Speed, (2) Reliability, (3) Availability, (4) Print Quality, (5) Print Consistency (from Sheet to Sheet), (6) Print Consistency (from Day to Day), (7) Ability to Handle Coated Paper Stocks, (8) Ability to Handle Heavy Weight Paper Stocks, (9) Ability to handle Special Printed Materials, (10) Convenience of Hardware Operation, (11) Expansion of the Hardware, (12) Operating Costs (Toner, Service, etc.), (13) Equipment Cost (Capital Cost), and (14) Overall Performance.

Table 1. The Mean and the SD of the Satisfaction Levels to the Digital Printing Press

	Total Mean	Total SD	Xerox Mean	Xerox SD	Indigo Mean	Indigo SD
1. Print Speed	3.34	0.72	3.40	0.76	3.00	0.00
2. Reliability	3.24	0.83	3.24	0.88	3.25	0.50
3. Availability	3.24	0.83	3.24	0.88	3.25	0.50
4. Print Quality	3.48	0.69	3.40	0.71	4.00	0.00
5. Print Consistency (from Sheet to Sheet)	3.28	0.84	3.12	0.78	4.25	0.50
6. Print Consistency (from Day to Day)	3.14	0.79	3.04	0.79	3.75	0.50
7. Ability to Handle Coated Paper Stocks	2.62	0.90	2.64	0.95	2.50	0.58
8. Ability to Handle Heavy Weight Paper Stocks	3.17	0.85	3.12	0.88	3.50	0.58
9. Ability to Handle Special Printed Materials	2.48	0.91	2.44	0.92	2.75	0.96
10. Convenience of Hardware Operation	3.41	0.63	3.40	0.65	3.50	0.58
11. Expansibility of the Hardware	3.00	0.93	3.04	0.93	2.75	0.96
12. Operating Costs (Toner, Service, etc.)	2.62	1.05	2.68	1.11	2.25	0.50
13. Equipment Cost (Capital Cost)	2.45	0.83	2.48	0.87	2.25	0.50
14. Overall Performance	3.21	0.90	3.20	0.96	3.25	0.50
	N = 29		N = 25		N = 4	

As noted in Table 1, all the digital printing services providers were satisfied on the “Overall Performance” (Mean = 3.21). There are several items that the services providers were not satisfied about (mean scores are less than 3.00), such as “Ability to Handle Coated Paper Stocks,” “Ability to Handle Special Printed Materials,” “Operating Costs (Toner, Service, etc.),” and “Equipment Cost (Capital Cost).” The “Expansibility of the Hardware” is just about the average (Mean = 3.00). This level of response means that digital printing services providers are not satisfied or dissatisfied about this aspect, overall. Items that are above the average, indicating general satisfaction are “Print Quality” and “Convenience of Hardware Operation” (Mean >

3.40).General speaking, digital printing services providers care very much about the cost of the equipment, , no matter whether it is capital or operating costs.

If we look at the two digital printing equipment providers, we can generally state that the HP-Indigo does have a better overall performance rating in the minds of its owners (only four services providers own the digital printing press). In the “Print Quality” and “Print Consistency,” there is a significant difference between Fuji Xerox and HP-Indigo, with the latter having better satisfaction levels. This may explain why the HP Indigo presses are selected by commercial printers because of their concerns about print quality.

3. Service Satisfaction Levels of the Digital Printing Services Providers to the Digital Printing Equipment Providers

The third part of the survey questionnaire was focused on service satisfaction levels (1 = completely dissatisfied, 2 = somewhat dissatisfied, 3 = neutral, 4 = somewhat satisfied, and 5 = completely satisfied) of the digital printing services providers with digital printing equipment suppliers.

Satisfaction levels were divided into two parts, (1) Sales Representatives and (2) Technical Support Engineers. In the first part, the survey questionnaire included: (1) The Understanding of the Digital Printing Press; (2) The Understanding of the Digital Printing Production Workflow Solutions; (3) The Understanding and Recommendations of Your Company's Status; (4) The Help on Overall Operations for Your Company; and (5) The Evaluation of the Overall Service Performance. Concerning the technical service engineers, the survey questionnaire included: (1) The Time Spending after Your Company Called for the Service; (2) Total Time Spending on the Machine Repairing; (3) The Quality after the Machine Maintenance; (4) The Quality's Stability after the Machine Maintenance; (5) The Evaluation of the Overall Maintenance Performance.

Table 2. The Mean and the SD of the Satisfaction Levels to the Sales Representatives

	Total Mean	Total SD	Xerox Mean	Xerox SD	Indigo Mean	Indigo SD
1. The Understanding of the Digital Printing Press	2.97	0.94	2.88	0.97	3.50	0.58
2. The Understanding of the Digital Printing Production Workflow Solutions	3.10	0.86	3.12	0.88	3.00	0.82
3. The Understanding and Recommendations of Your Company's Status	2.90	1.05	2.92	1.12	2.75	0.50
4. The Help on Overall Operations for Your Company	3.10	0.98	3.12	1.05	3.00	0.00
5. The Evaluation of the Overall Service Performance	3.10	0.98	3.12	1.05	3.00	0.00
	N = 29		N = 25		N = 4	

From table 2, we could conclude that the digital printing services providers were basically satisfied in the "Evaluation of the Overall Service Performance" since the mean score was above 3.00 (Mean = 3.10). The mean scores of the "Understanding of the Digital Printing Press (Mean = 2.97)" and "Understanding and Recommendations of Your Company's Status (Mean = 2.90)" were less than 3.00, meaning that digital printing services providers were not satisfied with the sale representatives' service performance. Digital printing services providers who used the HP-Indigo believed the sale representatives did meet their needs in "Understanding of the Digital Printing Press." The feedback from the digital printing services providers who used the Fuji Xerox showed better satisfaction levels than HP-Indigo in item "The Understanding of the Digital Printing Production Workflow Solutions" and "The Help on Overall Operations for Your Company."

Table 3. The Mean and the SD of the Satisfaction Levels to the Technical Support Engineers

	Total Mean	Total SD	Xerox Mean	Xerox SD	Indigo Mean	Indigo SD
1. The Time Spending after Your Company Called for the Service	3.34	0.77	3.48	0.71	2.50	0.58
2. Total Time Spending on the Machine Repairing	3.14	0.69	3.28	0.61	2.25	0.50
3. The Quality after the Machine Maintenance	3.31	0.76	3.36	0.81	3.00	0.00
4. The Quality's Stability after the Machine Maintenance	3.17	0.80	3.20	0.87	3.00	0.00
5. The Evaluation of the Overall Maintenance Performance	3.31	0.71	3.40	0.71	2.75	0.50
	N = 29		N = 25		N = 4	

The “Evaluation of the Overall Maintenance Performance” indicated satisfied by the digital printing services providers because the mean score was higher than 3.00 (Mean = 3.31). The digital printing services providers have different opinions on the digital printing equipment providers in the category of technical support. Basically, Fuji Xerox’s technical support engineers’ activities have been recognized by their good performance in all areas. Respondents had strong confidence in them because of their long presence in Taiwan. Technical support engineers from HP-Indigo still have room to improve on their after-sales service and technical support, especially in the “Total Time Spending on the Machine Repairing” category.

4. The Business Strategies to Face the Challenges and Fulfill the Needs for Customers

Interviews with owners of digital printing services businesses with at least two digital printing presses give us a clear view of the strategies they should have. They are:

- (1) Keep good relationships with clients and equipment providers. From the feedback of the business owners, they are pleased with the support teams of the equipment providers. This may be a result of these owners being large accounts for the suppliers.
- (2) Educate customers continuously. Some owners of the digital printing service providers have a close relationship with publishers but still find it hard to persuade them to use digital printing to reduce their run lengths. It might be a preferred publishing strategy to use short-run printing versions, first to test the market, and then decide whether to mass manufacture their books, which can have environmental and financial benefits.
- (3) Keep updating the new digital printing technologies. Pay attention to print trade shows, magazines, and journals, as well as the academic research, printing organizations, or associations to gain new knowledge, such as the possibility of inkjet technology to replace laser technology.
- (4) Keep upgrading the software and hardware. Normally, it is unrealistic to calculate depreciation more than three years in their opinions. Therefore, the investment on new equipment must achieve the desired ROI within three years. Otherwise, owners cannot make the needed profit because equipment suppliers will offer new models within that time frame.
- (5) There is not significant competition among the large digital printing owners at this moment. In some cases, this means they can work together on certain jobs. They do still need to constantly deal with pricing issues since their clients tend to be price-sensitive.
- (6) Focus on customers' wants and needs. Customers are the ones who decide whether the product quality is acceptable or not. Corporate customers seem to be less price sensitive than others. Unfortunately, the digital printing presses have some problems with consistent imaging. It is important to keep building the value for customers in areas beyond just pricing. Short-runs, job turnaround time, quality of binding, price, and color quality are the major issues that consumers care about. Color quality becomes less important from digital printing business owners' experience once these factors are taken into account.
- (7) Creating or finding certain new markets and applications are important. Uniqueness of the applications available is essential to avoid being trapped into dealing with only pricing and efficiency issues.
- (8) Digital printing owners provide B2B and B2C business models to their customers. Digital printing owners do use the custom-made ERP system to integrate their entire production workflows, such as ordering and monitoring systems. Technically speaking, it does match the spirit of CIP3 and CIP4.
- (9) Provide different platforms, supply chain, and satellite printing services to meet the needs for customers if the company is large enough.

5. Most Critical Problems That Digital Printing Services Providers Need to Overcome and Solve

Digital printing services providers are facing great challenges as competitors begin to enter this market faster than the market can expanded. There are several problems the digital printing services providers need to identify and solve. These issues encompass technical expansion, , new markets, personnel, customer relationships and others.

Faster production speed, better color quality, bigger print area, higher resolution, more printable materials, and additional applications are all welcome but not critical issues for digital printing services providers. The most critical problems they have:

- (1) Decrease the unit cost per print. The unit cost is the most critical issue. If the unit cost cannot drop significantly, the digital printing business will have trouble expanding. Based on our observations, as capital investment increases, the click charges from the equipment providers will decrease the unit cost. Once the unit cost decreases close to the unit cost of the conventional printing (for a certain quantity), digital printing business owners will have strong incentive to purchase newer expensive equipment.
- (2) The need to educate and promote digital printing to the end consumers. It is necessary to educate and promote the concepts of digital printing to the general public. Once the consumers are better aware of the benefits of digital printing, market growth is more certain.
- (3) The role and position of digital printing business. What is the position and role digital printing is playing? Is it part of the printing industry, the manufacturing industry, the service industry? Once it is has a vision of its role, the right efforts will direct it to the strategic path.

Concluding Remarks

After the survey questionnaires were collected and the interviews with the selected owners of the digital printing services providers were conducted, we submit the following key findings: (1) to provide satisfactory service to customers is the main objective of the digital printing services providers. (2) Every digital printing services provider has a different background. In many applications of digital printing, it is better to do what they are good at not only what they are technically capable of. (3) Focusing on one specialized market or one-stop-shopping business strategies are the major philosophies digital printing business owners need to select based on their different ideas and experiences. It is important to always provide services and products based on customer needs, not just what can be done. (4) Most problems need systematic methods in order to solve with patience and passion. Short-run lengths are one of the most important advantages of digital printing, and this definitely impacts the traditional way of thinking compared to traditional mass reproduction of printing. There is no perfect solution for one organization but certain actions need to be taken to find the best and most appropriate one.

We have some recommendations for the industry and future studies related to this topic. (1) It could do a larger and more general survey to all digital printing services providers to generate more opinions and ideas. (2) The end consumers' could be surveyed to understand needs from their perspective. (3) Survey the members of the digital printing association, digital printing equipment providers, academia, or even government's organizations to understand their perspectives to work together to promote the digital printing business.

Basically, digital printing is a bright path that the industry should pursue. It is at the stage where if a printing company does not enter the digital printing business, they will eventually regret their choice. We strongly believe that it is the time to take advantage of this great opportunity and create the digital printing market, especially because there are few competitors in the field. Digital printing is definitely a new application for end consumers to use for personalized products. It will meet the needs of the potential customers to profitable advantage.

Seize the "Digital Printing" opportunity now.

Acknowledgements

As we all know that conducting a research is not an easy job at all. There are many people to participate in and behind the theme that we need to appreciate. First of all, we would like to express our sincere gratitude to the EDSF for its support to our research project. Dr. Joe Webb and Holly Muscolino are the two key persons to assist and help us to conduct this research smoothly assigned by the EDSF Research Committee. We would also like thanks to those survey participants and the interviewees of those owners of the digital printing services providers in Taiwan to help us to allow this research can be finished on time. Last not the least that we have a special thanks to the Executive Director of the EDSF, Brenda Kai, who gave us great help to solve the administrative and financial problems patiently. This is a wonderful experience and our great pleasure to work with above helpers like a team.

Appendix

A Satisfaction Study of Color Digital Printing Presses in Taiwan – Survey Questionnaire for the Digital Printing Services Providers

Thank you for taking our Satisfaction Study of Color Digital Printing Presses in Taiwan Survey. We are focus on the printer in Taiwan who own high-end color digital printing presses, This important study will help the industry to better understand requirements and use of Digital Color On Demand Printing technology and it will allow you to have access to the most appropriate solutions offerings to meet your future needs. Please be assured that your individual responses will be held in strict confidence and that this is not related to any sales initiative.

1. When does your company established?
_____ / _____ / _____ ex: 1982/12/18

2. When does your company started to provide digital printing services?
_____ / _____ / _____ ex: 1982/12/18

3. In total, how many employees work at your print facility?

4. Please pick up which category best describes your organization?
 - A Copy Shop
 - A Commercial Printer
 - A Digital Printing Specialist
 - A Combined Printer
 - A Specialty Printer (e.g. Gravure, Flexography, etc)
 - Service Bureau
 - A Book Printer
 - Other (Specify) : _____

5. Approximately what percent of your total business falls into the following categories?

(TOTAL MUST = 100%)

_____ % Digital Printing

_____ % Copier

_____ % Traditional Offset Press

_____ % Large Format Printer

_____ % Other (specify) : _____

TOTAL = 100%

6. What percent of your impressions on your digital color device are: (TOTAL MUST = 100%)

_____ % A single set or proof of a document / Multiple sets of the same document

_____ % Variable data where the address or other content is unique from document to document within a job

TOTAL = 100%

7. In the business of non-VDP, what is the proportion percentage of each colored printing and black & white printing? (TOTAL MUST = 100%)

_____ % Black / White

_____ % Color

8. In the business of VDP, what is the proportion percentage of each colored printing and black & white printing? (TOTAL MUST = 100%)

_____ % Black / White

_____ % Color

9. How the performance of following printing types have been changed in the past three years

	B&W Pages	Color Pages
A single set or proof of a document / Multiple sets of the same document	<input type="checkbox"/> Raise <input type="checkbox"/> Drop <input type="checkbox"/> Flat	<input type="checkbox"/> Raise <input type="checkbox"/> Drop <input type="checkbox"/> Flat
Variable data where the address or other content is unique from document to document within a job	<input type="checkbox"/> Raise <input type="checkbox"/> Drop <input type="checkbox"/> Flat	<input type="checkbox"/> Raise <input type="checkbox"/> Drop <input type="checkbox"/> Flat

10. Approximately what percent of your total digital output falls into the following categories? (TOTAL MUST = 100%)

- Business Card / ID Card
- Password / Serial Number
- Greeting Card / Invitation Cards
- Labels
- Digital Proofing
- Brochures, Flyers, and Direct Mails
- Statements, Invoices, and Transaction Printing
- Calendars and Almanacs
- Periodicals and Magazines
- Proposals and Reports
- Books
- Discourse Printing
- Photo Books and Art Works

11. Approximately what percent of your total business have to finish the job in 24 hrs?

(TOTAL MUST = 100%)

_____ %

12. What is your company's primary business?

- General Customer
- The Same Printing Business.
- Books Publishing Business.
- Educational Service Organization.
- Government's Public Organization.
- Finance and Insurance.
- Advertising or Design Agency
- Other (Specify) : _____

13. Please fill in the color digital printing equipment that your company have: the brand name, the model type, the quantity and what is your average monthly output volume per color device? We want to know the average number of impressions per month per device. By impression we mean an 8.5 x 11 (A4) size. Process color is counted as one impression (not four). Printing on two sides would be two impressions. An 11x17 sheet printed on both sides would be four impressions.

Brand Name	Model Type	Qty	Impressions Per Month

14. Please fill in the digital printing relevant procedure software that your company has already bought:

Brand Name	Software Name	Qty

15. When do you think you will acquire your next digital color device?

- This Year (2008)
- Next Year (2009)
- In 2 Years (2010)
- Will Purchase in the Future
- Will not Purchase in the Future

16. Please indicate your level of satisfaction with your digital color device using a 5 point scale (5 = completely satisfied, 4 = somewhat satisfied, 3 = neutral, 2 = somewhat dissatisfied, 1 = completely dissatisfied)

	1	2	3	4	5
1. Print Speed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Reliability (Runs without Many Interruptions or Paper Jams)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Availability (Runs without Much maintenance or Down Time)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Print Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Print Consistency (from Sheet to Sheet)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Print Consistency (from Day to Day)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Ability to Handle Coated Paper Stocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Ability to Handle Heavy Weight Paper Stocks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Ability to Handle Special Printed Materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Convenience of Hardware Operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Expansibility of the Hardware	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Operating Costs (Toner, Service, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Equipment Cost (Capital Cost)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Overall Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17. Please indicate your level of satisfaction with digital color device manufacturer using a 5 point scale (5 = completely satisfied, 4 = somewhat satisfied, 3 = neutral, 2 = somewhat dissatisfied, 1 = completely dissatisfied)

Sales Representatives	1	2	3	4	5
1. The Understanding of the Digital Printing Press	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The Understanding of the Digital Printing Production Workflow Solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The Understanding and Recommendations of Your Company's Status	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. The Help on Overall Operations for Your Company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The Evaluation of the Overall Service Performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical Support Engineers	1	2	3	4	5
1. The Time Spending after Your Company Called for the Service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Total Time Spending on the Machine Repairing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 3. The Quality after the Machine Maintenance | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The Quality's Stability after the Machine Maintenance | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. The Evaluation of the Overall Maintenance Performance | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Additional Information

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About Shih Hsin University

Shih Hsin University (Taipei, Taiwan, R.O.C.) has become the reputable institution it is today by overcoming many challenges along the way. The following is a brief history of the school's development.

World College of Journalism (August 1960 to July 1991)

After the school was firmly established, its name was changed to World College of Journalism in 1960. The school's academic program was divided into two curricula, a three-year program and a five-year program. For the 1990 school year, the three-year program offered a total of eight majors, and the five-year program four majors. Total enrollment reached 6,055 students.

World College of Journalism and Communications (August 1991 to July 1997)

In August 1991, the Ministry of Education approved a change in the school's institutional status, and the World College of Journalism and Communications was born, with five departments (divided into a total of twelve tracks, or specializations). Dr. Chia-lin Cheng was named the school's first president after its change in institutional status. By the 1996 academic year, the World College of Journalism and Communications had one graduate school, fourteen academic departments, and a total enrollment of 6,276 students.

Shih Hsin University (August 1997 onwards)

Since attaining the status of institute, the school has invested heavily in the construction of new facilities, renovating dormitories, supplementing research and educational equipment, as well as significantly upgrading the organization of its teaching staff. Through the joint efforts of both faculty and students, the school made remarkable progress in academic quality, winning praise from all quarters, culminating in approval of its change of status to Shih Hsin University beginning in August 1997. The university brought together the College of Journalism, the School of Management Studies, the College of Humanities and Social Sciences, and the School of Law, with the goal of becoming a sophisticated comprehensive university with an enrollment of around 10,000 students.

Department of Graphic Communications and Digital Publishing

The Department of Graphic Communications and Publishing has gone through three phases of development to adjust to the demands of the times. It was founded in 1969 as the Department of Printing and Photography, which was subsequently changed to Department of Graphic Communications and Technology in 1995, and its curriculum was divided into printing and photography tracks.

A Master's program was launched in 2001, and it was followed by a graduate program for continuing education in 2002 to meet the demand of professionals in need of personal development. In addition, the Department offers a two-year program for graduates of community colleges, who wish to further their studies at the university level.

The four major focuses of the curriculum – design, photography, printing and publishing - are incorporated into two major modules of photographic imaging and digital publishing. The nucleus of the curriculum deals with the creation, reproduction, communication, and representation of images.

In educational direction, the Department provides a solid theoretical grounding in the various fields related to color imaging, and in undertaking research into technology integration. In addition, the Department equips students with knowledge about media types and nurture aesthetic sensibilities, giving them skills that encompass culture and technology, and theory and practice. Internship courses such as Applied Printing Technology and Applied Photography combine advanced technology in printing, photography, publishing, and computer and offer opportunities for students to work with related industries.

The hardware facilities of the department are the best of any graphic communications or print-media department in Taiwan. These facilities include a color management laboratory, network

management laboratory, screen printing laboratory, printing materials laboratory, Macintosh multi-media computer laboratory, digital publishing laboratory, darkrooms for advanced black-and white photography as well as professional photo studios. The faculty members consist of highly trained professionals and Ph.D.s educated in Taiwan and abroad.

About the Research Team

Dr. Tsung-Yu Hao is a faculty member in the Department of Graphic Communications and Digital Publishing at Shih Hsin University, Taipei, Taiwan, R.O.C.. He received his doctoral degree from University of Northern Iowa in the Department of Industrial Technology. He also serves at Shih Hsin University for over 15 years.

There are one graduate student and four senior students in the research project. They are all the students of the Department of Graphic Communications and Digital Publishing, Shih Hsin University. Mr. Yung-Hui Yen is our graduate student who received his Bachelor of Science degree in Information System Management. The other senior students are Yi-Ru Chen, Zhen-Wan Huang, Yung-Ting Kan, and Zi-Yi Lee.

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