Printing Industry Offshoring: Perspectives from U.S. Based Printers

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Introduction

Offshoring and offshore outsourcing, the movement of work and tasks to low-cost countries, has been increasing in scale and scope. Offshoring in the manufacturing sector has been an ongoing phenomenon for more than forty years . More recently, examples of offshoring in services industries such as software, once considered non-tradable and therefore immune to offshoring, have emerged. The concurrent effects of very rapid growth of the Indian & Chinese economies and dramatically lower cross-border transaction costs have the potential to change the structure of many industries. Some have called this as historic an economic transformation as the industrial revolution (Blinder, 2006).

Offshoring has transformed a number of industries. On the manufacturing side, in response to pressures from foreign competitors, US semiconductor firms were able to take advantage of labor in low-cost countries by modularizing their value chain (Sturgeon, 2006). By modularizing, they could break off pieces of the value chain and site them in the most efficient geographic location. They followed a division of labor where they first moved the very labor-intensive tasks such as assembly offshore. Later they moved foundries to more efficient locations while keeping high level design closer to customers (Brown & Linden, 2005). Similarly the U.S. automotive industry has been able to improve its competitive position by moving some of its labor intensive production to Mexico to lower its costs.

On the services side, certain industries are being transformed very rapidly. In a span of about three years, the American IT services industry has adopted a "Global Delivery Model" where customers now expect bids on projects to have blended rates, including both on-site and offshore labor components. And the work is not a simple division of labor, where the work completed on-site is high-skill and the offshore work is low skill. Major companies are creating

product specific centers in low-cost countries that will serve customers throughout the World. For example, IBM has announced that Bangalore will be the global home for its Service Oriented Architecture (SOA), a strategic business segment it expects will grow rapidly over the next decade (Global News Wire, 2006).

The printing industry has characteristics similar to both manufacturing and services industries. Like a manufacturer, printers produce tangible goods but like a service the product is often highly customized requiring co-production by customer and printer. As a result, increased cross-border trade, especially with China and India, will affect the printing industry in distinctive ways. The goal of this paper is to better understand the way in which the offshoring phenomenon is playing out in the printing industry. Because of the high number of small firms in the printing industry (about 80%) and thus the lack of public data, as well as its complexity, there is much to be understood about how offshoring is affecting US printers. This problem is magnified for the lack of data on service offshoring (Sturgeon, 2006). Printers and their suppliers are keenly interested in how globalization and offshoring is impacting their industry. The emergence of China and India as a source of markets as well as competitors is a frequent topic in trade publications and in industry conferences. In this paper we will offer a number of hypotheses, review descriptive survey data on the industry, test the hypotheses with this data, and expand on the quantitative findings with interview data.

The Printing Industry

The offshore outsourcing movement comes at a unique time for the printing industry. First, it is an industry that is undergoing complex competitive and economic pressures. One source

estimates that approximately 500 establishments per month have gone out of business from 1999 to 2001 (Romano and Soom, 2003). One reason may be that demand for traditional print products is down. US daily newspaper circulation, for example, was 63,147 in 1973. Over thirty years, it has steadily declined so that in 2002, it was down to 55,186. From 2000 to 2002, newsprint consumption decreased 14% from 12.039 to 10.395 million metric tons (Newspaper Association of America, 2004). Moreover, many print clients can increasingly meet shrinking print needs in house through sophisticated, yet easy-to-use desktop publishing systems.

Second, there is also a shift in the very nature of print, as digital printing and information exchange increase in popularity. Digital printing has changed the skills needed in the industry, and has expanded the range of service opportunities for printers to such areas as data management. This shift to digital media, particular on the pre-press side, is particularly important when looking at the issue of offshore outsourcing, as online file transfer and other aspects of e-commerce have significantly reduced the cost of transportation of pre-print media. Obviously, this expands the world of potential printers to a global basis.

Thus, printers face both challenges and opportunities with greater cross-border trade. On the upside, U.S. printers have the opportunity to expand their customer base by selling to new markets like China and India, and to lower costs by more efficiently locating their inputs and processes. The potential upsides of globalization can be a larger overall market due to rapid overseas growth, a larger market in the US through efficiency gains in offshoring components, a larger market in the US by offering more products as a broker for offshored products, and more competition in the US from new entrants overseas through remote delivery and entry in the US market. On the downside, and perhaps what gets the most press, is that offshoring can result in the loss of customers who move their operations overseas and may stave off the ability to move

into higher-value complementary services such as database management and print pre-processing since these may move offshore as well (Nason, 2005).

While most observers believe offshoring has not had a dramatic impact on most segments of the printing industry, the potential for a significant increase in cross-border trade exists. Unlike most goods sectors, the U.S. runs a trade surplus in printed materials. In 2005 the US was a net exporter of printed materials with a trade surplus of over $500 million. But some segments have already been transformed. The $500 million number, for example, is down from over $1 billion in 2000 (Davis & Gleeson, 2006). Some major print companies see the writing on the wall have already expanded overseas. R.R. Donnely, for example, purchased OfficeTiger in 2005 to expand its presence in the Business Processing Outsourcing (BPO) market in India (Outsourcing Times, 2006).

Theory

When looking at how printers are likely to be affected and respond to offshore outsourcing, there are a number of ways to categorize firms. In the printing industry, much of the discussion focuses on the types of products that are more or less likely to be offhsored. Thus, one way is to look at printers is by the types of products and services that they offer. As discussed above, there is some trade data that hints at the types of products that are more likely to move offshore (David & Gleeson, 2006). Yet, this data is limited in content and scope.

There are a number of factors that impact weather or not firms are likely to lose print jobs to overseas competitors. Industry experts emphasize several criteria as important when a customer chooses a printer, including: turnaround time, quality, cost, trust, ability to customize, co-location with other production processes, availability of other services, unique abilities, and

others. So, it isn't simply a matter of lower costs and price. For each job, the weighting of each criterion will change.

One of the biggest risks with offshore outsourcing is the risk of delays in shipping. It follows, therefore, that "quick print" jobs would not move overseas. Thus,

H1: Printers that offer "quick printing" will be less likely to experience job loss to offshore printers[i]

On the other hand, from our initial discussions with industry experts, books often don't require quick turn around time. In addition, some books, such as children's "pop up" books require complicated finishing. When such labor intensive finishing is involved, there is a clear cost advantage for printers offshore that enjoy much lower labor costs, such as those in Mexico and China. This makes books more susceptible to offshoring, leading to Hypothesis 2.

H2: Printers that print books will be more likely to experience job loss to offshore printers

Packaging also often requires more complex finishing. In addition, as manufacturing moves overseas, there are some financial and logistical benefits for packaging printing to move overseas as well. Thus,

H3: Printers that print packaging will be more likely to experience job loss to offshore printers

The high cost of shipping is another main detractor to offshore printing. As in other industries, printers need to attend to the value to weight ratio (Linden & Brown, 2005). Often, in variable data print, this ratio is small and, economically, it does not make sense to pay the shipping costs. Additionally, those items that are personalized and mailed are less likely to be moved offshore if customers are relying on the printers for mailing and fulfillment. Thus,

H4: Printers that offer variable data printing will be less likely to experience job loss to offshore printers

H5: Printers that print advertising materials will be less likely to experience job loss to offshore printers

Little is understood about the types of services that can help printers retain jobs that would otherwise be lost to overseas competitors (Sorce, Pellow, and Frey, 2003). On the one hand, greater digitization of the printing process, as in other industries, can facilitate information transfer on a global scale (Levy & Murnane, 2004). On the other hand, in the printing industry service provision, increasingly involving digital technology, is often seen as the means to address global competitive pressures (Bauer, 2006). This latter view is supported by the concept of embeddedness, as developed by Uzzi (1997) and is central in relationship marketing (Morgan & Hunt, 1994). In reality, new technologies have actually increased the embeddedness of some economic transactions in printing and decreased it for others. In the past, the basic printing process was more embedded in relationships. One printed item required multiple personal trips back and forth from the customer to the printer, to ensure layout and color accuracy. In fact, many printers have lavish waiting areas with movies, food, etc, for customers to comfortably wait while an item is printed for review. With modern technology, however, a customer can email a file, the printer can print it with significant accuracy, the customer then mails it back for review and the exchange is complete. While these services may make them a more efficient printer, there is no reason to think that it would protect them from job loss to overseas companies that offer similar standard print services.

H6: Printers that offer standard digital services such as digital proofing will be more likely to experience job loss to offshore printers

Another new areas of service provision is data management services, where printers take and manage the data that will be used in the printed material. At the simplest level, this is a mailing list. But it can also relate to more complex and sensitive information such as financial information. In addition, what seems like simple information, such as a menu layout for a restaurant, can have embedded in it information that is quite central to the firm, such as information for proper supply chain management (i.e. what food to order and when). Innovative printers are finding ways to manage this type of information, and as they do so they create more complex social relationships with their customers. As printers take on some of the services that are further up and down the value chain, they increasingly embed the economic transaction in a relationship that requires trust, needed for the handling of sensitive information, and mutual knowledge exchange, both which serve to facilitate the effectiveness and efficiency of the interaction. Therefore, customers engaged in these relationships will face increased transaction costs if they move to a new print supplier. Thus,

H7: Printers that offer data management services will be less likely to experience job loss to offshore printers

H8: Printers that offer non-standard IT services will be less likely to experience job loss to offshore printers

Methods

The data collection comprised of three parts. The first part was a set of exploratory interviews with industry experts. Six interviews were conducted with individuals well known in the industry for their expertise in industry dynamics. These interviews varied from ½ hour to 1 hour in length, and focused on their opinions regarding how offshore outsourcing was playing

out in the printing industry, the factors that might influence the degree to which printers were either negatively or positively affected by offshore outsourcing trends, and the potential future of offshore outsourcing.

These exploratory interviews lay the basis for an industry survey. The web-based survey was written in cooperation with the GATF/PIA. After pre-testing by some industry contacts, the survey was sent to approximately one half of the GATF/PIA membership.[ii] A total of 3228 printers were sent an email. Of these emails, 465 were returned as undeliverable. After 2 email reminders, a total of 242 responses were received, resulting in a response rate of 8.8%. While this response rate is low in comparison to most academic surveys, this population has a greater number of smaller firms than most industries, many of which are extremely pressed for resources. In addition, the survey was administered during a period of great economic uncertainty and turbulence. Therefore, with potential issues of response bias in mind, we felt that this was an acceptable response rate.

In the survey, we asked for contact information for those participants that would be willing to discuss the issue more with us. We randomly chose fifteen interested participants and conducted semi structured phone interviews, each of which lasting 45 minutes to an hour long. All interviews were taped and transcribed for accuracy. Interviews were used to better understand survey findings.

Survey Measures

By reviewing related literature and interviewing professionals in printing industry,

Independent Variables

Product Type. We created a twelve-item list to cover the common product types in printing industry. They are: advertisement, color books, black and white books, catalogs, direct mail, directories, forms, transaction statements, packaging, periodicals, labels, and quick printing. We then conducted exploratory factor analysis on these 12 items (SPSS 14.0). By employing principle components method with oblique rotation and by analyzing the correlation matrix, four factors were extracted with eigenvalue greater than 1 (eigenvalue = 1.108). KMO measure of sampling adequacy was 0.68. KMO measure calculates both for the entire correlation matrix and each individual variable in order to evaluate the appropriateness of applying factor analysis. Values above 0.50 indicate appropriateness. Another indicator of the strength of the relationship among variables is Bartlett's test of sphericity. In this EFA, Bartlett's test of sphericity was significant at .001 level. Barlett's test is used to check if the variables in the population correlation matrix are uncorrelated. Significant test concludes that the strength of the relationship among variables is strong and it is a good idea to proceed a factor analysis for the data.

By reading item content, four factors clearly represent four different product types: ADVERT included advertisement, catalogs, and periodicals; BOOKS included color books, black and white books, direct mail, and directories; QUICKVAR included forms, quick printing, labels, and transaction statement; and the last product type PACKAGE is a single item factor – packaging. 61.65% of the total variance was explained by these four factors. From the pattern matrix, we found that even though most of the loadings were no lower than .50, two items loaded on each factor at 0.47 (catalogs) and 0.41 (periodicals). Catalogs seem to load with ADVERT as well (loading = .46), which makes sense since catalogs are one form of distribution for advertisements. Periodicals seem not load on any factor firmly – the second highest loading of

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periodicals is 0.30, with the factor BOOKS. We then double checked the structure matrix loading table. The factor structure is consistent with the result from pattern matrix. Structure matrix is simply the factor loading matrix as in orthogonal rotation, representing the variance in a measured variable explained by a factor on both a unique and common contributions basis. The pattern matrix, in contrast, contains coefficients which just represent unique contributions. In EFA with oblique rotation, we are advised to look at both matrices and find the consistent factor structures. Therefore, in this exploratory study, the factor structure as above is consistent in both matrices and we employ it in the following regression analysis.[iii] We summarized the item content and factor loading information is included in Table 1.

Table 1 About Here

Since the last factor – PACKAGE – only includes one item, we further wondered if it was necessary to include packaging into other factors and force the group form three factors instead of three factors. Further examination found that the component correlations of the four factors were from .04 to .23, indicating that there were no strong correlations among any of the four product types and thus, they are distinctively different and not further EFA was needed. The Cronbach's Alpha for QUICKVAR, BOOKS, and ADVERT were .71, .69, and .58, respectively. The arithmetic averages of grouped items were entered into regressions to measure the four product types.

Service Type. Going through the same process for determining product types, we developed a nine-item list to cover many common service types in printing industry. They are mailing and fulfillment, variable data printing, supply chain management, digital photography,

online template, web development and hosting, CD-ROM production, digital proofing, laminating and mounting. We also conducted exploratory factor analysis on these items. By employing principle components method with oblique rotation and by analyzing the correlation matrix, three factors were extracted with eigenvalue greater than 1 (eigenvalue = 1.001). KMO measure of sampling adequacy was 0.69. Bartlett's test of sphericity was significant at .001 level. Therefore, both tests conclude that the strength of the relationship among variables is strong and it is a good idea to proceed a factor analysis for the data.

By reading item content, the three factors represent three different service types: DIGSERV including web development and hosting, CD-RM production, digital photography, and online template development; DATSERV including mailing and fulfillment, variable data printing, and supply chain management; and PRESSSERV including digital proofing and laminating and mounting. 55.96% of the total variance was explained by these three factors. No loading was lower than .50 and the structure matrix also suggested the same factor structure. Further examination found that the component correlations of the four factors were from .08 to .25, indicating that there were no strong correlations among any of the four product types and thus, they are distinctively different and not further EFA was needed. We summarized the item content and factor loading information was included in Table 2.

Table 2 About Here

The Cronbach's Alpha for DIGSERV, DATSERV, and PRESSSERV were .61, .60, and .22, respectively. The factor reliabilities are above the threshold point 0.60 suggested by previous research (Nulley, 1994). However, the validity of reliability test in this study can be questioned. Different from reflective measures who describe different aspects of the same object, the product and service types can be classified into different groups with distinctive natures and objectives.

Therefore, the product and service types can be recognized as formative measures and low reliability is not a concern. Furthermore, in order to validate our future regression results, besides using the arithmetic averages of grouped items as the independent variables, we also broke the low-reliability factor – PRESSSERV – into two single-item factors: digital proofing and laminating and mounting. The direction and significance of the regression coefficients do not change and therefore, our conclusion is robust to the service type structures.

Dependent Variables

Job Loss. Three items were used to measure if the printing firm suffered from losing job to foreign competitors. They are if firms lost job(s) to a foreign competitor with a non-US customer(s), if firms lost job(s) to a foreign competitor with US customer(s) where the print job was NOT being exported, and if firms lost job(s) to a foreign competitor with US customer(s) where the print job was being exported. If a printing firm lost job in any of the above situation, the case will be coded as "1"; otherwise "0". This dummy variable is used later in regression to measure job loss (JOBLOSS).

Control Variables

Four variables that may affect the explored relationships are controlled in regressions. The first control variable is *SIZE*, which is measured by the number of employees. The second control variable is *REPEAT*. We ask printing firms to answer the question what percentage (approximate) of the total business is a result of repeat business from existing customers. The greater percentage of the repeated business, the greater the likelihood of loyalty of the customer to the printers and therefore, the less likely it is to lose business and job to foreign competitors.

The third control variable measures the firms' product *INNOVATION*. We ask firms what is the percentage of sales in FY 2004 from products not offered 3 years ago. As discussed earlier, many in the printing industry see advanced technology, such as digital printing, and new services as a means to remain competitive in the changing marketplace. This measure was one way to gauge the degree to which the printer was introducing new products and services as a means to deal with increased competitive pressure. The last control variable is SOURCESERV. We ask firms if they outsource the following services to overseas: customer relation care/call center, finance/accounting, human resource service, and legal service. There were two reasons for this question. First, this may capture an overall comfort with outsourcing; the more comfortable a firm feels about outsourcing, the more likely it will outsource both here and in the US. Second, this may also indicate an organizational structure that is more amenable to outsourcing. The Cronbach's Alpha for these four items was .72. The arithmetic averages of the four items were entered into regressions to measure experience with outsourcing in internal service areas.

Other Tests

All of the data used in this study is drawn from a single source – the online survey. As the variables to be measured were generally straightforward and objective in nature, however, the survey method may be subject to common methods variance. Therefore, we tried to estimate the potential common method bias by conducting Harmon's one factor test (Podsakoff & Organ, 1986). The items that were used to measure both dependent and independent variables were entered into one exploratory factor analysis. In analyzing the correlation matrix, we found that the first factor accounted for only 12.81% of the total variance, which suggested that no single factor accounted for the majority of covariance; therefore, common method variance is not solely

responsible for our findings. Thus, common method bias would not explain many interactive relationships between the predictor and outcome variables.

We conducted two ANOVA tests to detect any non-response bias and missing-value bias. The first ANOVA was conducted to see if there is geographic bias between the respondent cases and non-respondent cases. Another 50 printing firms were randomly selected from the non-respondent pool. The ANOVA test did not find any significant bias in the geographic location between the 145 respondents and the 50 non-respondent firms. The second ANOVA was employed to test if there is any bias between the final sample and the cases that were deleted for missing values. No bias was found among our key variables such as employee number, job loss, product types, and service types.

Findings

<u>Descriptive Statistics</u>

The descriptive statistics suggest that while many in the printing industry are aware of the threat of competition, and are being affected by it, they are not operating on a global scale to any large extent. When asked how foreign competition would change over the next two years, 72% responded that would increase and 18% thought it would stay the same. 49% of the respondents reported having lost a job to a foreign competitor. On average, 57% of those losses were to China, 16% to Mexico, 16% to Canada, and 10% to Europe. Despite the increased digital component of printing, only on average 5% of these losses were to Indian printers.

For those that did lose jobs, lower costs were suggested to be the primary reasons for this loss (34.0%). The next most common was that the customer's work moved outside the US (7.7%), better local reach (5.7%), and the larger size of the foreign competitor (5.7%). 14% of those losing jobs reported that a common factor across lost jobs were long print runs, while 11%

reported that a common factor across lost jobs were that they had a reasonable or long turn around or labor intensive finishing.

For the most part, the printers in this sample did not have a global customer base, with 17% of the respondents reporting that they had performed a print job for a customer outside of the US. Most of the outsourcing, if done, was done within the United States. For most aspects of the printing process, less than one percent of the respondents outsourced outside the US. There were a few small exceptions to this. 5.4% of those outsourcing reporting that they outsourced printing to China, 3.4% to Canada and 1.5% to Mexico. Approximately 2% of the respondents outsourced finishing and assembly to Mexico and 3% to China. Lastly, 1.5% of the participants reported that they sent some prepress and design to China and 1.9% reported that they outsourced this to India. "For those that took advantage of offshore outsourcing, approximately 43% reported no savings, 40% reported savings between 1 and 39%, and 16% reported savings of higher than 39%."

Table 3 summarizes how those that were engaged in offshore outsourcing saw the problems and benefits associated with this activity. Some of the highest rated benefits (other than cost savings) were use and learning about new technologies (using a scale of 1-5, where 1 was did not agree and 5 was fully agree, the means were 4.02 and 4.03 respectively) and increased product quality (4.03). In general, the problems were rated lower than the benefits, but the highest rated one was shipping delays (2.8), and then quality problems (2.49). These findings are summarized in Table 3.

Table 3 about here

While only a small number of firms were engaged in offshore outsourcing, few went so far as to say that they had ruled it out as an option for the future. Eighteen percent of the respondents who had not engaged in offshore outsourcing had definite plans to do so in the near

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future. The most often cited concerns for these printers were loss of client control (74% saying this was a concern), risk of losing key employees (31%),

Regression Analysis

Table 4 summarizes the mean, standard deviation, and correlation of the pertinent variables. The highest correlation among independent variables is between ADVERT and DATSERV ($r = .42$, $p < .001$, two-tailed test). However, ADVERT belongs to product types and DATSERV is a service type and they will be entered into regressions separately. Therefore, there are not serious multicollinearity concerns in our later regression analysis.

Table 4 About Here

Since our dependent variables are dummy variables, logistic regression is employed to test the hypothesized relationships. Logistic regression is used to predict a categorical (usually dichotomous) variable from a set of predictor variables. The benefit offered by logistic regression is that logistic regression makes no assumptions about the distributions of the predictor variables. Therefore, it is more applicable when the predictor variables are a mix of continuous and categorical variables and/or if they are not approximately normally distributed.

Two sets of logistic regression were employed to test the hypothesized relationships. The two sets of regressions relate job loss to product types and service types, respectively. We control the same variables in these two regressions. By doing this, we hope that we can clearly map how product and service types explain the variance in firm job loss.

After excluding one outlier that is outside two standard deviations, we summarized the regression results in Table 5. None of the control variables is found to relate to job loss significant, as Model 1 of Table 5. However, after the four product types added into regression

(i.e., Model 2 of Table 5), we find that BOOKS positively and significantly relates to job loss (B = 1.06, p < .01, one-tailed test). It means that the more printing firms focus on BOOKS, more likely they will lose jobs to oversea competitors. Therefore, H2 is supported. The same relationship can be found between packaging and job loss (B = .43, p < .05, one-tailed test), which indicates that the more printing firms focus on packaging business, more likely they will lose jobs to oversea competitors. H3 is thus supported. ADVERT is also found to positively impact on job loss situation. However, this relationship is not significant (B = .23, p > .05, one-tailed test). Therefore, H5 is not supported. The opposite relationship is found between QUICKVAR and job loss (B = -.84, p < .05, one-tailed test). It shows that the more printing firms focus on quick and variable printing, the less likely they will lose jobs to foreign competitors. Therefore, H1 and H4 are supported.

Table 5 About Here

Model 3 and Model 4 of Table 5 shows the logistic regression results of testing the impact of service types on job loss. Model 3 has three service types and they are DIGSERV, DATSERV, and PRESSSERV. Model 4 breaks PRESSSERV into two groups: digital proofing and laminating and mounting. The purpose of doing this is that because the two-item service type PRESSSERV has a low reliability (Cronbach's Alpha = .22) and we wonder if we enter two single-item into regression, the hypothesized relationship will change. The consistency between the two studies will assure the robustness of our conclusion.

In both Model 3 and Model 4 of Table 5, DATSERV shows a positive and significant relationship with job loss (B = .46, p < .05, one-tailed test). It indicates that the more printing firms focus on data related services, the more likely they will lose jobs to oversea competitors. Therefore, H7 is not supported. The same relationship is found between PRESSSERV and job

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loss (B = 1.29, p < .001, one-tailed test), indicating that the more printing firms focus on press related services, the more likely they will lose jobs to oversea competitors. The relationships between digital proofing and laminating and mounting and job loss are also confirmed by testing the two services separately, as Model 4 in Table 5. Digital proofing positively and significantly relates to job loss (B = .73, p < .001, one-tailed test) and the same is found between laminating and mounting and job loss (B = .59, p < .001, one-tailed test). Therefore, H6 is supported. However, even though DIGSERV has a strong negative relationship with job loss, but this relationship is only close to be significant (B = -.42, p > .05, one-tailed test). Therefore, H8 is not supported. However, we can see that those firms that provide digital IT services will be less likely to have job loss to offshore competitors, which is in the hypothesized direction.

Analysis and Discussion

The data suggest that while printers are aware of the offshoring trends, and are being impacted by it. From the interviews, there were three main ways the printers are remaining competitive in the face of offshore competitors. One was by sticking to a specific niches or product areas that were considered "safe." Some of these areas were safe because it was a small and specific customer base that few printers were interested in targeting. Two examples we saw in our interviews were high end stationary and funeral service material. Other product areas were believed to be less likely to be outsourced because they had the features for which offshoring is believed to be the weakest: turn around time and shipping costs. As expressed by one printer who did not feel threatened by the offshoring trends: "*Yes, if I was book printer, I'd be dammed scared. But if I'm a magazine printer, a direct mail printer or other things that are more timely, I see much less of a threat.*"

Our survey results suggest that this view is reasonably correct, but printers have to be careful about what products they assume are "safe." We found, for example, that printers who were involved with the printing of periodicals were more likely to be experiencing job loss. Another comment we heard in the interviews was that short runs were also safe, a common assumption in the industry (Bauer, 2006). But it is not clear that this is the case either. Again, what needs to be focused on is the value/weight ratio and the time sensitivity of the printed matter. One thing to keep in mind, however, is that this ratio can change.

In addition, it may be the case that printers may not understand the reason for the lower costs overseas, and thus can not respond appropriately. The common story is that labor is cheaper, therefore print is cheaper. One of our sources suggested that this may not be the case, which could impact the strategies firms can take to remain competitive. He stated:

I was doing some estimating of jobs in Sri Lanka and a pressman there at that time would earn $90 a month. I then quoted[the job] in the Philippines, where a pressman made $220 a month, and later I quoted in Thailand, where they made $440, and at that time Hong Kong was at $1,250. The interesting thing was the job cost more in Sri Lanka than it did in the Philippines, and in the Philippines it cost more than Thailand, and Thailand cost more than Hong Kong. That didn't seem right because it wasn't in relationship to the amount of wages that were being paid to an individual person. And that bothered me for a long time and I was finally able to work out what are differences and one of them is that almost all products in the world are dumped in Southeast Asia so that the price that anybody else in a high-end country has to pay for them for are a lot greater. So for example, at the current time - and this is of a couple of days ago - an eight color Heidelberg press in San Francisco installed in the company is going to be about $3.1 or $3.2 million. I know of a specific case where that same identical press was put into Hong Kong only a few months ago at $2.4 million.[1] I know the top code paper which is made in Japan and sells for about 78 cents a pound here and its 39 cents a pound in Hong Kong. And almost all papers are less expensive.
In the Philippines, 60 cents out of every dollar goes to materials whereas only 8 to 10 cents goes to labor. China at the current time, about 45 cents goes to materials and about 35 cents goes to labor - maybe a little less than that. And in the United States, you're talking 20 cents for paper roughly and 54 cents for labor. You know so you can see that labor has something to do with it but overseas, but if you can impact the cost of your materials, it has a greater impact on the cost of that job than labor ever will.

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[1] Some OEM's have suggested that perhaps the equipment being sold overseas is older, this accounting for the price difference.

A second way printers told use they were remaining competitive was by offering creative value added services. Several people we talked to discussed how they were moving into services such as data management, supply chain management, and other IT related services. Some examples in our interviews included a printer of real estate books who expanded in to areas such as real estate ad design, mailing and fulfillment and even invoice billing. Another participant told us about how his company moved from printing menus to using menus to develop detailed supply chain information. As expressed by one printer:

You know five years ago or seven years ago if somebody were to say, you know,' what business are you in?' I'd automatically say commercial printing. But not so much anymore. A lot of our printing is driven from some of the other services we offer.

This particular printer outsourced much of his printing work now, but was adamant about not moving offshore for reasons of patriotism. Interestingly, our survey findings suggest that offering data management services alone will not protect printers from job loss. Those printers offering less standard services, such as web page design, hosting and digital photography do seem to be less susceptible to job loss. It may be that these types of services require creative content and therefore greater levels of communication and embeddedness. As India's booming IT industry becomes more involved with the printing industry, however, these services may also move offshore.

Another area of service that we did not explore in the survey, but was mentioned in two interviews was that they hoped to retain some customers by offering "green" printing. As explained by one printer who was Forest Stewardship Council (FSC) certified: *We're finding a lot of [government] agencies insisting on that. I guess what the trend is there are people that are concerned about the environment and it's difficult to say that you're an environmental company*

and yet use outsourcing. They also described how several large retailers, such as Target, were also looking into sourcing print from green printers.

The last way that printers were staying competitive was by offshore outsourcing themselves. In our survey, we found that while many printers are outsourcing, they are not yet doing this on a global scale. But, there are many fears about moving offshore, some of which are real, some less so. Our survey suggests that shipping delays were the greatest problem for those that did offshore outsource. Overall, however, the benefits of moving offshore were rated higher than the costs. Firms were able to lower cost, use new technologies, and even increase product quality. Our interviews suggest that firms that have connections overseas are first-movers in the process. While some have argued that large firms have an inherent advantage in this regard, we found that this was not necessarily the case. For example, we had one firm CEO tell us he made contacts in China on a trip during his MBA program. The result was he tested out outsourcing some of his work to the Chinese shop. He got multiple bids and his results were excellent and he is planning to expand his operations.

As one print broker observed, however, feeling comfortable making these types of contacts may pose a challenge for American printers in particular. Reflecting on his global experience, he stated:

I think also one of the things that may be hitting the United States more than other countries is the fact that we're more provincial. We're less used to travel, language, currencies and other things and so when we see other people tending to do what we think we should be doing, we're less tolerant of it and I think we're also less understanding of the fact that it can be our benefactor as well as a detrimental thing is we want to fight it.

Conclusion

In this paper we found that printers are aware of the offshoring threat and are being affected by it. In terms of products and services, quick and variable printing, as well as non

standard IT services (with the exception of data management), are the areas that are less likely to suffer from job loss due to the offshoring. To deal with the threat of offshore outsourcing, printers are trying to either focus on "safe" products, introduce new services, or offshore themselves. For the former two strategies, comparing our interviews with the survey data, it is not clear that printers have a good understanding of what the "safe" products and services are. For the latter strategy, very few printers are taking advantage of lower offshore costs. This is due to fears about its implications for customer and employees, lack of knowledge about how to explore this option, and overall feelings of patriotism. Those that have offshored have enjoyed benefits above and beyond lower costs, including increased quality.

Complicating this picture is the fact that the costs and benefits of offshoring are likely to change. India and China, for example, are both working on improving transportation, particularly air freight. Customers are becoming increasingly global and even changing their business models to adjust to the downsides of offshoring.

Clearly, this paper is just the beginning of understanding the dynamics of offshoring in the printing industry. Given the low response rate and the nature of our dependant variable, we are limited in understanding the complicated nature of the issues involved. In the survey, we did ask for performance data, but the response rate was so low we were unable to use those questions. This is a limitation that researchers in this industry will have to find a way to overcome given that for a large percentage of the industry there is no public data available. The interviews were one method to get to some more detailed understanding, and there is a need for additional qualitative data. Given these limitations, however, this paper offers some answers regarding offshoring and the future of print and raises a number of questions for future study.

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Table 1: Exploratory Factor Analysis on Product Types				
	Factor 1	Factor 2	Factor 3	Factor 4
B&W Book	.84 (.81)			
Color Book	.77 (.77)			
Directories	.60 (.65)			
Catalogs	.472 (.573)		.460 (.571)	
Forms		.90 (.90)		
Quick Printing		.78 (.80)		
Labels		.60 (.59)		
Transaction Statements		.55 (.53)		
Advertisements			.83 (.80)	
Direct Mail			.80 (.79)	
Periodicals	.30 (.38)		.41 (.50)	
Package				.90 (.89)
Note: The default loadings are from Pattern Matrix, and the loadings in () are from Structure Matrix.				

Table 2: Exploratory Factor Analysis on Service Types			
	Factor 1	Factor 2	Factor 3
Web Development and Hosting	.81 (.82)		
CD-ROM Production	.71 (.71)		
Digital Photography	.66 (.69)		
Online Template	.61 (.63)		
Mailing and Fulfillment		.85 (.82)	
Variable Data Printing		.74 (.76)	
Supply Chain Management		.54 (.60)	
Digital Proofing			.72 (.73)
Laminating and Mounting			.65 (.67)
Note: The default loadings are from Pattern Matrix, and the loadings in () are from Structure Matrix.			

Table 3: Problems and Benefits of Offshore Outsourcing

Benefits	Mean*	Problems	Mean*
Used new technology	4.02	Language Barriers	2.38
Increased production volume	3.67	Communication Problems (Other than language)	2.33
Increased product quality	4.03	Technology Incompatibility	2.06
Increased product variety	3.15	Shipping Delays	2.8
Learned about new technologies	4.03	Quality Problems	2.49
Increased operational efficiency	3.67	Substrate Availability	2.42
		Loss of Intellectual Property	2.22
		Increased Travel Budget	2.32
		Increased Employee Training	2.34

* Respondents were asked to rate their level of agreement with a number of statements, with 1 being no agreement and 5 being full agreement.

Table 4: Mean, Standard Deviation, and Correlation

	1	2	3	4	5	6	7	8	9	10
ME	.42	.60	2.53	75.60	14.14	.82	.89	.72	1.16	.5
SD	.50	.49	1.46	18.80	17.54	1.14	.51	.50	.55	.6
1.JOBLOSS	1									
2.OUTSOURCE	.07	1								
3.SIZE	.02	-.05	1							
4.REPEAT	-.12	.10	-.12	1						
5.INNOVATION	.02	-.10	-.08	-.09	1					
6. SOURCESERV	-.04	.29***	-.02	.02	-.01	1				
7.BOOKS	.23**	.05	-.03	-.01	-.11	.08	1			
8.QUICKVAR	-.13+	.05	-.00	-.10	.16*	.01	.11	1		
9.ADVERT	.17*	-.05	.04	-.07	-.13+	.08	.39***	-.10	1	
10.PACKAGE	.18*	-.04	.05	-.15*	.08	-.02	.08	-.08	.09	1
11.DIGSERV	.05	-.00	.09	-.10	.17*	-.01	.03	.00	.17*	.1
12.DATSERV	.15*	.04	.02	.05	-.02	.03	.22**	-.00	.42***	.0
13.PRESSSERV	.33***	.00	-.04	.00	.19*	.02	.21**	.06	.26***	.27*

Table 5: Logistic Regression Result of Job Loss (JOBLOSS)					
Product	Model 1	Model 2	**Service**	Model 3	Model 4
Control Variable					
SIZE	.02 (.11)	.03 (.12)	SIZE	.07 (.12)	.06 (.12)
REPEAT	-.01 (.01)	-.01 (.01)	REPEAT	-.02 (.01)	-.02 (.01)
INNOVATION	.00 (.01)	.01 (.01)	INNOVATION	-.01 (.01)	-.01 (.01)
SOURCESERV	-.08 (.14)	-.13 (.15)	OUTSOURCE	-.12 (.15)	-.12 (.15)
Independent Variable					
BOOKS		1.06** (.38)	DIGSERV	-.42 (.30)	-.42 (.30)
QUICKVAR		-.84* (.37)	DATSERV	.46* (.26)	.46* (.27)
ADVERT		.23 (.35)	PRESSSERV	1.29** (.32)	
PACKAGE		.43* (.25)	DIGPROOF		.73*** (.23)
			LAMMOUNT		.59** (.20)
Fitness Indices					
Model Chi-square	2.51	22.71**		28.57***	28.82***
d.f.	4	8		7	8
-2 log likelihood	221.79	201.59		195.73	195.48
Nagelkerke R^2	.02	.17		.21	.22
Note: 1. * p < .05, ** p < .01, *** p < .001, one-tailed test 2. Coefficients are regression coefficients (B). The numbers in () are standard error.					

Endnotes

[i] In this paper "job loss" refers to print jobs, and not worker jobs.

[ii] Because we were offering a $25 incentive to all respondents, we did not send the survey out to the entire membership of over 7000 printers.

[iii] In order to confirm the explored relationships between product types and dependent variables, we also tested the factor structure with catalogs grouped with factor ADVERT. Even though the absolute value of regression coefficients slightly changed, the direction of the coefficients and the significance of the relationships do not change. Therefore, our regression results are robust to the change of the factor structure.