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Estimating Systems Research

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The following document provides a summary of the research methodology and survey results from the estimating systems research conducted by RIT, School of Media Sciences.

Introduction

The estimating process in the printing industry is a complex process that involves the gathering and entry of job-specific information in such a manner that a suggested sell-price can be achieved based on underlying cost of materials, labor, and equipment usage for a specific printing operation. It is important to note that each printing operation has a unique set of people, processes, and systems that dramatically influences the production cost of a print project such that print cost/price may be quite different for one operation to another. Therefore, precision is required with respect to the cost and estimating system for each print operation, such that these systems reflect the differentiable context of each unique print operation. It is common that one printing operation might be optimized for a certain type of work, while another printing operation might be tuned for another type of print production. The estimating system provides the print service provider with a cost and marked-up price reflecting the complete cost associated with the print project and the specific profit margin that the printing company believes it can achieve in the market. Estimating is a trusted means for generating fast and accurate customer quotations and is a core component of operating a successful printing company.

This study is focused on the requirements of print service providers as well as the process and systems involved in the generation of customer print quotation. The quoting process is the fulcrum-point of a printing business. Many inefficiencies in the quotation process make the time and accuracy of generating a customer quotation unpredictable at times. Automating the quotation process is of high importance to print services providers.

The print quotation workflow begins with a customer providing order specifications for a print project to a service provider. This order information is used to process an estimate, which reflects the cost and sell-price of a print project (Figure 1 below). The cost-estimate reflects all internal and external costs (buyouts) and is used as a basis to generate a customer quotation. Appropriate mark-up or profit margin is then applied to the cost-estimate, finalizing the quote. The customer quotation is then delivered to the customer for approval. The estimating system stores estimates, and quotations so that once a quote is approved the order information is transferred to become the actual production specifications for the print project. Print companies manage requests for quotations in an estimating queue that are usually processed in priority order.

Automating this estimating and quotation process can reduce time and free-up resources for other necessary tasks. This study aims to uncover requirements from print service providers that are important to the timely and accurate generation of customer quotations.

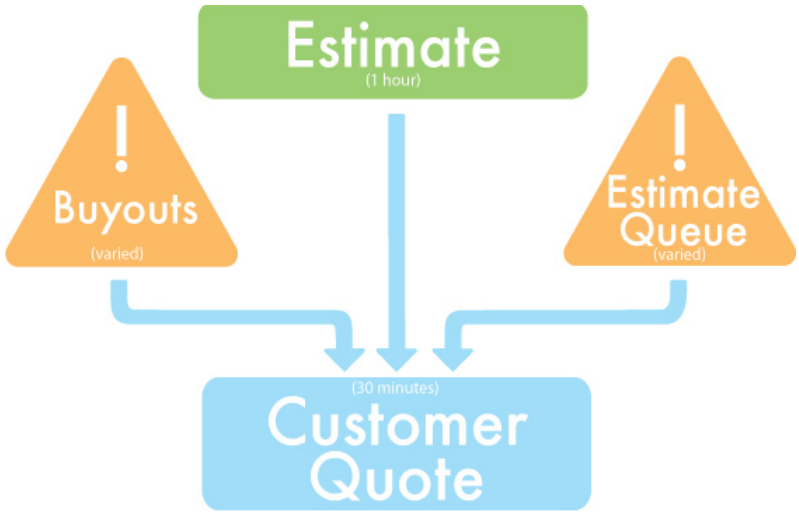

Figure 1: Print Quotation Workflow

Purpose

The print quotation process starts with a customer request for quotation and ends with a commitment from the customer to release the project to the printing company for production. The quotation process needs to be accurate and fast so that customers can quickly receive the price in a timely manner to confirm that the price will meet their budget. The quotation process also needs to be accurate such that the print service provider is able to generate a quote that reflects the complete cost of the print job and the appropriate embedded profit margin.

There are often many steps and iterations between the customer and the print service provider from the inception of a print job to the approval of a quote, including: cost estimation, price quotation, quotation approval, project submission, all leading to pre-press and print production. The use of an automated system for the quotation process can create faster, more accurate quotes while reducing human interaction and errors.

Price estimation is a component of the quotation process and is a complex process that involves estimating the cost of an entire job, adding overhead plus management costs, and establishing an appropriate profit margin. Price estimation can be achieved by a variety of methods. Two popular methods include Budgeted Hourly Rate (BHR), and Activity Based Costing (ABC).

BHR is a costing system based on the hourly-rate cost of labor, equipment, supplies, facilities, and utilities. It is a full-absorption cost method of accounting, which means it includes even indirect business costs through fully-burdened production rates. BHR consists of carefully evaluating all the production steps in the plant and then assigns production times and hourly cost factors for all job functions in each cost center. The material costs and buyout costs are then added to form the final BHR cost estimate formula:

Standard production time × BHR + Material cost + Buyout costs = Estimated cost

This calculation is made for each cost center that is involved in the production process. Depending on the job, multiple cost centers may be required. In this case, cost for each cost center total is added together to formulate the total cost estimate. By combining all the cost centers that are active for a particular print project, the total cost estimate for the job can be calculated.

Activity Based Costing (ABC) is a means of job estimating real-time costs for all activities, not just production operations. ABC charges all direct costs and a prorated portion of indirect cost (e.g. sales, general administration, SG&A), to the customer. ABC does not try to recover support costs exclusively through production rates. The accumulated activity costs for a production job are tabulated at the end of the production run and a profit margin is attributed to achieve the final ABC-base price to the customer.

Research Methodology

This research involves secondary research conducted from a variety of estimating systems and associated websites, and primary research conducted directly with print service providers. The primary research was conducted via a web-based survey, face-to-face, or through telephone interviews using a consistent survey tool that was developed and deployed specifically for this research. The following steps were involved in this research:

1. Conducted secondary research of a variety of estimating systems
2. Received product demonstrations of several estimating systems
3. Designed survey
4. Deployed survey - online, hard-copy, and face-to-face
5. Collected and summarized survey data
6. Analyzed survey data results
7. Formulated survey conclusions
8. Finalized research report

Before creating the survey, preliminary research of estimation systems was conducted. The research was used to populate a list of features included in estimation systems. These features were then used to form questions regarding their value, as well as the efficiency of these systems. Questions regarding workflow and demographics were added as well allowing the comparison of long-standing companies with new start-up companies.

The survey was then circulated to a few industry experts to review the overall survey flow, language, and ease of operation. All comments were taken into consideration and used to develop a final version of the survey. The survey was then conducted with various print companies. Respondents represent various positions in their respective companies; from estimating and operations, to company leadership. Following the survey all data was collected and the aggregated data was analysis analyzed. Each question was summarized and possible connections within the data were considered. The analysis was then summarized, reviewed, and published in this report.

Survey Design

This survey was designed to uncover certain needs that print service providers have in the quotation process, most specifically the ease and efficiency needed to generate a sales quotation for the customer. The survey was then used to conduct either face-to-face or teleconference interviews of print service providers to collect information in a consistent manner. Some surveys were also completed remotely by print service providers in either an online or hard-copy form.

This survey was targeted at print service providers that are currently in operation conducting business using some sort of estimating system or process. The survey was designed to include the following sections (the complete RIT Print Estimation Research Survey is in Appendix A).

Survey Design:

- Section 1: Demographic information
  Section 1 covers the specific market served by the print service provider, the number of years in operation, and distribution of revenue across pre-media, print, finishing, and other.
- Section 2: Quotation and Estimating Software
  In Section 2, the type of estimating software, time to complete and quotation, and questions regarding a variety of estimating system features are covered.
- Section 3: Workflow
  Section 3 is the workflow section, which provides survey questions regarding the specific workflow associated with processing a customer quotations from receipt of the customer request to delivery of the quote.

- Section 4: Sales Integration
  Section 4 covers the sales demographic information that was captured in this survey, including, number of sales people, time with firm, and quotation volume.

The Demographic section of the survey is used to gather information on the size and impact of the respondent's companies. This section provides a view of the diverse range of print service providers involved in the study. The Quoting and Estimation section is focused on the features and capabilities of the respondent's current estimation system, as well as what they would like to see in an ideal estimation system. It includes questions in multiple choice, multiple response form, or question presented in a Likert scale. The objective of this section is to capture the respondents view and importance of key features in an estimation system, as well as assess how well their current estimating system is performing compared to their expectations. The Workflow section is designed to hone in on the respondents view of possible inefficiencies in the estimation process workflow. This includes questions asked on a Likert scale, as well as semantic differences. The Sales Force section's intent is to see the capacity of the respondent's company, in terms of how much estimating volume is conducted in their business, and the breadth of the sales team associated with that volume.

For companies with multiple responses, results were aggregated for that company to form a single response for the firm in an effort to not skew the impact of multiple response for a single firm.

Survey Results

Demographic

The companies that participated in the study had varied time in the industry, with a median range between 31 and 50 years. The average company proportion of revenue was gained from the following categories:

11% from Pre-Media
56.4% from Print
20.8% from Finishing
12.8% from other sources.

With respect to markets served, 87.5% of respondents were engaged in promotional printing, 64.3% transactional, 50% in publishing, 42.9% in labels and packaging, and 7.1% served other markets.

What estimating system (MIS or standalone app) do you use currently to provide customer quotations?

Summary data:

There was a range of estimating systems, including Pace, Avanti, EFI, Print Smith, and Enterprise. The most popular estimation system was EFI.

How long did it take to configure (install and setup for use) your current quoting system?

Summary data:

63.9% of respondents said their current estimation system took at least a month to install and configure, and only 21.3% said it took less than a week to configure.

How long did it take to train your staff to use the estimating system?

Summary data:

Data varied significantly on this question. The spread can be seen in figure 2.

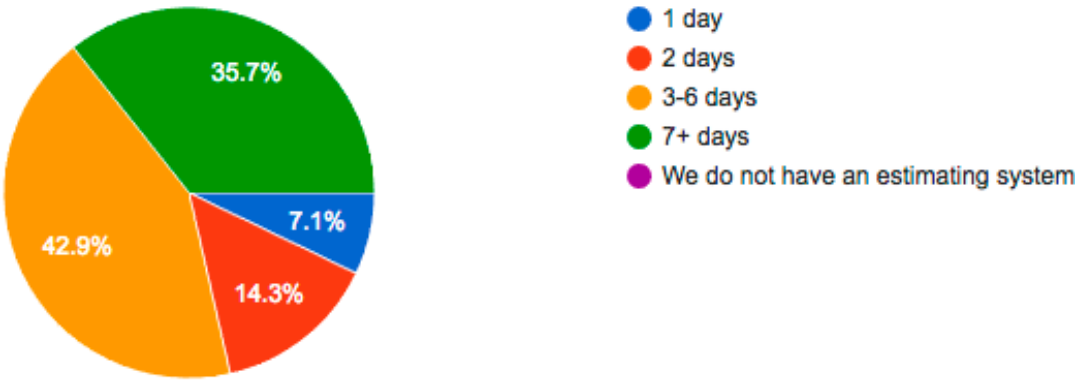

Figure 2: Pie Chart and key for estimation training time

Select all the data points needed to produce a customer quote

Summary data:

All parameters presented in this question are considered necessary to create a customer quotation, with printed dimension being the most important at 100%, pre-media, print quality requirements, and imposition/signatures being the least important at 72% yet still very significant. All other estimating parameters registered above 72% representing the importance of this refined set of estimating elements in forming a customer quotation.

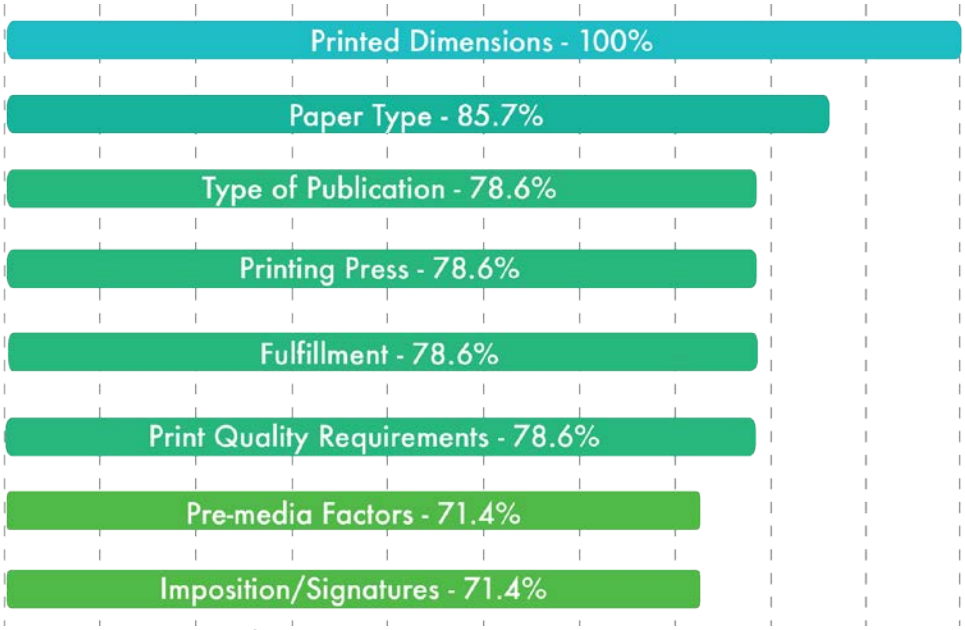

Figure 3: Distribution of data points needed to create a quote

Respondent comments:

Most respondents agreed that all of these points were useful for a quote.

How much experience is needed to create a quote using your current estimating software?

On a scale where 1 means no experience needed, and 5 is mastery, 64.3% of respondents rated the complexity to be a 3, 28.6% a 4, and 7.1% a 2.

Select all platforms you can create a quote from.

Summary data:

85.7% of respondents can generate a quote from a local computer (not 100% since there is an option to quote from any computer), 21.4% had the ability to quote from a tablet or any computer, and only 7.1% could quote from a smartphone.

Respondent comments:

The higher percentage on tablet use was due to a workaround using a VPN to remotely connect to the server in the company. Not native with the system they use.

What critical features do you require in an estimating system?

Summary data:

The rating of these data points can be seen in figure 4.

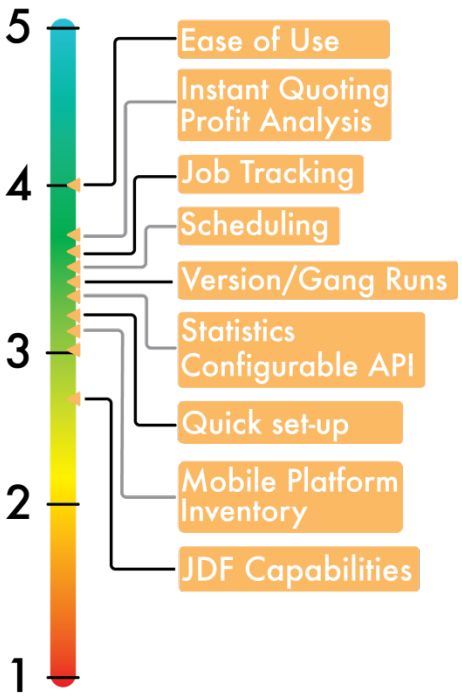

Figure 4: Distribution of critical feature rankings

Does your current estimating system provide the most optimized price based on all available printing systems?

Summary data:

42.9% of the respondents had estimation systems give them the most optimized price 57.1% did not.

Workflow

Summary data:

Below is the breakdown of the quoting process, and the time to complete each step.

Workflow Stage	Average time
Receive and respond to an RFQ	Same day
Complete and present an estimate to a customer	45 Minutes
Receive, file and create job ticket	40 Minutes
Enter prepress, preflight and proofing info	15 Minutes
Schedule and plan the job	30 Minutes

Respondent comments:

> Each company presented a range of workflow times. The company with the fastest quotation cycle-time could process an RFQ to estimate in 20 minutes, although each company required quite a bit of time to "receive and respond to an RFQ" versus the specific process of producing a quote from an estimate queue. An estimator cannot always start working on an estimate as soon as they receive the request since they typically have 5 or more estimates in the queue that they need to process in the order they were received.
>
> Other respondents talked about the difference between an RFQ transaction, and how that affected time versus a standard quotation. Respondents also mentioned that a simple, transactional quotation that doesn't require any buyouts takes very little time. Alternatively, a complex, project with multiple components requires a lot more planning and consideration, requiring much more time to generate a quote.

How integrated is your current estimating system to your live production workflow?

Summary data:

> The average integration rank was a 2.7 out of 5, with 1 being manual and 5 being completely automatic.

How complex is it to quote using your current estimating system?

Summary data:

> The average complexity was a 3.2 out of 5, with 1 being very difficult and 5 being very easy to use.

How large is your sales team?

Summary data:

The sales team size varied, with 57.1% of respondents having 5-10 members, 28.6% had less than 5 members, 7.1% had more than 20 members, and another 7.1% had 11-20 members.

How long has the majority of your sales force been with you?

Summary data:

78.6% of the respondents' sales force had 6+ years' experience, with 14.3% having between 3-5 years' experience, and 7.1% having 1-2 years.

How many customer quotes does your company produce on average in a month?

Summary data:

53.8% made between 501-1000 quotes a month, 23.1% had between 101-250, 15.4% had less than 50, and 7.7% had between 51-100.

What percentage of your total customer quotes in a given month are for new customers?

Summary data:

Respondents recorded between 10% and 25% of their quotes from new customers on average.

Survey Observations and Conclusions

The survey provided valuable insight into the critical importance of the estimating systems to the operational success of a print service provider. Firms feel that there is an opportunity for improvement in the ease of use, quotation speed, and efficiency of the estimating system to enable faster quotes. There is also a belief that a certain class of estimates (simple jobs without buyouts or multiple parts) can be conducted in real-time and empower other non-estimating individuals, such as sales and customer service staff to provide quotations to customers.

Training Requirements:
More than 75% of the service providers that participated in this study required greater than 3-days of training to appropriately train their staff to be proficient enough on their estimating system. There is an opportunity for estimating systems to be more intuitive and easier to use so that new users can easily ramp up to speed to learn how to produce a customer quotation with minimal training. Additionally, 64% of respondents required greater than mid-level skills or experience to generate a quotation. Estimating systems that are designed to be easier to use and require less training will be valuable to print service providers. Many service providers feel that their current estimating system is more complex for their employees to use than they would like it to be (3.2 out of 5 average for estimating system complexity).

Ease-of-use:
Of all the features presented for an estimating system, the most important was ease-of-use for the respondents of this study. Estimating and quotation systems that are making advances in the user experience will become more attractive to service providers.

Accessible:
Service providers are looking for fast, accessible, and easy to use systems to provide “real-time” quoting for customers. Service providers are interested in simple mobile apps that can be used to do simple quotes and “what-if” pricing analysis for different print job options. Providing a simple to use, system that can be run from a smart phone or tablet device is viewed as an important requirement by print service providers. This mobile capability can help service providers conduct business with their customers in a real-time nature, many service providers feel that if they can provide immediate quotes, they can increase their opportunity to secure the print job from other competition.

Optimized Workflow:
Print service providers are constantly looking for opportunities to reduce cost and improve operational efficiency. This is true for the estimating and customer quotation process. Service providers are interested in fast turnaround on customer quotations, such that any iterations with customers can be handled while the job specifications are being finalized. When service providers take a long time to process an estimate or iterate a change to an estimate they run the risk of competitors winning the job due to

an unacceptably slow quotation process. Service providers are highly interested in estimating and quotations systems that have the shortest cycle-time.
Estimating systems should be optimized for two specific types of quotations; standard job-print estimates, and complex RFQ's. Standard print job estimates can be further segmented into simple and complex print jobs. For simple print job, estimating systems can be streamlined and simplified such that individual in the printing firm without extensive estimating experience can easily and quickly provide a customer with a quotation in a matter of minutes for a simple print job where all cost exposure is contained within the confines the single estimate (no buy-outs). Further optimization can be achieved with the capability of a sales or customer service representative to process a "simple print job" estimate in an untethered fashion via a smart mobile phone or tablet device. This extended capability needs to also include the provision to generate a final formatted customer quote/quote letter from the mobile/tablet application as an integrated and fast method for simple print quote generation.

Estimating systems can also be expanded to accommodate to workflow barriers associated with complex print jobs, including multiple components and external buy-outs. Improvements in the request, management, and integration of third-party estimates that are included in the quotation process is key. Efficiencies in the management and integration of each modular job component as part of a multi-component print project can be more seamlessly orchestrated. In addition, future estimating systems have potential to provide optimization with a systemized RFQ workflow for the automation of information entry through completion of a detailed RFQ proposal.

Estimating systems also need to be more compliant with industry standards including out-of-the-box compliance for workflow standard like JDF (Job Definition Format). These extended workflow features can insure that the once job estimates are completed, they can easily be converted to production work orders in a manner that minimal re-entry is required. This capability allows the job estimate to be converted to a work order in a compliant format for direct use in production of other JDF compliant systems.

Appendix A

RIT Print Estimation Research

This survey is designed to see exactly where bottlenecks happen during the quoting and sales part of an order. The survey is 4 sections and should only take 10-15 minutes to complete.

* Required

1. **If you would like the results to the survey, please enter your email below.**

_____

Demographic

This section will gather info about the scale and market of your company.

2. **What is the name of your company?** *

_____

3. Do you have any affiliate companies

Leave blank if not.

_____

4. **How long has your company been in the printing industry?** *

Mark only one oval.

- Less than 5 years
- 5-10 years
- 11-30 years
- 31-50 years
- More than 50 years

5. What markets do you serve? (Select all that apply) *
Check all that apply.

- [ ] Promotional; includes advertising print such as posters, point of sale displays, direct mail, leaflets, fliers, catalogs, brochures, inserts, sundry promotional items, billboards, and outdoor signage.
- [ ] Transactional; includes bills and invoices; reminders; national and local tax demands; statements; pay slips and employment documents; pension and healthcare programs; proposals and certificates (e.g. insurance); and sundry support, and fulfillment services.
- [ ] Publishing; includes books, manuals, magazines, newspapers, and directories.
- [ ] Labels & Packaging; includes labels for beer, water, and soda bottles; food cans; commercial consumer products, from household cleaners to shampoo; flexible cartons; and corrugated boxes.
- [ ] Other: _____

To your best knowledge, how would you proportion the percentage of your total revenue adding up to 100% across the categories pre-media, print, finishing, and other sources?

6. Pre-Media

_____

7. Print

_____

8. Finishing

_____

9. Other Sources

_____

Quoting and Estimation software

This section will gather information regarding the software and manual components of the quoting process.

10. What estimating system (MIS or standalone app) do you use currently to provide customer quotations? *

Mark only one oval.

- Accura
- arifiQ
- Avanti
- Bright
- Blue
- EFI
- Enterprise
- Franklin
- Imprint
- Logic Printing
- Presswise
- Printvis
- Technique
- Tharsten
- We use a different MIS from the ones listed
- We do not have an estimating system

11. How long did it take to configure (install and set-up for use) your current quoting system?

Please answer for standalone estimating system or specifically for the estimating module of your MIS.

Mark only one oval.

- 1 day
- 2-7 days
- 8-30 days
- 1-3 months
- 3-6 months
- Over 6 months
- We do not have a quoting system

12. How long did it take to train your staff to use the estimating system?

Mark only one oval.

- 1 day
- 2 days
- 3-6 days
- 7+ days
- We do not have an estimating system

13. Select all the data points needed to produce a customer quote

Check all that apply.

- Type of publication (business card, poster, pamphlet, etc.) Pre-media factors (source files, trapping, IM, etc.)
- Printing Press
- Printed dimensions (overall print size including bleeds) Print quality requirements (e.g. offset, digital)
- Paper type (e.g. coated, uncoated, text, cover, color, texture) Fulfilment (e.g. multiple product pick--and--pack) Imposition/signatures

14. How much experience is needed to create a quote using your current estimating software?

Mark only one oval.

1 ⬭ 2 ⬭ 3 ⬭ 4 ⬭ 5 ⬭

No experience

Mastery

15. Select all the platforms you can create a quote from.

Check all that apply.

- ☐ Local computer
- ☐ Any computer
- ☐ Tablet
- ☐ Smartphone

16. What critical features do you require in an estimating system?

1 being completely unnecessary and 5 being vital

Mark only one oval per row.

	1	2	3	4	5
Ease of use					
Quick set-up					
Instant Quoting					
Mobile platform					
API available (configurable)					
JDF capabilities (JDF import, export)					
Job Tracking					
Scheduling					
Version/Gang runs					

Inventory					
Statistics					
Profit analysis					

17. Does your current estimating system provide the most optimized price based on all available printing systems?

Mark only one oval.

- Yes
- No
- I do not have an estimating system

Workflow

This section looks at the efficiency of your current quoting process.

18. How much time does it take to receive and respond to an RFQ?

_____

19. How much time does it take to complete and present an estimate to a customer?

_____

20. How much time does it take to receive, file and create a job ticket?

_____

21. How much time does it take to enter prepress, preflight and proofing information?

_____

22. How much time does it take to schedule and plan the job?

_____

23. How integrated is your current estimating system to your live production workflow?

Mark only one oval.

1	2	3	4	5
Completely manual				Completely automatic

24. How complex is it to quote using your current estimating system?

Mark only one oval.

1	2	3	4	5
Very difficult, takes a lot of training				Easy to use, intuitive design

Sales force information

This section will gather information about your current sales force scale and capability.

25. How large is your sales team?

Mark only one oval.

- Less than 5 members
- 5-10 members
- 11-20 members
- More than 20 members

26. How long has the majority of your sales force been with you?

Mark only one oval.

- Less than a year
- 1-2 years
- 3-5 years
- 6+ years

27. How many customer quotes does your company produce on average in a month?

Mark only one oval.

- ☐ Less than 50
- ☐ 51-100
- ☐ 101-250
- ☐ 250-500
- ☐ 501-1000
- ☐ 1000-2000
- ☐ 2000-5000
- ☐ More than 5000

28. What percentage of your total customer quotes in a given month are for new customers?

_____