

# A Comparative Study on Print Production Workflow Systems

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**Abstract-** The adoption of technological advancements have been a major reason for the prosperity of any business. The business world has taken good lead by adopting workflow automation in their processes. The business entities that have embraced technological changes by blending them into their processes in right manner have come out as leaders. These changes has also had an impact on the print industry. The internet popularity and adoption has been one of the reason for the decline in print industry. But at the same time lot of new possibilities have been created due to technological advancements. Print industry has adopted workflow automations for their growth and to serve customers in a much better way. The paper discusses about why small scale print providers face difficulties in adopting print workflow automations. The challenges faced by the small scale print providers (SSPP) are very different from the large scale print providers (LSPP). The proposed cloud based model 'PrettyPrint' can serve the needs of small scale print providers. The paper presents a comparative study of 'PrettyPrint' model with few other print workflow solution providers and describes how the proposed model stands better to be adopted by small scale print providers.

**Keywords –** Print Workflow Automation, Interpret Workflow Model, Small Scale Print Providers, Web-to-Print, B2B

## I. INTRODUCTION

The way the print industry operates has changed drastically because of various reasons that include advancements in technology, abundant internet access to people, changing trends and demands of people [1]. The demand for print has declined to an extent. But for the print production players who have adopted the technological changes are being able to properly understand customers' mind-set are doing well.

The internet revolution has resulted in the way traditional media and communication were used. The print industry has faced the changes as well and the three major reasons include - the digitization of the workflow, the integration of technology and as said earlier the demands are changing. The print industry has adopted automated workflow processes and the files are being electronically delivered. The print industry uses the hybrid printing concept by combining different reproduction processes because the print jobs are complex. The print production has shifted more close to the point of distribution. The print production has now shifted from being press-centric to printer-centric [2, 3].

The print industry has now adopted automation software generally known as Print Fulfillment Software for their business needs. The print fulfilment software can be considered as a process of warehousing online printing items and it is accomplished by the method of receiving orders, gathering the items for order, packaging, shipping and also confirming that the order is full. These print fulfilment software are customised and owned by specific organisations as a print production automation solution. The print service providers that are working at large scale adopt such software solutions. These software are adopted due to the changes taking place as discussed above. But there are print service providers that operate at a small scale [4]. The challenges and critical needs of small scale print providers must be focused upon. The paper focuses on the challenges of small scale print providers, their automation needs and how they can adopt automation.

## II. CHALLENGES OF SMALL SCALE PRINT PROVIDERS

The above discussion highlights the fact that the print industry is going through phase of drastic changes due to various reasons. The complete unit of printing can be set up by investing good amount of money for the required machinery. In addition the purchase of automated software solution is required. The process of printing involves three important aspects of management [14]. These aspects include -

- a) Pre-press management process
- b) Print management process

### c) Post-press management process

The print service providers working at large scale can manage all the three aspects of print. They have well established print units as they invest good amounts of money and human resources. The situation with small scale print providers is quite different. They are not in a position to manage all the three aspects of print as they do not have complete resources and investments. Generally, the small scale print provider takes the print assignment from the clients and completes the pre-press part of the print assignment. The pre-press tasks are the ones that can be completed on computers using some software and tools that can include Corel Draw, Adobe Photoshop or InDesign and many more of similar nature [15]. After the pre-press tasks is completed then the print ready job after the approval by the client is further handed over to any suitable third party print service provider to get the printing done.

The small scale print providers do not have such financial backing that they can set up expensive printing machines (e.g. Heidelberg). Therefore, they have to be dependent on large scale print providers for the print management aspect. Due to this scenario the pre-press task is completed on time as it is managed by the small scale print provider itself, but as the print management is dependent on a third party print provider so the problem of delay in job completion may exist. The delays can lead to poor satisfaction level of customers towards small scale print providers. Also, the price of getting print management tasks from third party service providers may vary depending upon the print machines setup by the third party print service providers.

### III. WHY IS 'PRETTYPRINT' PRINT PRODUCTION WORKFLOW SYSTEM MODEL NEEDED?

The fundamental concept of workflow automation systems for Print Service providers is not exactly new, the necessary groundwork exist as far back as 1998 [5, 6]. Many print service providers have adopted workflow automation systems for print. An independent study has been conducted and some of the print service providers have been considered for comparison. The print service providers that were chosen for comparison are - Brushyourideas, Printnow, Ordant, Coreprint and Rocketprint. The core objective is to evaluate and understand the business model and services being provided by them. The study will also help us understand why the Small Scale Print Providers operating in small towns and cities are still not adopting such cloud based automation solutions for their businesses.

A survey or sampling activity was conducted with reference to small scale print providers to get an insight about their present scenario with reference to the use of print automation. The survey was conducted in the form of a well designed questionnaire among 25 print providers<sup>l</sup>working on a small scale [16]. It was found that many of the small scale print providers are implementing automation for their business up to a certain extent in preparation of pre press job. Most of these small scale print providers outsourced the printing job to Large Scale Print Providers (LSPP). In the survey it was identified that 90% of them agreed that they will be benefited if the task of assigning print jobs can be automated [16]. The analysis gave a clear indication that the small scale print providers are willing to use workflow automation solutions for their businesses.

The study says that the small scale print providers (SSPPs) are willing to adopt workflow solutions but there is a question why they have not yet adopted such solutions. More information has been analysed from print providers those who were using cloud based print workflow solutions. Then it was known that all these providers have priced their product high and this is one of the reasons that discouraged small scale print providers to adopt these solutions as the SSPP have smaller market coverage with limited profit margins. The money is not the only factor for the SSPP not adopting the cloud based workflow solutions. Another reason is that the small scale print provider will require some training to effectively use these services, and many of the providers do not even provide print integration services which are another reason why some small scale print providers were not willing to adopt cloud models. Therefore, due to all such problems most of the current workflow solutions are less desirable for the small scale print providers operating in small towns or cities.

The proposed print production workflow model 'PrettyPrint' has been conceptualized with the goal to provide a blueprint for an ERP based management service for print providers [13]. The proposed system will fulfil the essential automation requirements of small scale print providers in small cities, such as clear and simple user interface, uniform quality, almost bare minimum training and print services via large scale print service providers of choice. The model will help establish a smoother relationship between LSPP and SSPP. The adoption of print workflow automation will save time, make print job outsourcing easier and most importantly increase profits in the long run for both small and large scale print service providers. The initial registration process of print providers in the proposed model has been illustrated in figure 1. The 'PrettyPrint' model has been illustrated in figure 2.

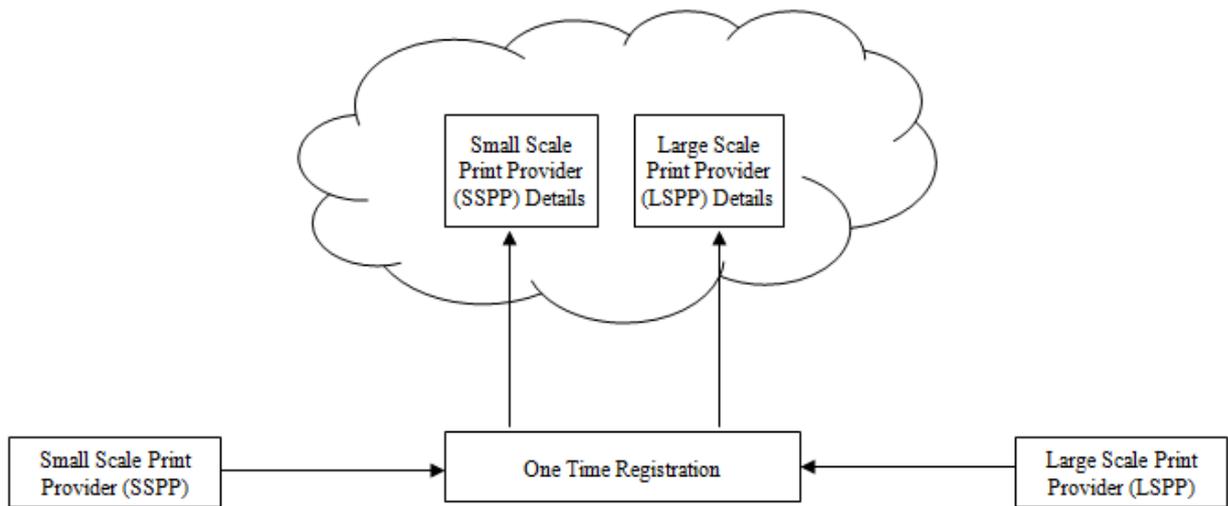


Fig 1: Initial Registration Process of Print Providers [13]

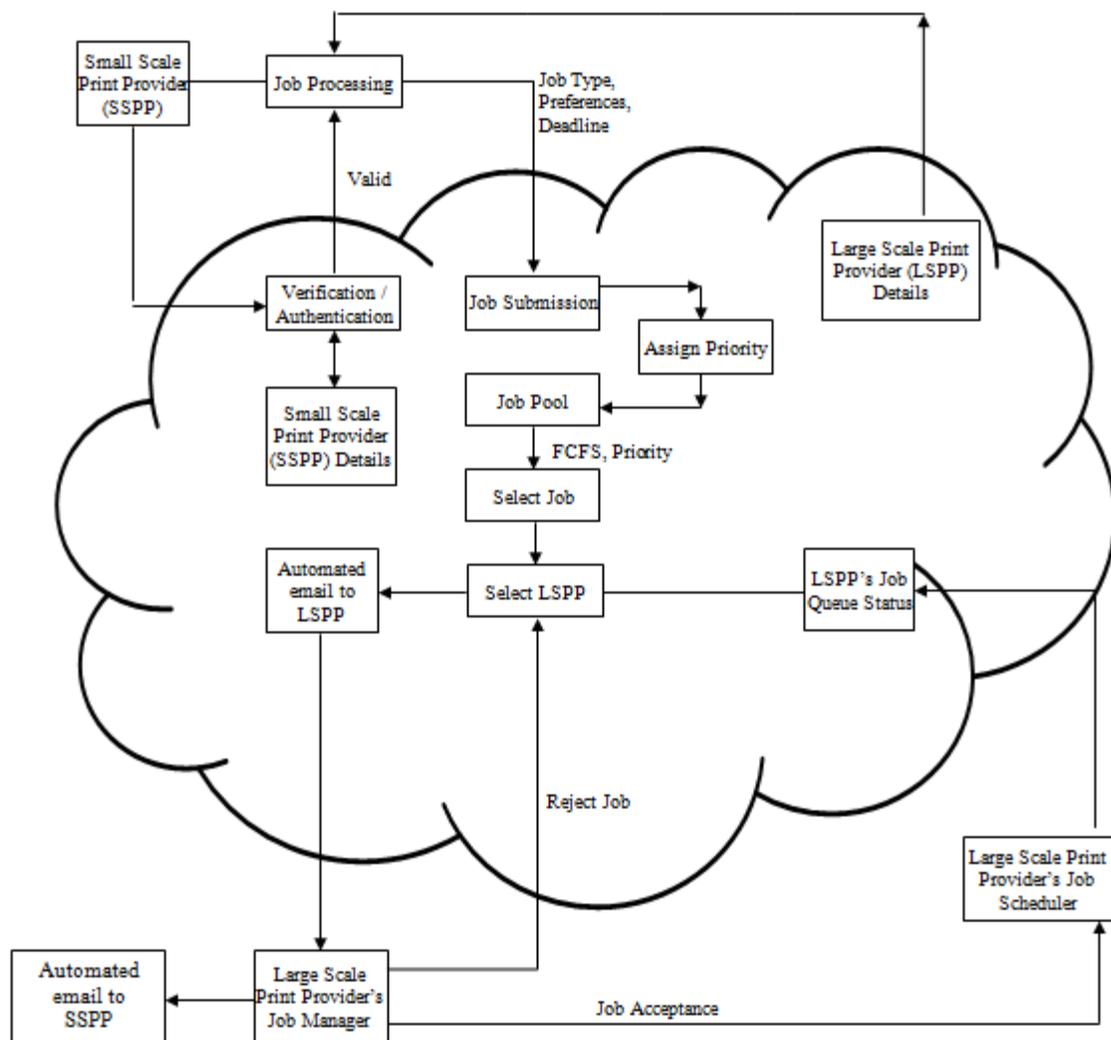


Fig 2: The proposed cloud based print workflow model - 'PrettyPrint' [13]

#### IV. RESULTS AND DISCUSSIONS

There are a number of cloud based workflow solutions in the market, as stated in previous discussions. It is therefore required to explore how the proposed 'PrettyPrint' model will stand among those solutions already operating in the market. For analysing how the proposed model stands better or not, selection of five print workflow solution providers were chosen. They are - BrushMyIdeas, Print Now, Ordant, Coreprint by Vpress and Rocketprint. These were selected for comparison as they emulate the proposed model in certain aspects [7].

On the parameter of pricing, it was observed that all the other five competitors charge between \$249 to \$600 on a monthly basis. Among these competitors, some are targeting small scale print providers. It was observed that as the price increases the services offered by these providers also get diverse. They include multiple portals, analytic tools and various resources for B2B and B2C aspects of the print providers. Whereas the 'PrettyPrint' model can offer service at a price much lower than these competitors. The service can be offered for the price between \$50 to \$60 on a monthly basis for the small scale print providers. These providers operate in small cities and towns so they only require essential services to automate some of the aspects of their business.

All the above mentioned solution providers give training to the people who choose their product. The training can be in form of simple video tutorials, documentation, webinars, In-Person as well as recurring online training over a period of time, to help users understand the features available to them once they have access to the product. These can include Digital Marketing tools, analytic tools, hosting a website, or B2C tools. For SSPPs in cities who are usually not comfortable using complex technology, excessive training becomes overwhelming and they may not be able to

utilize tools at their disposal, PrettyPrint model only provides the essential features which require bare minimum training to get started.

The survey study exercised among print providers revealed that over 90% of the print service providers wanted to have automation for assignment of print jobs [16]. But among the five solution providers only BrushMyIdeas offers print integration services. The proposed model, 'PrettyPrint' will offer the choice to get the desired quality print from the large scale print providers with the least waiting time. It will also provide clients an option to tag the large scale print provider with a flag where the small scale print provider was not satisfied in the past because the quality standard was not as expected. The 'PrettyPrint' model can also remove any such large scale print provider where multiple flags are being observed against them after proper investigation.

The table given below illustrates the comparison of 'PrettyPrint' model with five other print workflow solution providers.

Table 3.1

S.No.	Parameter	Different Print Workflow Solution Providers					
		Pretty Print (Proposed System)	Brush My Ideas[8]	Print now[9]	Ordant[10]	Coreprint by Vpress[11]	Rocketprint[12]
1	<b>Pricing</b>	Expected pricing between 50 - 60USD, only essential services will be provided so that B2B interactions between print providers can be maintained.	Starting with 249USD AND 549 USD per month	Starting with 250 USD for a simple editor.	Starting with 295USD providing payment gateway and order management.	Self-sufficient version starts from \$7,500 offering a wide variety of tools	Starts at \$289.00 per month with ERP, CRM and MIS integrations
2	<b>Scope of Use</b>	Small Scale Print Providers working in small cities	Small Print Providers working in metropolitan cities and Medium Scale providers in small cities and metropolitan cities	Small scale providers in metropolitan cities only	Small Print Providers working in metropolitan cities and Medium Scale providers in small cities and metropolitan cities	Large Scale Print Providers	Small scale providers in metropolitan cities only
3	<b>Ease of use</b>	Minimum Training Required (Demo provided at initial use would be enough, no need for excessive training)	Training Required	Training Required (Online/ Webinars)	Training Required (In Person/Online)	Training Required for effectively using the service and taking complete learning of administration features	Training available via webinars, Online and Documentation

4	Support for different portals or websites	All work can be done through same portal	Multiple portals provided	Multiple portals provided	Multiple portals provided	Multiple portals provided	Multiple portals provided
5	Print Service Integration	Yes	Yes	No	No	No	No
6	Client issues	Yes, client issues are managed	Issues can be sort through online customer support	Issue are dealt via Phone and Email Support	Issues will be dealt via Customer Help section on website	Issues will be dealt via Mail/Phone	Issues will be dealt via Mail/Phone/Online

#### V. CONCLUSION

The print industry has adopted print workflow automation in different aspects. The large scale print providers with better financial status adopted complete print workflow automation for their print businesses. But the small scale print providers operating in small towns and cities with limited resources and not so profound financial status are not able to afford print workflow solutions. Also they do not have complete print setup to perform all print related processes at their own so they are dependent on large scale print providers to get their print jobs done. This scenario makes them face various issues that can include late delivery of print job, quality issues, cost issues and the like. Due to this many times the customers of small scale print providers can get dissatisfied. The 'PrettyPrint' model as discussed in the paper will turn out to be beneficial for the small scale print providers. The model will also serve to open more business for the large scale print providers as more number of small scale print providers can easily hand over their print jobs to them.

The results of the sampling activity revealed that problems are being faced by print providers and the small scale print providers definitely requires the automation of tagging print jobs to the third parties. The adoption of the 'PrettyPrint' by small scale print providers will solve their problems to an extent. The comparison of 'PrettyPrint' model with other existing models of print workflow automation on specified parameters indicate that the proposed model stands better to be adopted specially by SSPP for their business needs, challenges and growth.

#### REFERENCES

- [1] R. Romano, "Transforming today's print business for tomorrow's marketplace - The view from 2020", (2015).
- [2] M. Riorden, "Trends in current print technologies", International metal decorators association Conference, (2004) May.
- [3] C. K. Choi, "New trends of digital printing market in Korean printing industry", 9th forum of Asian Pacific Graphic Arts Technology, (2007) June.
- [4] Print Fulfillment Software. Available at: <https://www.g2.com/categories/print-fulfillment>. Accessed: (2019) May 07.
- [5] White Paper, "Adobe PDF workflows for print production", Adobe Systems Incorporated, 345 Park Avenue, San Jose, CA 95110-2704 USA, (2001).
- [6] The Workflow Management Coalition Specification, 1996, The Workflow Reference Model, 1995, Workflow API Specification, 1995, Workflow Interoperability Specification, 1996, Process Definition Interchange Specification (draft), 1998.
- [7] Kim, Dan & Agrawal, Manish & Jayaraman, Bharat & Rao, Raghav. (2003). A comparison of B2B e-Service solution. Commun. ACM. 46. 317-324. 10.1145/953460.953516.
- [8] Brush Your Ideas. Available: <https://www.brushyourideas.com/> Accessed: (2020) May 20.
- [9] PrintNow. Available: <https://www.brushyourideas.com/> Accessed: (2020) May 25.
- [10] Ordant Print Estimating Software. Available: <https://ordant.com/> Accessed: (2020) June 05.
- [11] CorePrint by Vpress. Available: <https://www.vpress.com/coreprint-pro/> Accessed: (2020) June 10.
- [12] RocketPrint Software- Web-to-print Software for On-Demand printing and Online Quotes. Available: <http://rocketprintsoftware.com/> Accessed: (2020) June 22.

- [13] Singhal, P., Kundu, S., & Kumar, A. (2019). Print Production Workflow Systems: An Algorithmic Implementation. *International Journal of Advanced Science and Technology (IJAST)*, ISSN: 2005-4238(Print); 2207-6360 (Online), NADIA, 131, 43-50. doi: 10.33832/ijast.2019.131.05.
- [14] Singhal, Priyank & Kumar, Anil. (2017). Print production: Proposing a new cloud based print workflow model for print providers. *International Journal of Engineering Research & Technology*. ISSN: 2278-0181 Vol. 6, Issue 04, pp. 169-172.
- [15] Singhal, Priyank. (2013). An Overview of Print Industry Trends using Workflow Technologies. *International Journal of Trends in Computer Science*. ISSN: 7462 – 8452 Volume 2, Issue 11.
- [16] Singhal, Priyank & Kundu, Shakti & Kumar, Anil. (2020). An Automation Perspective of Print Production Workflow System. *International Journal of Innovative Technology and Exploring Engineering*. 9. 10.35940/ijitee.C9112.019320.