About the Center

Rochester Institute of Technology (RIT) was selected by the Alfred P. Sloan Foundation in 2001 to join the family of Sloan Industry Centers located at prestigious universities across the U.S. The Printing Industry Center at RIT is a joint program of the School of Print Media and RIT's College of Business, emphasizing Sloan's long-standing tradition of applying a broad multidisciplinary approach to industry investigations and findings.

Dedicated to the study of major business environment influences in the printing industry brought on by new technologies and societal changes, the Printing Industry Center at RIT addresses the concerns of the printing industry through educational outreach, research initiatives, and print evaluation services. The Center creates a forum for printing companies and associations worldwide to access a neutral platform for the dissemination of knowledge that can be trusted by the industry, to share ideas, and to build the partnerships needed to sustain growth and profitability in a rapidly changing market.

With the support of RIT, the Alfred P. Sloan Foundation, and our Industry Partners, it is our mission to continue to develop and articulate the knowledge necessary for the long-term economic health of the printing industry.

More information on the Printing Industry Center at RIT and its research activities can be found online at http://print.rit.edu.

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For Affiliates of the Printing Industry Center at RIT

Implementing Lean Manufacturing into Newspaper Production Operations

Lean manufacturing is a buzzword often used in the printing industry. Companies strive to be "lean," often without taking an in-depth look at what parts of their operation can truly benefit from its application. This research summary is on Implementing Lean Manufacturing into Newspaper Production Operations, a master's degree thesis prepared by RIT School of Print Media graduate student Marianne Engum.

Introduction

Newspapers are a dynamic medium, and the development of newspaper products is continuously changing. The paper has been around for centuries, but today there are a myriad of alternatives for reading the news. In addition to changes in circulation, demand for quality, volume, price, and distribution has changed considerably. The newspaper as a medium must change to meet these demands. The challenges in the market have forced an increased focus on change management, as well as more focus on processes and cost reduction (IFRA, 2006b).

Lean Manufacturing (also referred to as Lean) is a process improvement strategy to increase efficiency. It can be a first step in the right direction as a response to the problems that newspaper printers are facing in today's market. Competition and costs in the printing industry are increasing, and profits will come from lowering the costs, rather than from raising the prices (Cooper, Keith, & Macro, 2007).

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R·I·T Printing Industry Center

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Lean Manufacturing *continued*

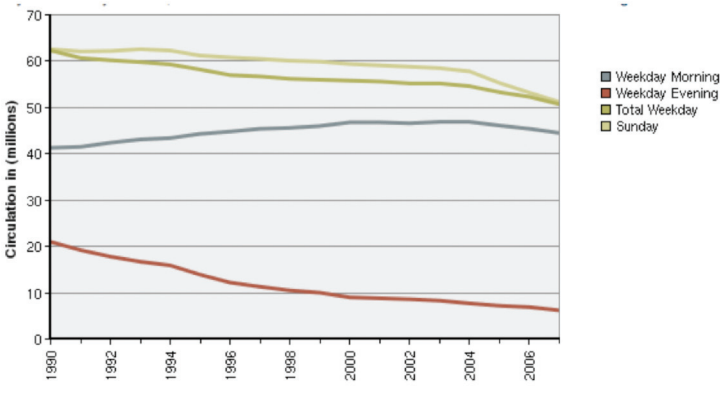
Market Overview

The industry was still profitable by the end of 2008, but the recession has threatened the weakest newspapers. However, several major newspapers have been forced to shut down within the last year (The State of the News Media, 2009). The newspaper market varies from country to country, and the readership and circulation also vary, depending on the type of newspaper. In North America, Sunday papers have the biggest circulation (see Figure 1). The growth of free newspapers has been significant in Europe, where the circulation of free dailies has grown five times from 2000 to 2007, with a total circulation of 26.5 million in 125 titles. However, data show that the number of subscribers is falling, the free newspaper is also challenging the traditional newspapers in North America, and advertising is moving to Internet services (Eskildsen, 2006). At the end of 2007, U.S. circulation was over three million in about 40 free newspapers (Mediacrit, 2007).

The amount and immediacy of information on the Internet is increasing, and more readers are turning from the printed newspaper to reading the news online. Most newspapers have begun to realize that providing electronic content online is demanded more and more by their readers (NAA, 2006). In addition to the traditional newspaper, more newspapers are beginning to maintain websites, which they finance with advertising revenues (Newspapers, 2007). The key to the future may be to build a portfolio of additional products around the core product of the traditional printed newspaper. This is feasible because one of newspaper's advantages is the ability to speak to a community as a part of the community (NAA, 2006).

The challenges faced by the newspaper industry call for a new way of thinking—all the way from the top to the bottom of the organization. The mass-media business models that built the newspapers are no longer applicable, as the mass audience is drifting away. Two main strategies have appeared in response to the challenges faced. One is to become a newspaper editorial company and outsource all the production, separating printing and publishing operations. The other solution is to expand production capability while taking a step into the commercial printing market (Sherburne, 2007). No matter what strategy a company chooses, a new business strategy requires a good business plan and market research in order to survive in a challenging industry (IFRA, 2006a).

Figure 1. U.S. Newspaper Daily Circulation (The State of the News Media, 2009)



Most newspapers' first reaction to

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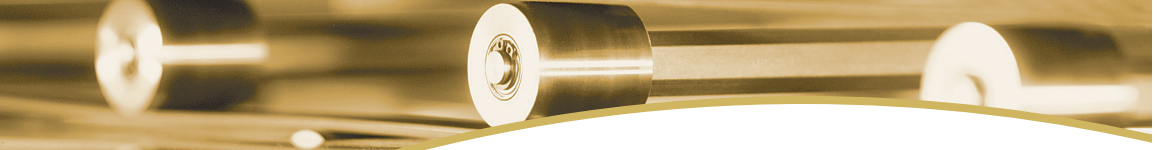
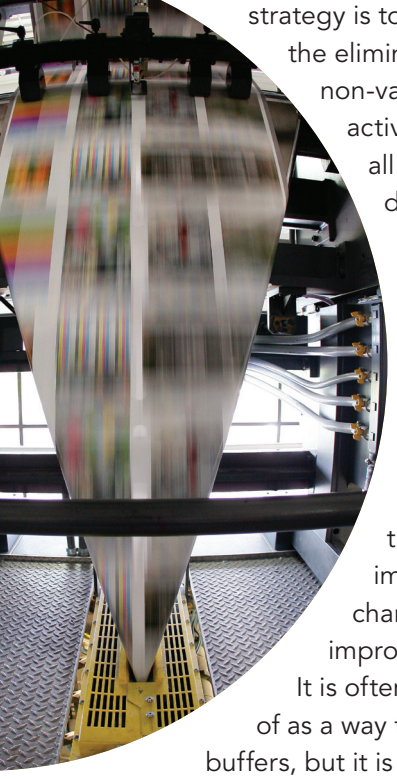


Lean Manufacturing *continued*

the challenges they face is to create new products and revenue streams, but the products that they create are still very close to the core and lean on the traditional business model (Gray, 2008). In addition, the typical approach to improve efficiency has been to cut staff and to reduce the quality of goods, while avoiding the topic of process improvements. Implementing Lean Manufacturing into the newspaper industry will help to usher in a new way of thinking.

Lean Manufacturing

Lean Manufacturing is a total enterprise strategy, which embraces the entire business model. The Lean strategy is to approach the elimination of non-value-added activities, which are all activities that do not directly increase the value of a service or product (Cost & Daly, 2003). Lean is a way of minimizing production time and implementing changes to improve efficiency. It is often thought of as a way to reduce buffers, but it is also a multifaceted approach to operate a Lean production (Cost & Rothenberg, 2004). Lean is focused on doing the right things, at the right place, and at the right time, throughout every step from product development to order fulfillment (George, 2002). Elimination of any type of waste is considered to be the heart of Lean Manufacturing. Lean thinking helps specifying processes creating value and can create ways of converting waste into value (Womack & Jones, 2003).



The principles of Lean Manufacturing have been around for decades and were pioneered by Toyota Production System in Japan in the 1960s (Womack, Jones, & Roos, 1990). The interest in Lean Manufacturing has grown significantly as global competition forces all industries, including printing, to be more proactive and to improve their processes and productivity (Rizzo, 2008). Many manufacturing industries have successfully implemented Lean Manufacturing within their processes since Toyota; over the last decade, printers also have been implementing tools and concepts based on Lean thinking (Cooper et al, 2007).

Waste in a Lean Environment

Toyota defined three broad types of waste, named *muri*, *mura* and *muda*:

- ***Muri*** is the excessive work that the managers give employees and machines due to a poor organization structure. Muri includes bad working conditions, and it will often push a resource to work harder than its natural limits. Lean focuses on the planning of processes to avoid muri.

- ***Mura*** is the variation and inconsistency in quality and volume in both products and human conditions.

- ***Muda*** is the Japanese word for waste; it specifies any human activity, which absorbs resources, but does not directly add value. The definition of muda is the variation in output.

The traditional thinking about waste found in a printing company involves makeready waste and print waste.

However, with a Lean perspective, waste from waiting, time wasted due to long changeovers, products waiting in queues (work-in-progress), waiting for stock, warehousing of finished products and raw material, downtime, mounting plates, people or equipment moving around more than required, conducting inspections, overproduction, under utilized resources, or waiting for payments are all also considered to be waste (Huskins, 2007; Cooper et al, 2007).

Change Management

When organizations implement Lean Manufacturing, one of the fundamental elements is not only to focus on the tools and the methodology, but also to include the organization's culture. In a traditional organization, there is be a downward communication flow between the management decisions and the implementation of those decisions by the employees. In a Lean organization, managers encourage a flow of information in all directions, and there is a focus on cross-functional training. To make an organization Lean, it is not enough to implement it in manufacturing; there must be a total integration in all aspects. The management must make a complete commitment to the continuous development of all employees (Cooper et al, 2007; Womack et al, 1990).

Implementing Lean means instituting changes across the whole organization, and change management is therefore a critical part of the implementation. Fear of change is particularly true in the printing industry; it may be a major constraint preventing a Lean success (Cooper et al, 2007; Stevenson, 2007).

Lean Manufacturing in the Newspaper Industry

Lean Manufacturing has often been thought of as only applicable to manufacturing industries, but as Jones and Womack said in their first literature about Lean, it is applicable to any industry. Over the last decade, more and more printers have been introduced to, and have implemented elements from, Lean Manufacturing (Cooper et al, 2007). Lean Manufacturing can help printing companies to do more with less and to lower their costs by reducing the number of non-value-added activities. Printers implementing Lean are often bringing tools into both office and print operations (Celebrating Excellence in Lean, 2007).

Lean implemented in a newspaper printer can make the operations more efficient and cost-effective, in addition to changing the focus to look for answers and improvements (Brady, 2008). According to Michael Brady, formally with the Newspaper Association of America, three of the main benefits for a newspaper printer to implement Lean Manufacturing into their operations are:

- Outsourcing of functions for increased efficiency and cost reduction, and better customer service

- Reduction in the geographic area of distribution, resulting in reduced newsprint and transportation cost, allowing more targeted focus on the core audience

- Use of common operational systems to optimize communication between departments

Some newspapers in United States have already been successful in implementing Lean. The Milwaukee Journal Sentinel has used Lean Manufacturing and Six Sigma to achieve ISO 9000 certification.

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Lean Manufacturing *continued*

The Wall Street Journal has used Six Sigma to identify problems, to analyze causes of problems, and to determine customer preferences (Columbia, 2007). Southernprint is one printing company that successfully managed to implement Lean Manufacturing; it obtained a better working environment and a significant improvement in reducing overruns (Thinking and Acting Lean, 2000). Another example of a newspaper company that has successfully implemented Lean is North Jersey Media Group (NJMG).

NJMG, a newspaper publishing company, has implemented Lean into their non-manufacturing environment.

With this implementation, they managed to save more than $0.5 million in 2004. As with other players in the industry, they were facing challenges with declining circulation, a drop in advertising revenues, and the need to manage the costs of production. The managers at NJMG realized they had to do something, and they wanted to have all of their employees involved in the process.

NJMG started with process mapping, 5S, planning of a Kaizen event, and identifying other operational improvements. One of their main objectives was to improve the newspaper's on-time delivery, and they used a cross-functional team to prepare a map of all the activities involved in getting a newspaper out efficiently. A better process helped them to improve their on-time delivery from 92% to 98%, compared to an industry average of 89%. In addition to this, they saw a significant increase in available plant space, improvements in efficiency, and faster response times to customers' needs (Keeping the Presses Rolling, n.d.).

Research Objectives

This research project sought to determine the level of knowledge of lean manufacturing within the newspaper printing industry, as well as to identify the benefits of implementation. The scope of this research was global in nature, with a focus on newspapers in North America. The printing operations, distribution, and management of these newspaper printers were all studied.

Specific research objectives were as follows:

1. Identify the general knowledge of Lean Manufacturing within the newspaper industry.

2. Identify areas where newspaper printers can reduce or eliminate waste by implementing the principles of Lean Manufacturing.

3. Explore the best approaches for implementation of Lean Manufacturing principles at a newspaper printer.

Methodology

Survey Design

The first section of the survey was designed to obtain information about the newspaper's demographics, circulation, and parent organizations. The second section aimed to find the most important trends in the industry, the respondents' knowledge about Lean, and whether or not the company has received Lean training. In the last question of this section, the survey took the respondents in one of three different directions, depending on their level of Lean implementation using the "skip logic" provided by the online survey hosting tool.

Data Collection

The data for this research was collected from an online survey. An American trade publication, Newspapers and Technology, posted a link to the survey in their "Dateline" publication, which was sent out on Mondays during January 5 to February 16, 2009. The same journal also had a short description of the research and a link to the survey in their printed February 2009 edition. The survey was also sent out by e-mail to every newspaper printer in Norway with help from Bjørn Wisted of Papirkjøp AS, which is owned by the Norwegian Media Businesses' Association. EW Scripps, one of the major newspaper companies in the US, sent the survey out to all of their newspaper printers in the US.

The final number of respondents was 69. However, only 51 respondents completed the entire survey. Five of the 69 respondents had to be excluded due to incomplete information and redundancy (two respondents from the same company).

Based on the results, the respondents were divided into three groups for further analysis: those who have implemented Lean in their production (Group 1), those who have plans for implementation within 2-3 years (Group 2), and those who have no plans for implementation (Group 3). Two participants from each of the three groups were then chosen to be a part of a more in-depth study. The purpose of the in-depth studies was to compare the utilization and management of newspaper printers with and without some implementation of Lean Manufacturing tools. (The in-depth studies are not included in this summary. To read the full thesis, please visit the RIT Digital Media Library.)

Research Findings

Demographics

Table 1 shows where the companies are located. The majority of the respondents were from the United States, Norway and Canada. Of the 64 respondents, 61 gave their circulation data, which is shown in Table 2.

Table 1. Location of Companies

Country	Respondents	Percentage
USA	40	62.5%
Norway	12	18.75%
Canada	6	9.38%
India	1	1.56%
Russia	1	1.56%
Venezuela	1	1.56%
Argentina	1	1.56%
Colombia	1	1.56%
UK	1	1.56%
Total	64	100%

Table 2. Circulation Data

Circulation	Respondents	Percentage
< 10,000	5	8.2%
10 - 50,000	20	32.8%
50 - 150,000	17	27.9%
> 150,000	19	31.1%
Total	61	100%

Trends in Newspaper Operations

Respondents were asked what they considered to be the most important trends in newspaper production operations today. The responses are

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Lean Manufacturing *continued*

shown in Figure 2, and are arranged by ranking. The question used a four-point scale, with 4 as "Extremely Important" and 1 as "Not Very Important." Respondents were also able to provide alternative answers, which included strategic analysis of overall processes, cross-training staff to perform multiple functions, revenue, and long-term strategies within decision processes for the future as being other important trends.

Lean Manufacturing

Respondents were asked about their company's knowledge of lean manufacturing concepts, the amount of training their company had received on Lean, and if Lean has been implemented in any locations that the company owns. Based on the results, the respondents were then divided into three groups for further analysis as described previously. Group 1 had 8 respondents, Group 2 had 17 respondents, and Group 3 had 26 respondents.

Tabular responses from these groups are not shown here, but comparisons of their responses are discussed in the next section. (To read the full thesis, please visit the RIT Digital Media Library.)

Discussion of Research Findings

Knowledge of Lean Manufacturing in Newspaper Production Operations

The first objective of this research was to determine the general level of knowledge of Lean Manufacturing within newspaper production operations. Many newspaper printers are somewhat familiar with the Lean concepts, but many are not aware of its advantages and do not see how it could improve their organization.

From a total of 64 respondents, 48.44% have no plans for Lean implementation, while 17.19% have implemented some degree of Lean Manufacturing into their production operations. In addition, 28.1% are familiar with Lean Manufacturing, 50% are somewhat familiar, and 21.9% have no knowledge about Lean Manufacturing. An illustration of the level of knowledge correlated to the level of implementation is shown in Figure 3.

Although it seems that there is a fairly high level of knowledge of Lean concepts, only 17.2% have actually implemented some degree of Lean Manufacturing in their operations. The assumption can be made that potential respondents with no knowledge of Lean concepts may have chosen not to complete the survey. If this assumption is correct, then the level of newspaper printers with Lean applied to their operations can be expected to be lower than 17.2%.

The respondents were asked to rate the importance of Lean Manufacturing on a five-point scale from "Very high" (5) to "Very low" (1). Groups 1 and 2 had a much higher rating average than Group 3, as shown in Figure 4. It is clear that Lean organizations rate its importance more highly than organizations without Lean. This indicates that newspaper printers with no plans for Lean implementation may not be aware of the advantages of Lean Manufacturing and how Lean principles can help their organizations.

Lack of Knowledge as an Obstacle for Implementation

Lean companies (Group 1) rated "Lack of knowledge and implementation know-how" as their biggest challenge with Lean implementation. However, their average rating is still lower than that of the other groups for this challenge. This indicates that the

Figure 2. Trends in the Industry

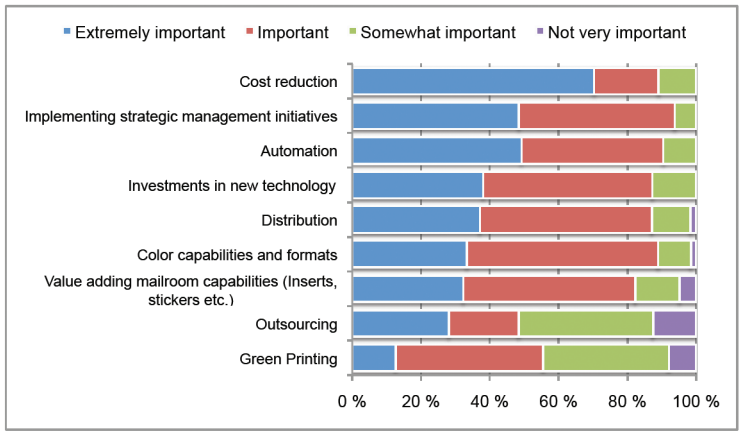


Figure 3. Knowledge of Lean Manufacturing and Level of Implementation

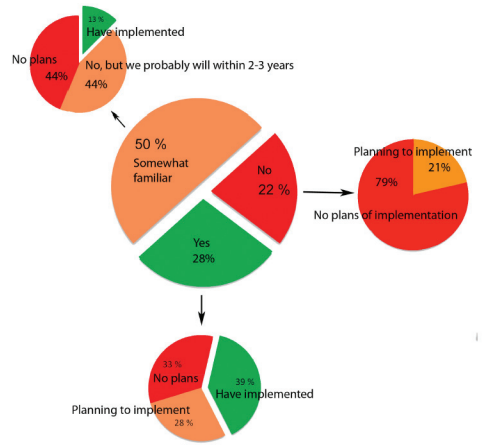


Figure 4. Importance of Lean for Future Success

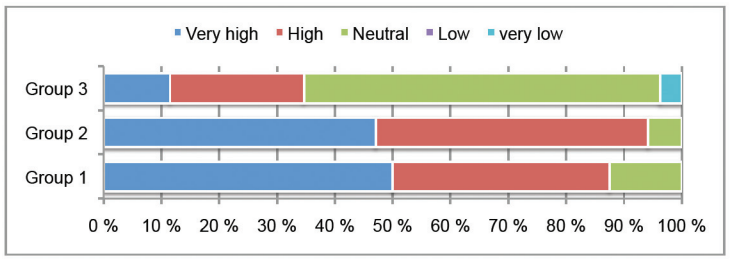
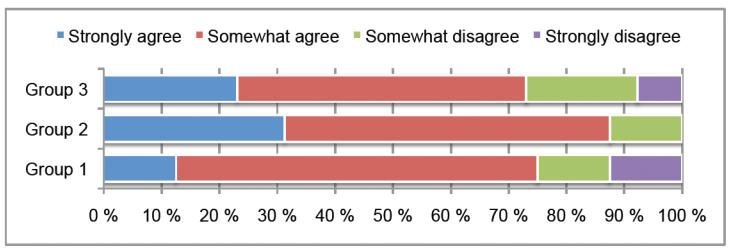


Figure 5. Lack of Knowledge Being an Obstacle for Implementation



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Lean Manufacturing *continued*

challenges with implementation might not be as significant as newspaper printers fear before they start the implementation process.

Areas where Newspaper Printers Can Reduce Waste with Lean

When discussing waste reduction, it is essential to remember how waste in Lean thinking is specified as any human activity that absorbs resources, but does not directly add value. Waste is not only the traditional print waste, but also waste from waiting, time wasted due to long changeovers, work-in-progress, warehousing, downtime, people moving around, under-utilized resources, or waiting for payments (Huskins, 2007; Cooper, Keith, & Macro, 2007).

Of the newspaper printers who have implemented Lean (Group 1), 75% "strongly agree" that "decline in non-value added activities and reduced waste," as well as "Change in culture within the organization" have been major benefits with implementation. 62.5% also "strongly agree", and 25% "somewhat agree" that they have had a significant reduction in costs, which may be a direct result of waste reduction. When the respondents were asked to rate the four listed benefits, "Elimination of non-value work" was rated the highest by 57% of the respondents. The average ratings are:

- Eliminated non-value work (3.29/4)
- Increased customer satisfaction (2.75/4)
- Reduced inventory (2.14/4)
- Reduced changeover time (1.67/4)

These results show that most of the newspaper printers who have implemented some degree of Lean into their operations have experienced a reduction in or elimination of non-value added work, and therefore, a reduction in waste.

Implementing Lean Manufacturing

No matter the approach for Lean implementation, it is extremely important to have a clear vision of what you want your business to become. Training is a number one key word, together with engaging and focusing on people (Ginn and Finn 2006; Cooper et al, 2007; Hall, 2009; Ambor, 2009). Regardless of the path of implementation, if tools are implemented without corresponding changes in management style, the benefits gained will not be continuous. The management needs to spend as much time in enforcing cultural changes as it does on implementing the actual tools. Being successful with Lean requires dedicated senior-level leadership (Markey, 2009).

It is important to know that implementing Lean is not something that a company does once; it is an ongoing process. Even Toyota, which has been working on Lean for decades, still does not consider itself to be Lean enough. It is all about the mind-set. It is not rocket science, but a change in the way of thinking.

Before any newspaper printer decides to implement Lean, a comprehensive evaluation of the current state of production processes and operations needs to be done. This will include evaluations of the capabilities of today's equipment, process performance, and the effectiveness of methods used. Figure 6 shows the areas where Lean concepts have been applied among companies who have implemented Lean (Group 1).

Challenges with Lean Implementation

Table 3 shows how the three groups

Book It: RIT Hosts Future of Reading June 9-12

Renowned speakers include author Margaret Atwood and 'Wired' magazine's Chris Anderson

What happened to reading while we weren't looking?

Gone are the good old days of Dick and Jane readers with dog-eared pages; now we have those "aha" moments with a Next Page click on the Amazon Kindle.

The art of reading in flux is the focus of The Future of Reading Symposium, a three-day event to be held from June 9-12 across the university campus at Rochester Institute of Technology. The conference is co-sponsored by RIT's School of Print Media and RIT Cary Graphic Arts Press, and will feature presentations by experts on three central themes: Reading and Writing, Media and Technology, and Science and Art of Literacy.

Information is available at **http://futureofreading.cias.rit.edu/** and the full conference registration cost is $295 and includes several meals and special events. A reduced full-time student rate of $150 is also available with proof of student status.

Kicking off the event is a giant of modern literature, Margaret Atwood, the Booker Prize-winning author of *The Handmaid's Tale* and *The Blind Assassin*. Based out of Toronto, Atwood has written more than 40 books that have been translated into more than 30 languages—including novels such as *Alias Grace*, *Life Before Man*, and 2008's *Moral Disorder*.

The Future of Reading also welcomes keynote speaker Chris Anderson, editor-in-chief of *Wired* magazine. Anderson's newest book, *Free: The Past and Future of a Radical Price*, has generated incredible insight, buzz and debate over the concept of "freeconomics"—what business models look like when free has emerged as a full-fledged economy.

"RIT faculty and students are conducting research on the experience of reading in print versus the screen," says Patricia Sorce, professor and administrative chair of RIT's School of Print Media. "The conference and the renowned speakers will provide a forum for interaction among participants to discuss whether the newer platforms deliver an enhanced reading experience or whether they detract from the enjoyment of reading and interfere with the comprehension of content."

The Future of Reading Symposium is expected to attract 500 national and international participants in the fields of publishing, graphic design and typography, digital humanities, library science and media technology.

For more information, contact Lisa DeRomanis, RIT School of Print Media at (585) 475-2728 or ljdppr@rit.edu or Amelia Hugill-Fontanel, assistant curator, Cary Graphic Arts Collection, at (585) 475-4213 or ritread@rit.edu.

Visit the symposium website at futureofreading.cias.rit.edu to see a full program and list of presenters.

Lean Manufacturing *continued*

rated the listed challenges; the gray area illustrates the highest rating average from each category. The challenges were rated on a four-point scale, with 4 representing "Strongly Agree" and 1 representing "Strongly Disagree." Averages below 2 suggest that the majority disagrees that the challenge listed is important.

Conclusion

Major changes are occurring in the newspaper industry. Newspapers are going out of business, moving to online-only publications, reducing their publications from dailies to weeklies, cutting staff, or paying their employees less. Since January 2008, at least 120 newspapers in the U.S have shut down (Chen, 2009).

To be able to survive in this market, the newspaper industry must learn from other industries how to be cost-effective. The typical measures implemented to handle the challenges have been budget reductions, layoffs, buyouts, and reductions in the number of pages as well as page size. In general, much of the cost cutting has been exercised on the printed product itself, instead of focusing on making the production more efficient.

Making the product less attractive will result in less satisfied readers. Newspaper printers should be adding value to the reader, not reducing the value. It might become necessary to look at other kinds of production equipment in order to gain the ability to produce semi-commercial products. Newspapers that embrace this spirit of innovation can print new formats, improve quality, and also work with other substrates.

Figure 6. Areas with Lean Implementation in Group 1 Companies

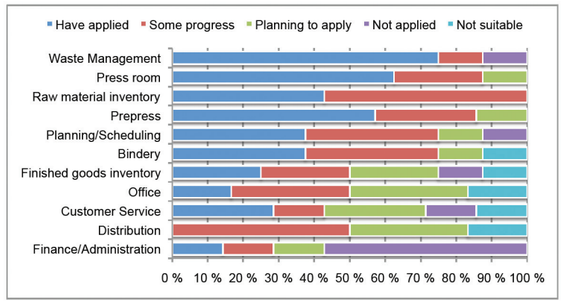

Table 3. Average Ratings of Challenges in All Groups

Answer Options	Group 1	Group 2	Group 3
Financial constraints	2.13	**3.13**	2.77
Backsliding to the old way of working	2.00	**2.93**	2.38
Employee resistance to change	2.50	**3.25**	2.46
Involvement in other projects	2.25	**2.93**	2.92
Lack of training/Cost of training	2.63	**3.19**	3.00
Lack of knowledge and implementation know-how	2.75	**3.19**	2.88
Lack of resources	2.38	2.69	**2.96**
Lack of management commitment	2.38	**2.56**	2.42
No clear benefits/hard to apply in this industry	1.88	2.06	**2.35**

Overall, the industry needs to focus on utilization. Process improvement methodologies such as Lean are proven to help increase profit margins, and can transform organizations to better utilize their resources. Lean organizations can strengthen their competitive position with better utilization of their resources. A systematic approach for implementing Lean needs to be adopted, and training needs to be enforced.

Even in the current economic situation, Lean newspapers have been able to maintain acceptable profit levels, and improved cost controls will enable them to stay well positioned in the marketplace.

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