Competitiveness, Innovation, and Sustainability

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Introduction

In 2010 the Center for Integrated Manufacturing Studies (CIMS) at the Rochester Institute of Technology (RIT) began a collaboration with the New York State Energy Research and Development Authority (NYSERDA), RadTech-The UV & EB Technology Association, and the New York State Pollution Prevention Institute (NYSP2I). Together, they set out to understand the competitive state of the commercial printing industry in New York and to what extent the industry has faced—or is currently facing—challenges and finding opportunities associated with energy usage, environmental impacts, and adopting sustainability as a business strategy.

The study found that the future competitiveness of the printing industry in New York State and throughout the U.S. is being influenced by shifting customer preferences and new technology, while the traditional pillars of price, quality, and performance continue to remain fundamental market expectations. Many commercial printers report they are being influenced by, and are taking action toward, differentiating themselves in highly competitive markets through innovation and sustainability. While some printers remain skeptical of this model, others are fully embracing and adopting elements of this strategy. Commercial printers choosing to compete on sustainability as an innovation strategy are finding new revenue, strengthened reputation, and reduced business risk.

The Influencing Factors

The two key factors influencing the commercial printing industry are **Shifting Customer Preferences** and **New Technology.** However, markets have begun to expect sustainability as a product and service attribute of commercial printing. Sixty-five percent of the study participants responded that their customers have shown interest in sustainability, and the same respondents note that customers have influenced their business as it pertains to adopting sustainable practices.

Commercial printers are closely following the evolution of digital print technologies and service models and how this will impact their future business. Nearly 60% of the study respondents reported that they are planning to purchase new digital printing technologies in the next five years. Additionally, the study revealed the average age of printing equipment in New York State is approximately 12.8 years old. The majority of printers use Heidelberg-branded equipment with an average age of 18 years old. Some printers have legacy equipment more than 60 years old. Nearly 50% stated they plan to purchase new offset printing technology in the next five years.

Sustainability as the Business Strategy

As a result of the influencing factors outlined, especially shifting customer preferences, commercial printers are much more aware of their environmental footprint and the concept of sustainability. Some printers have explicit policies, defining what it means to their enterprise and their customers. All study respondents affirmed their company has an existing recycling policy, while nearly 40% stated they have an active sustainability policy in place.

Thus, sustainability as a core business and customer value is entering the mainstream of business strategy, in addition to traditional business metrics. In fact, some commercial printers are differentiating themselves and competing on the "sustainable performance" characteristics of their operations, products, and service. This was substantiated by study respondents, 62% of which are considering or have implemented waste reduction programs, 54% are considering or have implemented Lean manufacturing techniques, and 46% are considering or have implemented volatile organic compound (VOC) reduction technologies.

Printers believe sustainability opens a new dimension to traditional corporate strategies and can provide new access to markets, opportunities for product and service differentiation, reduction in business risks, enhancement to reputation, and growth in revenue.

For the Printers Considering Sustainability

For printing companies that are still considering or evaluating the benefits of formally adopting sustainable practices as part of their business development strategy, here are some guidelines for consideration:

Monitor the digital movement and impact on industry energy consumption. The impact of technology shifts, such as the migration toward digital printing, on the energy footprint requires better understanding. The transition could result in increased printing industry demand for electricity and may require more information and options for reducing demand or enabling energy efficiency at their facilities to reduce costs and lower use.

Address aging equipment in the context of energy and sustainability. It would be useful to better assess and understand the relationship between the age of printing equipment and energy use. Should energy use be significantly greater for older printing equipment, it is recommended that all stakeholders identify options to collaborate and partner in the creation of sector-specific energy innovation programs. Based upon the history and success of other energy benefits programs, such as those administered by NYSERDA, an industry-specific energy innovation program could be the catalyst which supports the industry's migration toward lower-energy consumptive equipment, resulting in a reduced energy footprint.

Recommendations for the Printing Industry Ecosystem

The printing companies that participated in the study noted many customers are looking for "more sustainable, lower environmental footprint" products and services. They believe there is an opportunity to differentiate their businesses and compete on price, performance, quality, and sustainability. For example, food packaging printers noted their customers are looking for labels that use less material, less ink, and create less waste. Others are looking into the use of biodegradable papers and inks. However they are limited by the availability of knowledge/information, capital/investment, people/resources, and standards/specifications.

Recommendations for the entire printing industry ecosystem include:

Assess options for incentivizing the industry to reduce energy demand and enhance sustainability and competitiveness. Industry participants of this study reported they intend to buy new capital equipment in the next one to five years. This is a positive sign from the industry that it intends to make investments to remain competitive, efficient, and in-touch with customer needs and requirements. There are opportunities, however, to enable the industry to finance capital improvements in facilities, processes, and equipment selection that can lead to energy demand reductions, greater productivity, and less waste. Printers have expressed a need for many financial instruments, incentives, or programs that can enable them to do business more competitively, particularly in comparison to some of the business costs in other countries.

Printers expressed interest in programs to help with (1) energy costs (such as the New York Power Authority [NYPA] "Power-for-Jobs" program or printing-industry-specific funding by agencies such NYSERDA), (2) investment tax credits, (3) programs that enable the financing of capital equipment or facilities at lower rates, and (4) programs that pay upfront capital costs of new equipment or efforts to modernize their facilities. Most printers recognized there are many local/regional/state programs in place that do help with these needs and were thankful for them. The general feedback was that more targeted, industry-specific programming could help them better manage business costs and remain competitive.

Centralized knowledge creation and transfer. The topic of sustainability is gaining ground and advancing as a business concept throughout many industrial sectors. Printers have expressed a need

for more education, training, and technology transfer to help them remain competitive and stay abreast of new technology, Lean practices, energy efficiency, management practices, codes, regulations, and general business practices.

The printing industry can benefit from a centralized knowledge resource that can serve as a clearinghouse of data, information, analysis, resources, and knowledge networks to enable the industry to assess information on best practices in printing technologies, processes, and supply chain (paper, consumables, substrates, etc.) that address energy, environmental, and sustainability issues. There are numerous organizations already serving the industry that can, with additional support, provide this value-added resource.

Sustainable technology evaluation, test-beds, and technology transfer. There currently is not enough data and information available to help printers assess technology from the perspective of sustainable production. Printers place high value on cost and performance (specifically, equipment speed and quality). Metrics such as these, when aligned with print technologies that use less energy and have a smaller environmental footprint, will enable printers to make more informed decisions on capital equipment upgrades in the context of sustainability.

There is a need to assess the productivity, energy, environmental, and economic impacts of new technologies. For example, as some printers transition toward digital technology, there is a need to evaluate the printing technology in the context of the aforementioned categories. In addition, data and information on the entire life cycle (including manufacture and end-of-life scenario) of existing and new print technologies will be useful to assess and compare. This will provide the industry with information that can support capital purchasing decisions against sustainability criteria. It is recommended that industry, government, and research institutions collaborate to define the sustainability metrics, performance requirements, and test methods for assessing life-cycle and specific-use phase impacts of existing and new print technologies.

The printing industry is undergoing a fundamental shift to digital printing technologies. There remain numerous additional printing applications and processes that will have an impact on the future of the industry. There are new materials and substrates, new bio-based inks, ultraviolet (UV) and electron beam (EB) technologies, and a wide-variety of supplies that can have a positive impact on the industry for cost reductions, productivity and quality enhancement, energy reduction, waste, and water reduction. Printers have expressed a need for understanding better (more efficient and effective) facility designs that are flexible, yet enhance productivity and optimization of resources, including energy, people, and space.

The printing industry would benefit from independent testing and validation of many such technologies, so the risk of adopting any of these technologies into operations can be minimized. Universities and applied research organizations can serve a unique role in fostering innovation, testing, and validating technology. These agencies can directly or indirectly work with technology transfer organizations that disseminate knowledge and technology throughout the printing industry so all printers have access to the state-of-the-art.

Conclusion

The commercial printing industry ecosystem includes government agencies, trade organizations, paper and consumable suppliers/vendors, customers, OEMs, applied technology and research organizations, academic institutions, and other stakeholders. To achieve a more sustainable future will require collaboration, interaction, and support among all ecosystem stakeholders.

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About the Study

The full report of the study can be found at:
(http://www.rit.edu/affiliate/nysp2i/publications)

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- Center for Integrated Manufacturing Studies (CIMS) at Rochester Institute of Technology (RIT). (http://www.cims.rit.edu/)
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