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A Literature Perspective on Mill Locations in North-America and EU

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Historically the paper industry located its operations in areas that economized on one or more major inputs (e.g. fiber, water). In an early study that covered Swedish paper and pulp mills transportation costs for 1830-1939, Lindberg (1953) found that distance to raw materials mattered less than distance to product delivery and/or export markets. However, once located access to resources or markets would not guarantee success. Barr and Fairbairn (1974) interviewed managers in a number of newly established mills in western Canada in the 1960's and concluded that corporate behavior determines a newly located mill's success and viability. Building upon Barr and Fairbairn's work, Hayter (1978) interviewed mill managers over the same geographic area and time period and concluded that executives' decision criteria are: (1) selecting a forest-rich region; (2) identify a number of viable sites that economize on input and output shipment costs; and (3) compare and selecting the site/s. Hayter's study concluded that at the regional level corporate decision-making capitalized around cost factors – timber accessibility, quality, species mix and tenurial conditions; cost of adequate power, supply of fresh water for processing, suitable waterways for effluent disposal and minimal effect of air pollution on residential areas, and availability of housing or provision for building new housing.

In her extensive survey of regional composition and shifts of the U.S. papermakers during 1880-1940, Hunter (1955) points out that papermaking technology itself played the principal role in directing papermakers' locational choices. High capital costs rendered the industry more reluctant to rapidly relocate its operations in response to the introduction of wood pulp kraft process and fluctuating stocks of pulpwood.

Kraft pulping and uncertain pulpwood stocks put increasing pressures on mills to relocate, initially from urban to rural areas with bigger forests, and then to even more rural locales rich with self-replenishing forest stands. This reluctance to relocate quickly resulted in continuously increasing scale of production and vertical integration which internalized many procurement costs. Greater responsiveness to market and geographic cost conditions was found among producers of standardized paper-grades (namely newsprint and wrapping papers). Hunter's analysis suggested that the pulp and paper industry (and other highly capital-intensive industries) can take 40-50 years to adequately respond to location pressures and even then sunk costs tend to dictate many of the choices available to paper managers.

More recent research utilizes a variety of statistical techniques to analyze papermakers' location choices. Gray and Shadbegian (1998) studied the impact of environmental regulations across different states on new plant location decisions of the U.S. paper companies over 1972-1990. The authors analyzed the location choices by specific types of pulping technologies installed at new mills as well as annual investment spending at existing mills. The study concluded that mills choosing to locate in states with stricter environmental regulations installed cleaner technology. In a subsequent study, Gray and Shadbegian (2002) focused on the impact that environmental regulations have on the pulp and paper firms' decisions to re-allocate productive capacity across states. Using Census' Longitudinal Research Database for 1967-2002 they found that firms allocated smaller shares of production to states with stricter environmental regulations.

Shifting attention to the geography of the EU paper markets, Lundmark (2001) analyzed the importance of wastepaper as a raw material for industry location

decisions. Covering 16 European countries from 1985-1995, the study found that the local market size and the size of the paper sector were important factors explaining location. However, the study also found that increasing importance of wastepaper may have contributed to a structural locational shift/movement of paper companies from forest-endowed areas to regions with high levels of aggregate paper consumption and effective paper recycling programs.

In a related study, Lundmark and Nilsson (2001) investigated the importance of recovery paper infrastructure and other cost and demand factors in newsprint's investment location decisions, a standardized sector of the industry. The authors regress country-specific newsprint investment project counts against four cost factors: tonnage of wastepaper recovered, standing volume of forest, electricity price, and wage; two demand factors: per capita GDP and paper consumption; and income tax for 13 Western European countries over 1985-1995. The two raw material factors and energy input prices were found to be positive and significant indicating that Western European newsprint industry is resource-oriented while wages were found insignificant. Demand variables were also found to be insignificant. The findings suggest that more standardized grades (such as newsprint and wrapping papers) respond differently to changes in cost and market conditions.

Bergman and Johansson (2002) confirmed these results by demonstrating that the most important determinants of pulp and paper firms' decisions to locate their investments in pulp and paper capacity in 15 European countries over 1988-1997 were wage rates, already installed production capacity, price of the final product and the USD/EUR (European Currency Unit) exchange rate.

Finally, Lundmark (2003) analyzed three continuous location investment models for the pulp and paper industry in 10 European countries over 1978-1995. The results indicated that wages, the long-run wastepaper availability, market size and agglomeration economies have the strongest impact on papermakers' investment decisions, while prices for raw materials exhibited, at best, ambiguous effects. The author concluded that the choice of country to invest was related to time-specific effects that potentially could stem from market cyclicity, introduction of new technologies, and/or adjustments in competition

patterns due to changes in regional and common policies.

Thus, from this literature, pulp and paper is a highly capital-intensive industry that has not quickly adapted to changes in regional markets (Hunter, 1955). Proximity to forest stands, rivers, and transportation links (Lindberg, 1953; Barr and Fairbairn, 1974; Hayter, 1978) are important prerequisites for the initial plant location choices. However, once sited, regional fluctuations in raw material prices have significant effects only for the producers of standardized paper grades (Lundmark and Nilsson, 2001; Lundmark, 2003). Wages (Bergman and Johansson, 2002) and environmental regulations (Gray and Shadbegian, 1998, 2002) are found to be significant determinants of choice of the optimal location for continuous investments. Finally, agglomeration forces attract productive investments towards already well-established paper-producing regional markets even if technological advancements and/or requirements may call for geographic relocations (Hunter, 1955; Lundmark, 2001; Bergman and Johansson, 2002).

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Below is a selection of particularly relevant recent headlines, together with brief synopses.

February 11 – 18

IP's Fort Wayne, Indiana, containerboard plant to purchase US\$6.4M in new manufacturing equipment for expansion, helped by city's approved tax break that would save company US\$362,000

The expansion will also result in the addition of 104 full-time jobs. Fort Wayne City Council approved \$6 million in property tax breaks that are projected to generate \$44.5 million in new investments as well as create about 500 jobs.

IP seeks US\$56.9M in tax breaks over next 15 years from Memphis, Tennessee

In return, the company commits to retain 2,274 high-paying jobs in Memphis, add 101 new ones and invest \$115.7 million, including construction of a fourth office tower at its East Memphis corporate headquarters.

SAPPI Fine Paper North America pledges US\$100,000 to support science, technology, engineering, math programs at University of Southern Maine

Company says it will need to replace the nearly 30% of its workforce retiring in the next five years. The Pioneers Program is a learning community bringing together the best and brightest students in the STEM fields (science, technology, engineering, mathematics). USM Pioneers receive competitive four-year scholarship packages, premium housing, a laptop computer, undergraduate research opportunities, internships, and faculty mentors.

Sappi aims to maintain lead in world's chemical-cellulose market with mill conversions to dissolving pulp in Ngodwana, South Africa, and Cloquet, Minnesota, enabling company to produce 1.3 million tonnes/year

Sappi is continuing to expand beyond South Africa, as 24% of its sales are domestic compared with 53% in Europe and 23% in North America.

February 18 – 25

NewPage to eliminate 300 jobs, about 5% of its total workforce

Cutting non-workforce expenses by US\$20M in response to lower sales

Domtar launches three new product additions to its Paper Trail site and releases product and mill data revealing environmental, social impact data

Three additional products include EarthChoice30 Recycled Office Paper, EarthChoice50 Recycled Office Paper, EarthChoice Opaque Offset 30%. Additional product and mill information discusses its site history, picture gallery, and local stories from the company's Kingsport, Tennessee mill.

February 5 - 11

AF&PA announces its 2013 key policy initiatives including working with members to increase recovery and energy efficiency, working with EPA to support sustainable air regulations, promoting access to paper-based communication options

The initiatives will also include supporting policies that promote voluntary and market-based paper recycling programs.

January 29 – February 4

Domtar to add several new converting machines to increase adult diaper production at its facilities in Greenville, North Carolina, and Aneby, Sweden; aims to double its personal care segment operating profit to US\$150M within five years

The units will start arriving by the third quarter and be fully installed by June 2014.

Klabin receives environmental permit for 1.5 million tonnes/year Puma pulp mill in Brazil, to begin doing advance work at site while awaiting final approval for project from board of directors

The single-line mill would have a capacity of 1.1 million tonnes/year of bleached eucalyptus kraft pulp (BEKP) and 400,000 tonnes/year of fluff pulp. Klabin said the global fluff pulp market is projected to grow from 4.89 million tonnes in 2012 to 5.35 million tonnes in 2015.

January 22 - 28

Carbon paper demand has declined globally but continues on a smaller scale in some old and new applications, including tattooing, pottery making, dentistry, and in prisons, where inmates must carbon copy their letters

A British manufacturer's output has dropped from 10,000 tonnes a year in 1990 to about 15 tonnes. But a producer in India has around 200 competitors and his sales are growing by 5-10% annually.

Fortress Paper continues ramp-up of dissolving pulp output in Thurso, Quebec, improvement in operating efficiency, productivity expected in near future, says CEO; co-gen plant startup delayed, will drive up costs 10%-20%

The Company now expects delivery of power to commence late in the first quarter or early in the second quarter of 2013. The mill has encountered challenging ramp-up issues intrinsic to a dissolving pulp mill, but expects to improve operating efficiency and productivity in the near future.

January 15 - 21

UPM to cut its graphic paper capacity by 580,000 tonnes/year in Finland, Germany and France, in addition to prior announced plans to close 270,000 tonnes/year mill in Stracel, France, cites demand decline, overcapacity, high costs

Structural changes in paper end-uses and the current condition of the European economy have prompted the move.

Statistics Corner: Green Technology and Practice

In 2011, the Bureau of Labor Statistics conducted a survey of 35,000 establishments on their use of green technologies and practices. Figure 1 shows the percentage of establishments in various industries that reported at least 1 green technology in place. 75% of the manufacturing establishments, which includes pulp and paper, reported using green technologies, implying that a surprising 25% of manufacturing has not put at least 1 green technology in place. Yet relative to other industries identified, manufacturing compares well with mining and transportation. Information establishments score well on green technologies.

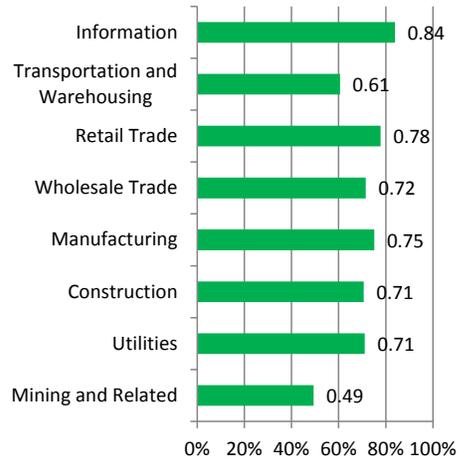


Figure 1.

What types of green practices do manufacturing establishments employ? The graph in Figure 2 identifies the technologies. The majority of establishments have focused on reducing waste materials (60.4%) and increasing energy efficiency (56.4%) technologies. Very few manufacturing establishments (2.1%), on the other hand, have integrated renewable energy sources in their production activities. There appears to be much room for improvement on renewables in the manufacturing sector.

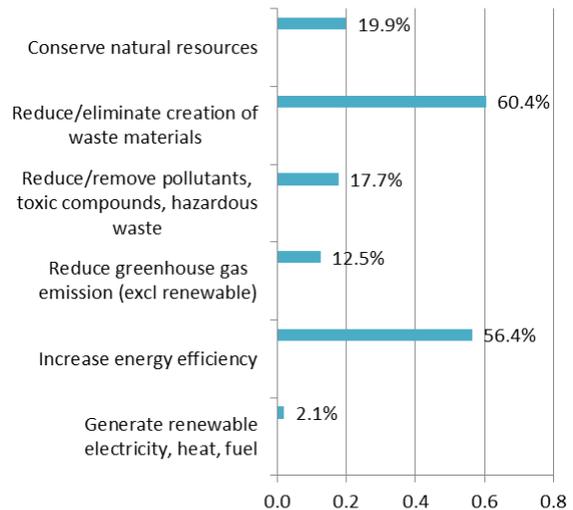


Figure 2.

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