Forest Industry Success in a Time of Timber Abundance
The Critical Role of a Highly Skilled Workforce[1]

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I. Introduction

The title is intentionally provocative—recent Australian success in exporting commodities in scarce supply and rising real prices has given hope to many in the forest sector that wood will be next. I don't think so, and, if I am right, forest products companies will have to look elsewhere for profitability.

My argument is in four parts:

i. Industry success depends on profitably combining forest resources, manufacturing capital and skilled labor to produce timber products society wants to purchase.

ii. Reasonable arguments that timber is now and will remain abundant for the foreseeable future, despite growing DD in China, so access to timber alone is not going to be a key driver of success.

iii. Manufacturing capital is ubiquitous—it's important to re-invest, but investment in modern equipment alone is not going to be sufficient to sustain profitability.

iv. In a high-income/high-cost country like Australia, the only way forest sector will remain competitive is via technical innovation, and the only lasting advantage from technical innovation arises from a skilled workforce.

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To illustrate how to make this strategy operational, I'll provide a case study of the Wood Product Processing program at the University of British Columbia, a program that I helped create.

There is a pro-education bumper-sticker in the US that pretty well sums up the situation. It says: "If you think education is expensive, try ignorance!"

Let's turn to the details.

II. The Setting: Timber Abundance

a. A brief history of timber scarcity

- Economists measure "scarcity" by changes in real (i.e. inflation-adjusted) prices
- Throughout 20th century, real timber prices increased. For benchmark US West Coast Douglas fir the increase was about 4%/yr prior to WW II, 2%/yr after WWII until around 1980, when prices have more or less stabilized on trend, with, of course, significant fluctuations around this trend.
- As an aside, economic theory would predict this pattern of price changes--prices are initially too low to justify investment in tree growing, so the timber inventory declines. As a result of reduced physical availability, prices rise and management intensity increases creating additional supply that eventually stabilizes prices.
- What about the future?

b. Global Demand

- Current consumption = 1.7 billion m^3/yr, with trend-line growth of 1.5%-2.0%/yr, or about 25-35 mm m^3/yr of additional demand (point of reference: NZ harvested about 20 mm m^3 last year, so the world is adding demand equivalent to the production of about one NZ each year)
- Superimposed on this upward trend is the major current cyclical downturn with lowest level of housing starts in the US since WWII, an emerging global recession, and a likely fall of in demand China post-Olympics. As a result, demand is apt to remain soft for the next couple of years.
- What about timber supply?

c. Global Supply—multiple sources including plantations and natural forests

- Plantations: 115 mm ha now, expanding at a rate of about 2.5 mm ha/yr. New plantations could provide additional supply of perhaps 50 mm m^3/yr, or quite a lot more than the anticipated increase in demand, as well as offsetting some reductions in harvest levels from natural forests. BUT, at least in short run, harvests from natural forests appear to be increasing, not decreasing!
- BC Interior: MPB outbreak has killed perhaps 600 mm m^3 of timber; AAC increased by 20 mm m^3/yr which is sustainable 5-10 years (with lots of dead trees left).
- Virgin tropical forests continue to be logged. EX: PNG—current rate of land clearing for agricultural projects and roads could supply 10-20 mm m^3/yr
- Much has been made of Russian taxes on log export taxes—increasing to 80% of value in 2009. BUT, most likely, especially in the longer run, the new tax will mostly shift the location of sawmill industry from Chinese side of Amur River to Russian side.

d. Comment on shipping costs

- It has been argued that increased fuel prices will increase shipping costs, making local supply shortages more acute and conferring benefit on local producers in such areas. However, only 15%-25% of the recent, disabling increases in trans-Pacific shipping costs are due to fuel cost increases—the rest is associated with capacity constraints for break-bulk carriers and containers. So, the temporary increase in shipping costs is not likely to be a major impediment to log trade.

e. Finally, what about the "new" forest products—biofuels and carbon credits?

- The availability of carbon credits is likely to INCREASE timber supply—the main effect is to make timber production profitable on lands where it would otherwise not be. Carbon credits will have only a tiny impact on inducing forest owners NOT to harvest trees.
- Biofuels: 1 ODT of wood = 3.36 bbl or oil, or at $100/bbl, one m^3 of wood is worth about $170, GROSS of processing costs (less than its current value in pulp mills given the current levels of NBSK prices?). If there is an impact, it will cascade slowly up the value chain—the first effects will be on mill residuals, then logging residuals, then roundwood from thinnings and final harvest, then sawlogs.

f. What do I conclude from this analysis?

- Timber is likely to be relatively abundant for next 10-20 years.
- Resource scarcity that has fueled such high returns in the Australian extractive industries are unlikely to occur in the forest sector
- The forest industry will have to rely on other factors of production for its success. What are these, and how can the forest industry take advantage of them?

III. Technical innovation: gaining and sustaining competitive advantage

a. Technical innovation in forestry and forest industry has a major impact on profitability!

   i. Forestry—although the data are poor, plantation yields appear to be increasing at a rate of 1.5%-3.0%/yr as a result of better genetics, better agronomy, and the interaction of the two. This rate of increase is consistent with what is seen in modern agriculture from the same sources, so it is not surprising.

   ii. Forest Industry—manufacturing efficiency is increasing dramatically from applications of sensing and control technologies. As one example, the AVERAGE LRF of BCI sawmills increasing at 1.3%/yr, with the best mills being nearly a decade ahead of the average.

   iii. Forest products—new forest products—OSB, LVL, Parallam to name a few—makes it possible to use wood where it was never used before, and to use low-cost raw materials to substitute for higher cost ones.

   iv. All of these technological innovations have improved profitability for those firms that have embraced them.

b. How can the Australian forest industry create and sustain a technology-based competitive advantage?

   i. Capital investment alone will not do the job. The world is awash in capital ready to move into the sector—no capital shortages in Russia, China, or even the rest of the developing world. One fund I manage, the Global Emerging Markets Forestry Investors, has $350 million to invest, and I know of at least another $750 million in

other funds ready to invest in forestry and related manufacturing assets in emerging market countries throughout the world.

ii. Industrial technology alone will not do the job. Technology is ubiquitous—Weinig sells lots of equipment to China and SE Asia. So, acquiring advanced capital equipment alone will not create sustainable competitive advantage.

iii. The only way to create and sustain a technology-based competitive advantage is through local skilled labor, which provides three key benefits to a country

1. A workforce with advanced skills can more readily adapt ubiquitous technology and capital to local resources to create profitable businesses.
2. A workforce with advanced skills will tend to create a "competitive cluster" of product manufacturers, equipment manufacturers, and technology providers. ASIDE: BC had this, but it is slipping way due to public inattention.
3. A workforce with advanced skills will tend to create a class of sophisticated consumers of wood products, especially architects and engineers, whose demand creates a virtuous circle of new demand for new products and new value-adding opportunities for manufacturers.

c. Imagine I have convinced you that (a) technical innovation is the only sustainable source of competitive advantage for the forest sector in a high-income country like Australia, and (b) a workforce with advanced skills is the only way to create and sustain technical innovation. Then, how can you create such a work force? To illustrate a general approach, I'll provide a case study of the Center for Advanced Wood Processing at the University of British Columbia that I was involved in establishing.

d. Program: two elements—(a) undergraduate B. Sc. in Wood Products Processing and (b) Centre for Advanced Wood Processing for research, technical development and graduate studies (www.forestry.ubc.ca)

   i. B. Sc. WPP (based on European university-based WPP programs):

      1. 5 years with one full year of "cooperative education" (directed work experience that is integrated with the on-campus teaching with no "locked in" ongoing responsibilities to the employer),

         a. Year 1: Basic Science

         b. Year 2: Wood and Materials Science + wood machining and co-op

         c. Year 3: Manufacturing + co-op

         d. Year 4: Advanced Manufacturing + co-op

         e. Year 5: Co-op + Integration

      2. Minor in Commerce/Business Administration (with Faculty of Commerce) a possibility

      3. Currently 108 students enrolled, or about 25% of the Faculty of Forestry's total

      4. Excellent job placement

   ii. CAWP—Canadian National Centre of Excellence for Research and Education in Wood Products Processing

      1. Supports Department of Wood Science research and graduate education

      2. Provides advanced training/certificate programs

      3. Conducts specialized research and proprietary product development

e. Process to establish programs

   i. First, the need was…

      1. Well understood by academic and research community, but no movement until there was industry leadership
      2. The needed leadership came from Art DeFehr, President, CEO and owner of Paliser Furniture in Winnipeg in Central Canada (NOT a forestry province; NOT a primary MFG; a person of great vision and commitment to community)
      3. Brought together a like-minded group—"The National Education Initiative"--that lobbied government (Lloyd Axworthy, Minister of Human Resources at the time was from Winnipeg), set up competitive process for (i) industry financial support and (ii) industry backing with government.

   ii. Process

      1. The NEI, with federal government technical support, issued a Request for Proposals and evaluated the responses; when UBC success seemed assured, other provinces argued for "equal treatment" but the NEI helped government resist diluting the effort by spreading the available resources.
      2. Fortuitously, at about the same time the UBC Faculty of Forestry was reviewing its academic programs—forestry enrolment was declining; traditional wood science way too small to justify the number of faculty members; nothing was being offered in the areas of conservation or environmental studies. As a consequence, it was a good time for us to prepare a proposal on WPP.
      3. What were the sources of financial support?

a. **Federal** support came in the form of $C 6.0 million for endowments + an annual operating grant to support the co-op program coordinator
b. **Provincial** support came in the form of $C 8.5 million for endowment + $C 20.0 million for the CAWP building;
c. **University** support came in the form of the allocation of faculty positions and space for the new program.
d. **Industry** support came in the form of ongoing annual operating grants, scholarships, co-op positions, commitments to hire graduates, and contribution of leading-edge equipment (Weinig) (lend, not donate!)

IV. Conclusions

a. For a high-income country like Australia, technical innovation is the only sustainable source of forest-sector prosperity—in the forest sector, you can't rely on resource scarcity as a path to profitability.
b. Profitable technical innovation needs to come in forestry (especially in plantations), forest industry, and forest products.
c. Profitable technical innovation requires a local workforce with advanced skills—capital and "off the shelf" technologies are too widely available to create profitability by themselves
d. Developing a workforce with advanced skills requires specialized university-based programs of education, training and research
e. Such programs can be developed ONLY with broad support from government, the academic community and industry
f. It is **extremely** unlikely that there will be positive change without strong industry leadership!