Chapter 6
The Role of Intellectual Capital in Business Model Innovation: An Empirical Study

Göran Roos
University of Adelaide, Australia

ABSTRACT

The Australian Manufacturing Environment has over a short time changed from being low or medium cost to becoming high cost. In the previous environment, success could be achieved through imitation and efficiency focus whereas in the new environment efficiency becomes a table stake where the basis for success becomes innovation. Innovation requires enablers, strategy, and management systems to deliver, and the innovative focus must be on both value creating innovations and value appropriating innovations. One of the key tools in appropriating value is business models. The effectiveness of business model innovations to manufacturing firms in this changed environment is investigated, and it is found that business model innovations are highly effective but that the dimensions expressed in the literature, which mainly focuses on ICT-based or dependent firms, are insufficient for manufacturing firms. Based on the literature and the empirical study, an improved business model framework is proposed.

THE CHANGING MANUFACTURING SECTOR

A number of the issues presently facing the Australian manufacturing sector were raised in 2006 by Combet and Apple. The manufacturing sector makes a vital and significant contribution to the economy in many countries accounting for a reasonable share of the GDP, and in Australia, this share is around 10%. Productivity growth in advanced economies typically involves technological innovation, i.e. expansion of the technological frontier. The extent of industrialisation is closely correlated with the overall level of economic development. When Abeles et al. (2011) analysed the relationship between the level of overall economic development as illustrated by per capita GDP (and the degree of industrialisation as represented by per capita manufacturing sector GDP, they identified two features that stood out:
The Role of Intellectual Capital in Business Model Innovation

- First, countries with the highest per capita GDP levels, are also those which reveal the highest per capita manufacturing GDP levels i.e. the US, Japan, Germany, and northern European countries (e.g. Sweden, Finland). This group is then followed by most of the remaining European countries, as well as Canada, Australia and some Asian countries (e.g. South Korea).

- Second, the data analyzed had a good logarithmic fit suggesting that the impact of an increase in the weight of the manufacturing sector in the economy depends very much on initial conditions. The sector also continues to be an important contributor to employment, employing a significant portion of workforce (about one million people in Australia compared to the Australian resources sector employing around two hundred thousand whilst also making up around 10% of the economy), and is a major source of exports.

  Manufacturing also has a multiplier effect in its impact on the rest of the economy. The US Bureau of Labour Statistics calculated that every dollar of manufactured goods creates another $1.43 of economic contribution towards other sectors, the highest multiplier of any sector. This is double the multiplier effect of services at $0.71 (King, 2010). This provides an interesting metric demonstration of the importance of the manufacturing sector to the economy by creating jobs, investments and sales in other sectors. An interesting discussion around the importance of manufacturing in the economic success of Germany can be seen in Rattner (2011).

  Tassey (2009) stated about the US economy, 
  “Manufacturing still contributes a significant share of GDP, performs a disproportionately large fraction of R&D, and produces a considerable number of high-paying jobs. Moreover, its network effects run wide and deep, with domestic companies from other industrial sectors participating in extended value chains. In particular, the rapidly growing technology-based service sector depends heavily on manufactured goods. Given the increasing complexity and rapid rate of change of modern technologies, co-location of these two sectors remains an important strategic factor. Consequently, manufacturing must be targeted as an essential element of the technology-based economy.”

  Many of the same traits are true for Australian manufacturing. Manufacturing is the primary source of technological innovation in the Australian business sector (Australian Department of Industry, Tourism, and Resources, 2007). It had the highest expenditure on R&D in 2008-09, comprising 26% of the total, followed closely by mining at 25%. Much of Australia’s higher value added activity is as a direct result of R&D activities of manufacturing firms. R&D expenditure was highest in the Transport Equipment sub-sector, followed by Machinery and Equipment. Fabricated Metal Products had the highest growth rate with an increase of 39.4%, followed by Basic Chemical and Chemical Products at 27.3% (Australian Department of Innovation, Industry, Science, and Research, 2010).

  Any numbers relating to the manufacturing sector in public statistics must be taken with a grain of salt since they are influenced by statistical problems. For example, if you use data from the World Economic Forum you will find the average manufacturing sectoral value-added as a share (%) of GDP in an innovation driven economy, (the most advanced form) is around 18% (Schwab et al. 2010). This is a highly doubtful number as has been pointed out by The Royal Society. In their 2009 review, they pointed to the blurring boundaries between services and manufacturing and referenced other sources of the same insight. For example, an Economist article on 10 January 2009 (Coming in from the cold) stated “In practice, there is no clear line between what counts as services and what has been made... The distinction owes more to government statisticians than anything else” and a recent UK Department of Trade and