Industrial Globalisation – The design of collaborative industry models for small economies

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Abstract

New Zealand is a small, relatively isolated economy with approximately four million people. Despite its size, it has launched a number of innovative products onto the world stage. The innovators behind these successful commercialisations have often come from engineering and manufacturing backgrounds. The supply of these innovators is now at risk.

Globalisation has changed the game for New Zealand innovators. Manufacturing is experiencing a decline caused by competition from larger, lower wage economies. Many New Zealand innovators and entrepreneurs are now relocating offshore or dealing direct with offshore manufacturers. Although some argue that New Zealand can still survive as a design led economy, the reality is that much of our innovation base is linked to the knowledge that our engineers and manufacturers build over time through working in their respective industries.

The objective of this research was to review the literature on collaborative business models and then apply some of the thinking to the New Zealand manufacturing sector. A series of qualitative interviews were undertaken with plastics manufacturers that serve the high growth sectors of marine navigation and healthcare. Brand owners and strategic suppliers were also interviewed. Initial interviews aimed at clarifying the concepts used in the industry and to establish a conceptual framework that could be developed and refined throughout each interview in an attempt to develop a common language and visual representation of the elements being discussed.

The research resulted in the design of four new collaborative business models summarised as:

1. The Collaborative Brand Owner Model: driven by an established brand owner, focused on their end customer requirements

2. The Collaborative Start Up/High Growth Model: driven by suppliers. This model requires an appointed co-ordinator to identify and organise a collaborative effort with emerging brand owners

3. The Collaborative Technology Model: driven by an idea carrier (engineer, brand owner etc). It requires a coordinator to pull together project teams around technical innovations
4. The Formalised Industry Collaboration Model: membership driven. Focussed on continual innovation across all areas, i.e. equipment, machinery, materials, process, product, distribution and service. This model is the most radical aimed at generating new wealth for an evolving membership base.

1. Literature Review

The industry model concept can be confusing because it is sometimes used simply to refer to how an industry creates wealth. However, the business model construct has been proven to be a useful conceptual tool for expressing the logic behind an organised set of
elements (Osterwalder, 2004). Much of the research on business models is applicable to the industry model construct. While the business model construct enables a comparison between one firm and another, the industry model construct enables a comparison of one industry to another. The modelling approach examines the business or industry from a systems perspective, rather than the more linear value chain or value system perspective (Porter, 1985).

As in the development of all tools, concepts are required to understand the phenomenon under study. The way these concepts are presented has an impact on the way they are interpreted. Therefore to enhance the intended logic of a business or industry model a design led approach to communications is required (Lawson, 1980).

It is not the intention of this paper to present the full literature review undertaken but the paper presents some key references drawn from literature on collaborative networks, business models, design thinking and economics.

Osterwalder (2004) depicts the business model as a description of the value a company offers to one or several segments of customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate profitable and sustainable revenue streams. The business model construct is often used to summarise a specific firm but this paper attempts to use it to describe an industry. Because industry involves multiple firms, the above concept of a “network of partners” requires some sort of collaboration between firms to achieve system wide objectives (Miles, Miles and Snow, 2005).

Business model research is relatively recent. It started with a series of papers on definitions and taxonomies (Rappa, 2001, Timmers, 1998, Tapscotte, 2000) and then evolved into a list of business model components (Linder and Cantrell, 2000, Magretta, 2002). Attempts were then made to describe the business model elements (Afuah & Tucci 2001, Hamel 2000, Weill & Vitale 2001) and then to model these elements (Gordijn 2002, Osterwalder & Pigneur 2002, Geerts and McCarthy, 2002).

Research on collaboration includes Appley and Winder, 1977, and Miles, Miles and Snow, 2005).

2. Methodology

It is not the intention of this paper to describe the methodology used in this research in detail. The research applied the grounded theory methodology to categorise and represent data obtained from interviews and desk research and to develop theoretical propositions for future research.

The theoretical models were initially developed from the literature review and then refined throughout the interviewing process. A series of qualitative interviews were undertaken with plastics manufacturers that serve the high growth sectors of marine navigation and healthcare. Brand owners and strategic suppliers were also interviewed. Initial interviews aimed at clarifying the concepts used in the industry and to establish a conceptual framework that could be developed and refined throughout each interview in an attempt to develop a common language and visual representation of the elements being discussed.
All interviews were documented and comments were labelled using analytical tools developed by Strauss and Corbin (1990) to make sense of the data collected.

The grounded theory paradigm describes a phenomenon in terms of its Cause, Context, Action Strategy, Intervening Conditions and Consequences. This paradigm was applied to the industry model development through open coding of the initial interview transcripts and correspondence files. Each comment was then expressed in terms of its context consisting of any intervening conditions and inherent strategies. These relationships were written down in memo form and were expressed as hypotheses, indicating that they were not accepted as proven, but that they were to be verified against other data to determine if they held up or needed modification. Such memos could be described as initial orienting memos.

While applying open coding and axial coding procedures to all of the evidence collected the ongoing search for patterns between individual comments was found to be a complex task suited to a longitudinal study.

3. Industry Players

The industry was divided into three categories based on the three main clusters of activities. The categories were Manufacturing Supplier, Manufacturers and Brand Owners.

Brand Owners

The research distinguishes between brand owners in growth industries (i.e. industries growing at a rate greater than 30% per annum) and mature industries where growth is relatively static. The design and manufacturing needs of those in growth industries are different from those in mature industries with significant implications for upstream mould-making activity.

Brand Owners in growth industries can be categorised into two types.

Firstly, there are those that have gained a significant market share of a global niche. Brand owners will differ with respect to product line extension activity, concept extension activity etc.

Secondly, there are those brand owners that are progressing toward a significant market share of a global niche. This could be a relatively unknown but rapidly growing small firm.

Brand Owners in mature industries were found to have a more challenging path ahead. Their end consumer markets are more volatile and competition is more intense. The nature of their industry appeared to make them more cost conscious. The risk of manufacturing shifting offshore is far greater for those operating in mature industries.

Suppliers to Manufacturers

To a large degree supplier performance is very linked to brand owner performance. The report distinguishes between suppliers serving customers in growth industries and those serving customers in mature industries.
Suppliers that supply products or components to brand owners in growth industries have more opportunity to add significant value to innovation. This is because they can become a partner in the innovation process. Their ideas around improved functionality and efficiency can result in better margins for the brand owner. This is particularly true for the early stage in an industries growth cycle where product functionality is being extended and new applications are continually being released. Products are likely to be produced in shorter runs and therefore suit the particular manufacturing capability of the New Zealand market.

The suppliers that were interviewed did not dispute the need to target manufacturers or brand owners operating in growth industries. However, they were quick to point out that there was a shortage in supply of high growth brand owners operating in New Zealand and there is also a shortage in supply of suppliers capable of securing offshore work. They also pointed out how difficult it was to identify the emerging brands.

The mature industries that still have manufacturing in New Zealand are predominately supplying product to the domestic market. We have seen a steady trend of companies operating in mature industries shifting manufacturing offshore. Manufacturers that are part of the mature industry value chain are competing on price and therefore margins in this business will never be great and suppliers from the cheap labour countries will present real competition for this work. Suppliers and manufacturers operating in local mature industries are in a relatively weak industry position and their prospects for growth are relatively low.

Strategic Models

Recent research on the New Zealand manufacturing industry completed by Waikato University (Manufacturing Plus, 2006) highlighted increased collaboration as a key recommendation to the New Zealand Manufacturing sector. This research has reinforced the need for collaborative business models and the critical value that mould-makers can add to their strategic partners. Total system costs can be reduced and product innovation can be increased through a collaborative effort.

Examples of collaboration benefits drawn from the interviews include:

- Materials sourcing
- Part interface issues
- Materials usage
- Process elimination/improvement
- Functionality ideas
- Functional build
- Customer satisfaction

The intent of collaborative business models is to encourage long-term relationships between a range of suppliers and their customers (Manufacturing Systems Group, 2005). The idea here is that suppliers with narrow, but deep knowledge can compete more effectively if they are part of a large coalition.

It is generally accepted that different businesses offer different rewards relative to risk. In economic terms some businesses are weakened by low barriers to entry and the disproportionate bargaining power of some suppliers and buyers. This will not change with a collaborative business model. However, what can change is the bargaining power of the
sector as a whole. Figure 1 below attempts to describe the desired front window for suppliers to the manufacturing sector representing broad capability (some of which might be outsourced) placing mould-makers in a key strategic position of coordinating other suppliers to manufacturing.

![Diagram](image)

**Figure 1: Suggested Strategic Expansion for Suppliers**

A highly-focussed, technologically-strong mould-maker sector with broad capability is what the customer wants. Location is not as important as delivering the desired outcome. In fact, some mould-makers may choose to invest in infrastructure offshore to broaden their capability.

The following four strategic models were drawn from this research. The collaborative networks proposed do require a degree of loyalty but do not necessarily imply any form of exclusivity. In other words, members of the network are able to receive and give knowledge that will benefit themselves and others in the network. The right conversations are encouraged with selected people, but negotiations in good faith, will carry on as before. There will still be areas of competition and perceived competition and these must still be managed delicately. The models may not work in isolation and a combination of models or part of a model could be used to advance the mould-making sector.

The collaborative network also respects that members are not all in it for growth. The craftsperson that gains great personal pleasure in developing high quality, complex moulds is highly valued and regarded as a particularly strategic part of the collaborative network i.e. looked after. Attracting new talent in this area would be a typical problem tackled by all of the models suggested below.

All models have the following in common:
they all require a governance structure that sets out rules and objectives and reviews progress against plans.
they all require specific acknowledgement of parties in the collaborative model. In other words, all invited parties know they are part of a collaborative effort.
they all require considerable degrees of “trust” and “proven capability”
they all require facilitation by a member or an appointed individual
all members of the collaborative network acknowledge that contributions may not be even and reward sharing may not be fair. However, everyone agrees that they will be better off.
Senior executive conversation needs to be included in the collaboration i.e. can’t have trust being broken by corporate decisions made higher up in the organisation i.e. unexpected decision to shift manufacturing to China

4. The Collaborative Brand Owner Model

The collaborative brand owner model takes the informal network that already exists and deliberately aims at improving performance resulting in a win/win for all parties. This requires a deliberate effort to map key suppliers and to facilitate process and product innovation across them by sharing knowledge and applying collective thinking to specific parts in the supply chain.

The facilitation of the model is funded by the brand owner. Needs and wants identified through interaction with existing or prospective customers provide the firms with the focus points for the collaboration. The need or want is identified by an appointed coordinator who in turn facilitates across “accredited” members of the network. The network is based on a high degree of “trust” and “proven capability” and everyone must abide by a clear set of rules of engagement. Seeds of the collaborative brand owner model exists now. As one brand owner interviewed commented

“The old model was the toolmaker and moulder talking separately to us. Now we find a trusted moulder responsible for delivering agreed outcomes.”

In this case the trusted moulder also had a number of trusted mould-makers but the relationship could also be the other way around.
This model can be improved if system wide performance measures are introduced, for example, lead times, warranty claims etc, and communicated to the group to encourage continuous improvement.

5. The Collaborative Start Up/High Growth Model

The collaborative start-up/high growth model starts with the emerging brand owner. The problem is identifying and supporting the emerging brands before they go offshore for their manufacturing. As one mould-maker put it:

“the challenge for us is how do we spot the next F&P before anyone else does”

A better question might be,

how can the value proposition of the New Zealand collaboration model reach an emerging brand owner before they move offshore?

... and if they are offshore ... exploring the role that the New Zealand collaboration model can play in their value chain?

The challenges for this model are numerous:

- Filtering out the ideas/brands that can make it on the world stage
- Assessing the entrepreneur and his or her team
- Designing and communicating an innovative business model
- Coordinating the skill sets required to deliver the business model
- Funding

The solution might be to build the network around the venture capital community. The government already has in place a number of mechanisms to engage with i.e. seed co-investment funds, venture investment funds, incubators, escalators. If this community was made aware that there was a centre of excellence that handled all plastics (or materials) enquiries and that there was a supportive prototyping arrangement then this might be the opportunity to sell the system wide value proposition.

Figure 3: The Collaborative Start Up/ High Growth Model
6. Collaborative Technology Model

The collaborative technology model is a highly specialised collaboration forum focussed on the identification and assessment of technology advancements/breakthroughs in materials, equipment and machinery, and techniques and processes. Members of the collaborative network(s) assess the implications of the technology in terms of impact on processes, costs and outputs.

The interviews revealed rapid changes taking place in materials, machinery and equipment, and techniques and processes. Knowledge of what is possible can be used by brand owners to create competitive advantage.

As put by one moulder

"we don’t need to formalise links between specific parties. Once materials, processes, toolmaking and design are being discussed around opportunities, the linkages will happen automatically."

Upgrading technology and upskilling will firstly require an awareness of what is possible. This will involve seeing first hand the benefits of working with the latest technologies and understanding the cost implications. Interviews revealed that the latest CNC technologies can sometimes eliminate polishing making New Zealand mould-makers internationally competitive in certain types of tooling. Under this scenario, even soft tooling might make sense in New Zealand.

Once the commercial benefits are clear then there will be a demand for training and it will be critical that the training providers also work in a co-ordinated way.

Figure 4: The Collaborative Technology Model
7. Formalised Collaboration Model

The formalised industry collaboration model is similar to the collaborative brand owner model except the facilitation is conducted by an independent objective party (the manager) representing the interests of the entire group as opposed to any one particular entity. Innovation across all areas is the focus. It is fair to say that it is a more radical approach that challenges the traditional theory of the firm.

Many of the ideas for this model were drawn from the work of Miles, Miles and Snow (2005).

Key to this idea is the establishment of a central services office to support a dynamic network of firms. The network starts off small but builds as more trusted parties bringing new capabilities are added to the network (not just limited to parties in the supply chain). A lot of information is shared i.e. profitability, human resources, customer issues etc. AND project teams may be drawn from people in different firms.

To summarise from Miles, Miles and Snow (2005)

The concept of ideas and information as an open source, available from all firms in the network, bears resemblance to the concept of openness that governs the Linux development community.

The difference is that shared ideas are themselves wealth generating, and the expectation is that returns from the innovation process will (over time) be equitably shared among the firms involved.

The central service office will provide a range of services including continuing education, facilitation of workshops around opportunities, communication of innovation success stories, identification of new members, project management of system wide projects, etc. Services will grow according to member needs.

On first read this model appears too socialist to ever work in a capitalist society. Miles, Miles and Snow (2005) argue that the reason it can work is that its focus is on the generation of wealth, rather than the distribution of wealth. Distribution of wealth is left to the parties to
sought out on a case by case basis, often with the shake of a hand. Their book provides further detail on its workings with some case studies included.

Figure 5: The Formalised Collaboration Model

The formalised collaboration model is membership driven. Key to its success is a manager with the right capability and incentives.
Conclusions and Future Research

All collaboration models require a system wide value proposition (Osterwalder, 2004). It is possible for members to belong to more than one collaboration model and there may be affiliates that are connected to the model but do not have member status. All models begin small but grow as they actively identify more members that can add value and are trustworthy. Most models identify who is in the network and establish performance measures and rules governing the behaviour of members.

Table 3: Comparison of Existing and Proposed Strategic Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Focus</th>
<th>Key Driver(s)</th>
<th>Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative Brand Owner</td>
<td>Market Needs</td>
<td>Brand Owner</td>
<td>Invitation Only: Key Suppliers</td>
</tr>
<tr>
<td>Collaborative Start Up/High Growth</td>
<td>New Revenue</td>
<td>Suppliers: Emerging Brands Committee</td>
<td>Open to all Stakeholders</td>
</tr>
<tr>
<td>Collaborative Technology</td>
<td>Technology Innovation</td>
<td>Suppliers: Technology Committee</td>
<td>Open to All Stakeholders</td>
</tr>
<tr>
<td>Formalised Collaboration</td>
<td>Innovation Across All Areas</td>
<td>Appointed Manager</td>
<td>Invitation Only: Key Stakeholders</td>
</tr>
</tbody>
</table>

Table 3 summarises the four proposed models

Collaborative models across different entities are challenging to establish and manage. However, this research has highlighted the value of sharing and focusing knowledge from different disciplines around a particular opportunity area.

Brand owners have developed sales and marketing expertise. Mould-makers and manufacturers that have developed strong relationships with brand owners have done well when they are seen to be proactively adding value. There is a shortage of brand owners and the ones leaving do not appear to be being replaced by emerging brands at the same rate. This supply of local brand owners and the ability to add value to them is of critical importance for the long term survival of the mould-making sector.

Further research into collaborative industry modelling is required. Because this area of inquiry is still in the theory development stage, longitudinal studies of existing collaborative networks is required.
This research has implications for industries in small economies that want to develop a more collaborative model.

- Brand owner networks should be mapped and strategic partners identified (both onshore and offshore)
- Collaborative technology networks should be established in partnership with precision engineers
- High level performance metrics should be established with the technology network and for the specific partners in the system
- Links should be established with the brand owner networks
- Technology agendas should be established and the transfer of knowledge facilitated
- Care should be taken in the recruitment of a suitably qualified coordinator and the design of their remuneration scheme
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