ABSTRACT

Market forces and international competition are driving companies to reduce costs. The operations management issues experienced by 50 Australian companies when investing in China were examined. Many experiences were found to be common to most of the participant’s industries. Relationships with government, associations, local partners and members of supply chains were considered highly important. Levels of technology in China were not considered to be a significant issue. Access to staff with sufficient technology training (particularly for product development) and technology implementation was an important issue. The paper presents a model relating the various operations management issues identified to one another.

Keywords: Foreign Direct Investment, Market Entry Mode, Operations Strategy

INTRODUCTION

Market forces and international competition are driving companies to seek opportunities to reduce product and service costs in order to enable them to compete on the basis of price [1]. Companies in the air travel and electronic equipment industries are good examples of this trend. For example, the profitable Australian icon Qantas recently considered moving its maintenance faculties offshore so as to reduce its operating costs (aircraft maintenance is a significant component of their operations). The pressure to reduce operating costs is also driving many businesses in other developed countries to spread their operations between the home country and relatively low-cost and low regulatory constraint countries, such as India and China [2]. This has created a new operations management environment with which its managers have little experience [3].

Businesses internationalising into China through Foreign direct investment (FDI) face a range of operations management issues. Contractual relations, infrastructure conditions, supply chains, law and work relations are sufficiently different to the conditions in most investing countries, such as Australia [4] that the operation management practices in Australia cannot be directly transferred to new business units in China. This paper examines the operations management issues experienced by 50 Australian companies when investing in China to identify the critical operations management issues and how they relate to each other.
Operations management has focused on theory development for the last 50 years. The practical application of theory has been shown to provide significant benefits to the manufacturing industry [5]. There still remains a need, however, for more empirical research to stimulate further theory development [6]. In addition, whilst empirical research has been conducted in its application to the service industry, it is quite limited compared to the research which has been conducted on the manufacturing industry. Furthermore, qualitative research in the area of international investment is also deficient [7] [8].

The following describes current international operations management practices and impediments for international companies operating in China, in a number of critical areas identified in research.

Supply chain management
The literature broadly expounds the significance of supply chain management (SCM) for all international industries and the automotive industry in particular. For example, Chandra, Kumar and Smirnov [9] noted that the management of supply chain systems is one of the major global industry economic issues, due to the difficult role of SCM in transforming incomplete market information and available resources into coordinated production and delivery plans, using a network comprising cooperating, but independently owned units. Similarly, Haight [10] claims that economic conditions and political unrest are adding to the above challenges of maintaining a global supply chain. He suggests that the principles concerns at present are improving supply chain efficiency and lowering overall costs.

These challenges make SCM for global industries a complex and demanding task. The complexities associated with effective SCM range across a number of operations management areas. For example, the increased demand for quality, customisation, innovation, lower prices and the costs of technology have driven the automotive component manufacturers into long-term, mutually dependent supplier relationships [11] [12]. Furthermore, Gould [13] found about one billion US dollars is annually wasted in the automotive supply chain area due to poor coordination.

Quality control
A recent McKinsey report found that quality control for international businesses importing from Chinese manufacturers remained a significant barrier to increasing supply chain network activity in China [14]. Communication has been identified as a critical factor for achieving satisfactory quality control in China [15] and is generally identified as one of the major quality control issues for international businesses [16]. Cultural attitudes to quality are also considered to be major implementation challenges for international businesses [17]. A related issue is the impact of local country quality standards on international quality control programs, although surveys have found that, increasingly, these standards can be common to a number of countries, making it possible for international businesses to adopt larger scale regionally customised quality-control processes [18]. Finally, different markets prioritise different quality characteristics which, when combined with dynamic product development creates a complex set of quality objectives for international businesses [19].

Cost control
Cost control through lean manufacturing, for example, is affected by the regulation regimes (laws) in each of the countries. In particular, the training necessary to introduce lean manufacturing operations appears to be more successful in more highly regulated environments than it does in less regulated indictments where total participation cannot be
guaranteed [20]. This makes the transference of cost control processes more difficult than many organisations would anticipate. Even access to lower cost labour markets may not be sufficient to achieve adequately low-cost operations. For example, a reduction in profits and high labour costs forced IBM to rationalise its PC manufacturing and sell it to Lenovo [21].

Recent research has indicated that cost control tends to be integrated with other local conditions, as well. As a result, costs can be reduced by replacing expatriate managers with locals who will frequently find access to better supply and regulatory conditions that expatriates, particularly in countries such as China [22].

Technology management
Technology management competency has been shown to directly correlate with business performance for high technology of organisations operating in China [23]. New countries often bring uncertainty in the local environments to international businesses. Where this uncertainty is high, these businesses need to adopt particularly entrepreneurial approaches to planning their technology management [24]. Where the technology includes a valuable intellectual property component, companies operating in China find that they need to utilise a range of techniques to protect their IP including; legal controls, secrecy, lead time advantage and combining the IP with ‘rare’ complimentary capabilities [25]. Desirable technology transfer from international business technology development in China tends to occur through the domestically consumed products and unskilled workers, whilst undesirable technology transfers occur through exports and skilled work employment [26].

R&D
China has become a major target for establishing critical offshore R&D facilities because of the access to low cost well trained technical staff and high levels of foreign direct investment it offers, which have stimulated domestic investment in R&D as well [27]. Consequently, international business R&D activities in China focus on access to low-cost R&D personnel, as well as establishing connections into local supply chains [28]. Researchers found that some of the most successful cooperative R&D activities also incorporate an element of competition and are focused in areas where the main investor also has a high market share [29]. In a similar manner, R&D apparently makes more of a contribution to performance in export market focused cooperative R&D activities, in which the non-Chinese partners are also the main investors [30].

METHODOLOGY
The data to be collected involved developing an understanding of phenomenon from the perspective of the research participant and understanding the meanings participants gave to their experience [31]. Constantly, a qualitative research methodology was chosen to provide rich [31] and in-depth data about how firms internationalise. This is information that cannot be meaningfully incorporated into a traditional survey protocol because the processes by which the decision-making occurs are not yet clearly understood.

A structured interview guide (available from the author) was developed based on the literature review above. A written invitation to participate was sent to a random selection of 500 companies operating in Australia which had either successfully or unsuccessfully established operations in China. The participants were identified from the membership list of the China Business Council of Australia and companies which have identified themselves as being
involved with China in recent public domain media. Follow-up phone contact was used to organise interview agreements with the CEO or director of international operations of 50 of these companies, on a random basis. The acceptance rate was in excess of 50%, however, many acceptances were conditional on availability and the ability of the participants in the interview timeframe effectively reduced this. The first 50 participants who could be available in the interview timeframe were selected to meet the planned sample size of 50 participants. Participants who could not be accommodated in the interview schedule were then replaced in a second and third round of interview follow-ups.

The interviews were conducted with the CEO because they were intimately involved in or actually chaired the process of strategy setting. This means that the interviewees had an extensive understanding of the organisation's operations strategy, the factors that affect it and its strengths and weaknesses. The interviewees were intentionally selected from a range of industries so that the research could identify international operations strategy effects across industries as recommended by [32]. These authors cite numerous previous studies that suggest a broader interpretation of results and development of basic archetypes is possible when the research brands several industries.

The interview transcripts were then reviewed by the interviewer and questions referred back to the interviewee where necessary. The data was coded using NVivo (version 7.0). NVivo is a categorising tool which enables segments (nodes) of larger blocks of data to be ‘tagged’ and linked into hierarchical patterns (trees) on the basis of a presumptive model (developed using the literature above) and thematic linkages appearing in the data. NVivo data interrogation (search) tools were used to facilitate the tagging process. The data was also simultaneously categorised under different headings, including interviewee, industry and theme to create a multidimensional perspective. The patterns of the linkages were then represented visually as a model (see Figure 1) using NVivo and the findings reverse interrogated to identify consistent and predominant themes.

The reverse interrogation of the tree nodes resulted in considerable consolidation of nodes in which the differences in the data groups were found to be minimal, confirmed the direction of linkages between nodes and identified the most suitable title for each node. The final official model was then produced.

**FINDINGS**

The industries represented by the interview participants are shown in Table 1.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number</th>
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<tbody>
<tr>
<td>Manufacturing</td>
<td>17</td>
</tr>
<tr>
<td>Service</td>
<td>20</td>
</tr>
<tr>
<td>Education</td>
<td>6</td>
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<td>Finance</td>
<td>7</td>
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**TABLE 1. PARTICIPANT INDUSTRIES**

Figure 1 shows the model representing relationship between Chinese business conditions, operations management practices and business performance and success for the participants investing in China. Some of the key findings and important model features included:
The relatively high level of technology in many industries and the weakness in technology utilisation.

the absence of an identified relationship between operations and the organisation's strategy. An operations plan was used only in seeking partnerships.

the impact of variations in local standards and regulations between particular regions of China on where successful operations could be established.

the limited importance of culture for local operations, once relationships were established.

the importance of relationships in establishing suitable supply chains and dealing with regulatory requirements.

the central role of entry mode as a consequence of most of the operations management issues and the time taken to come to the entry mode of decision.

The linkages between the nodes in Figure 1 indicate that entry mode is the ultimate consequence of a range of operating conditions in China that influence the operations management practices adopted. In particular, management issues including control, quality and cost factors determined the approach taken to entering China. The industry conditions in China (such as the desire for technology advancement, regional economic conditions, levels of economic growth and relationships available to the organisation) were also a significant contributor to the approach taken to enter China.

**FIGURE 1. MODEL OF THE OPERATIONS ISSUES IDENTIFIED BY THE PARTICIPANTS.**
Perhaps more unusually, the status of technology in China also drove the participants to adopt different entry modes. Three general positions were found to relate to different entry modes - the technology was more advanced in China in that industry, the technology was significantly more basic in China in that industry, or their was no technological difference between Australia and China in that industry. More unexpectedly, the behaviour of other organisations in the participant's industry in China also influenced the approach that companies took to enter China. Frequently, existing contacts within the industry attracted the company to China. In addition, the importance of operating in China to achieve competitiveness (in terms of scale as well as other factors) for the industry was a major driving force. The absence of competitors or lack of popularity of China also influenced the way in which the company entered China.

In only one instance, was a distinct organisational strategy identified as a factor affecting entry mode and, even in that case, the connection was very weak. The entry mode appeared to have a strong relationship with the success of the entry into China, however, independent of the participant's industry. Although the principal driver of entering China was to reduce operating costs, interpretations of success frequently proved to be more general (for example success was sometimes considered to be the ability to sustain operations in the immediate term). A lack of success was also sometimes not identified as a financial failure, but as the difficulty of sustaining the operations in the entry mode adopted.

DISCUSSION

The following details the experience of the participants in the operations management areas discussed in the introduction to this paper.

Technology
The bank industry participants found that their advanced technology was very attractive to Chinese partners, but the cost of developing it in Australia was a barrier to transferring it. The building and education industry participants found that the FDI in China from around the world has meant that commonplace technology in China is sometimes more advanced than in Australia. The manufacturing participants found that the R&D expenditure in China is very high compared to the rest of the world. They also found that, whilst technology utilisation is weak, there is no shortage of advanced technology in China or money to spend on technology. Interestingly, the manufacturing participant's quality standards in China were affected by the weak utilisation of technology. They suggested that technology implementation and infrastructure is a major export from Australia to China. Some of the manufacturing participants have chose to use more basic technology and a greater number of operators in Chinese operations for this reason, even though operator turnover was very high. They also found that they were expected to import technology at Australian standards, even if local operators do not work at this standard.

Cost
All of the participants identified the low cost of labour in China (a cost ratio of about 10:1) as a major cost advantage. Interestingly, participants in traditional industries such as footwear manufacturing found that the superior infrastructure in China for those industries also provided a cost benefit. All of the participants found that expatriate costs were very significant, driving them to use local management as much as possible.
The manufacturing participants found that, although some cost savings could be achieved through purchasing a whole container load directly from Chinese manufacturers, ultimately, an investment partnership in China was required to achieve real cost savings. The education industry participants found that fees levels for education in China were quite low making it difficult to be profitable in that industry. In many cases it was used as a 'loss leader' to encourage students to come to Australia and pay higher fees. Participants from the finance and legal industry observed that many of their customers don't consider all of their operating costs in China when evaluating overall profitability.

There were still a few challenges around returning profits to Australia. The manufacturing industry participants found it often took three years before profits were generated there. The manufacturing participants also found that the use of hedging involving Chinese banks could also be risky, with the banks seeking contract faults to escape their responsibilities. Financial resources were also very important for coping with the impact of unexpected regulatory constraints which could result in several years of non-profitability. Establishment costs for the manufacturing participants often proved to be quite high.

**Local regulations (environmental and safety)**

In addition to a physical presence, the service industry participants found that involvement of the correct authorities and associations was necessary to make work conducted in China to commence. There is also a big difference in the regulatory constraints between the capital cities such as Shanghai and Shenzhen and the more regional areas. The building industry participants found that projects were generally conducted in one third of the time if the projects were properly set up with local authorities. Skipping of stages in approval processes was quite frequent. The education industry participants found the lack of regulations for education in China made it easier to set up operations, but that regulation implementation was open to corruption and subject to varying interpretations. They found that this meant doing business in China was very uncertain. The manufacturing companies found that even where products coming into China meet international standards, there was a bias towards Chinese standards instead. Many regulations were managed on the basis of expectation rather than evidence. For example, if safety equipment was specified, it was expected and no assessment of it was undertaken.

**Quality control**

The manufacturing participants found that the level of competition in specific industries determined the quality standards of those industries. Access to quality raw materials also varied considerably between locations in China for these participants. The price and quality of raw materials varied to a much greater level than in Australia. Although low-cost production for sale in China was an option open to the manufacturing participants, many felt that this would negatively reflect upon their brand in Australia and chose not to go down this path. Participants in the service industry found that to maintain the quality of their work, they had to accept a slower rate of growth in the Chinese operations, rather than accepting all the projects that were offered. Employing staff with sufficient skill levels was a particular quality/growth rate constraint. Participants in the education industry found that education infrastructure and preparation of students were not quality problems.

**Production control**

The finance industry participants found that they had consistently needed to increase their risk levels to continue to operate in China, which they did because revenue levels were high. The manufacturing industry participants found that staff training was an import aspect of
production control. The education industry participants found that production control was much more successful when a small number of larger programs were delivered in China.

**Product design**

The manufacturing participants found that the product design in China was very cost-effective and that there had been sufficient technology diffusion over the last few years to support high technology design work. Technology transfer into product design, however, still needed to be strengthened in China, they said. The education industry participants found that there was strong support from the Chinese government for developing an improved R&D capacity.

**Operations strategy**

The manufacturing industry participants found that a clear plan for the operations was a vital ingredients in success when seeking local Chinese partners. Most of the manufacturing industry participants invested in most of their Chinese activities along with local partners. No further connection with operations or business strategy was evident.

**Home country industry behaviours**

Some of the banks interviewed had been establishing operations or activities in China since the 1950s. The service industry participants had also been moving into China slowly and had typically been operating for more than 10 years. The automotive industry participants found they needed to incorporate operations in China to remain competitive. The education identified China as their biggest market.

**Supply chain management**

The manufacturing, service and education industry participants found that effective supply chains were formed on the basis of senior management networks and were established over long periods of time. The hospital supply participants found that variations in standards between Australia and China created problems with consistency and that their customers in China now buy their equipment configured to Australian standards. The service industry participants found that local regulations often required them to establish more administrative operations in China than they had expected which resulted in more complicated supply chains. The mining industry participants were particularly concerned about the ability of the marine transport sector to meet demand.

**Inventory management**

Inventory management in China was not considered to be an issue because demand outstripped supply.

**CONCLUSION**

This paper has investigated how the differences in business conditions between China and Australia influenced the operations management practices that were adopted by Australian companies investing in China. Interestingly, many of the reported experiences were common to most of the industries represented by the participants. As would be expected, relationships with government, associations, local partners and members of supply chains were vitally important. Unexpectedly, technology levels in China were not an operations management issue, although the ability to employ staff with sufficient technology training (particularly for product development) and technology implementation was an operations issue. Perhaps not surprisingly, limited consideration of operations strategy was apparent in the entry decisions. These decisions were characterised by long periods of time before the final entry mode.
decision was made and long lead times before profitability was achieved. Local variations in conditions including local regulations and availability of suitable raw materials suppliers also influenced location decisions. Finally, the regulatory expectations required that Australian companies to set up operations to Australian standards in China.

This paper provided an empirical perspective of operations management issues for Australian businesses operating in China. The experiences of Chinese companies in establishing operations in China in partnership with foreign companies now also needs to be considered. This will enable a comparison with the model presented in this paper to be made and further validate the experiences reported by the Australian participants.

REFERENCES


