A Systems-Based Methodology for Industry-Level Analysis

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Abstract

Both strategic planning by senior management in the private sector and industry policy analysis by analysts in the public sector have the need for a systematic approach to develop an understanding the dynamics of their industry. Currently a systematic attempt at industry-level analysis requires the simultaneous use of a plethora of techniques such as Porter's five forces for competitive analysis, value chain analysis for cost structure and other aspects of competitive analysis, network approaches to examine inter-organisational transactions, as well as population ecology to examine population dynamics. Building scenarios of possible consequences of significant strategic moves involves modelling the industry or strategic group through a mix of techniques that do not necessarily synergise to form a consistent basis for modelling. This paper develops a general systems based methodology for industry level strategic analysis. The underlying theory is developed from general systems theory, strategic policy analysis concepts combined with techniques developed for Information systems analysis. The aim of the approach is to allow a comprehensive qualitative model of the industry or strategic group to be developed based on graphically representing three subsystems: The Social Subsystem, Information Subsystem, and the Physical Subsystem. The approach has been applied to an examination of the rapidly developing textile industry in Indonesia.

include. In the electronics industry for example, the initial entities which are readily identified include the organisations comprising: the system suppliers, component suppliers, and maintenance providers (CABR, 1986). From these entities the relations which are relevant to the analysis can be followed to other entities to ensure all significant entities are included in the system boundary subsequently selected.

The **temporal** dimension is often one that is problematic in industry studies. Systems based approaches for industry and organisation level analysis are often criticised for their synchronic approach. Kimberly (1980), in his use of the life cycle concept in examining the decline of organisations, is an example of an alternative perspective to static approaches. The corresponding research method associated with a synchronic theoretical orientation is one which emphasises cross-sectional research as against longitudinal research. An accomplishment which may only be achieved if a temporal perspective is included in the model applied. The inclusion of a temporal dimension then requires a boundary to be selected in the form of the period of time over which the system is to be analysed. Trends in industry evolution, life cycle concepts, and feedback loops are all necessary attributes in industrial systems that are only identifiable when a diachronic perspective is adopted by the industry analyst.

The third stage of the industry analysis methodology involves identifying and describing the significant subsystems. The subsystems may be delineated by the nature of the relations between entities and related together by having one common set of entities. The following three subsystems are identified which reflect a taxonomy of the relations between the identified entities for a system and also correspond to the types of resources previously identified in the identification of the primary attributes of entities: the Information Subsystem, the Social Subsystem and the Technical Subsystem.

The importance of the inclusion of the **information subsystem** in the analysis of the relations between entities was recognised by Kast & Rosenzweig (1972) who identified information with materials as the significant things that flow between organisations within a system. The turbulence of the modern industrial environment, particularly for high technology industries, has placed increasing importance on the need for continuing information gathering and analysis mechanisms to be established.

Technology transfer, which is critical to small economies, is an example of an issue recognised as part of the information subsystem. Allen et al(1971) says that the challenge for developing countries is to select and apply efficiently the worldwide massive body of technical information that exists. Allen's research found that the most successful technology transfer occurred via personal contact networks both within and external to an organisation. He also found that traditionally accepted forms of technology transfer such as journals had a limited role in the transfer of information.

Another example of a less obvious flow of information that the information subsystem may include is identified by Anderson and Lundvall (1988). They describe a process of information flow between organisations which they identify as 'learning by interacting'. Their proposition is that successful innovation may be achieved through learning that develops from fostering close relations between users and producers.

The relations within the **Social Subsystem** involve an emphasis which includes the types of relations addressed by sociological based theories. Aldrich and Zimmer (1986) provide one example in their discussion of the importance of social networks to entrepreneurial activity. By proposing that appropriate social networks are a critical success factor in effective entrepreneurial activity they highlight the strategic significance of social relations in the system within which an organisation is positioned. The ability of large organisations to influence their environment by political activity is another example of social subsystem relations.

An existing theoretical perspective which focuses exclusively on the social relations subsystem is the Social Action Perspective as applied by Rogers (1986) in the examination of the coal industry in the USA. The basis of the Social Action Perspective is to analyse the constant renegotiation of interorganisational relationships based on how individual people in organisations assess their own resource positions and their interest in certain activities. Like most approaches within the sociological paradigm this theory views organisations as primarily social constructions.

The relations within the **technical subsystem** facilitate the flow of goods, services, and finance through inter-organisational value chain. A biological based classification of relations provides a useful starting point for the identification of the appropriate relations within the technical subsystem. Smith (1974) classified species interaction into three types:
Competition where species have a negative affect on each other; commensalism where species have a positive affect on each other; predation where there is a positive affect on one species and a negative affect on the other.

The notion of predators when applied to industry level analysis needs subdivision into the two distinct types. The first arising when for example one organisation completes a takeover of another or is so successfully competitive that it bankrupts another, thus in either case destroying one as an entity. The second type of predatory relationship is better described as 'parasitic'. An example being where a small organisation uses niche market strategies to take part of the market of another larger organisation; thus one operates at the expense of the other, however neither is destroyed in the process.

There is a range of commensal relations that will exist with sub-contractors, suppliers, customers and even potential competitors. Porter (1979) in identifying five forces for competitive analysis indirectly delineates a range of relations possible for both competitive and commensal relations between entities at this technical level. The transaction cost approach (Williamson, 1981) also describes the importance of the analysis of cost/benefit analysis of relations to optimise decisions concerning alternative choices of relations, for example, in deciding whether to either make or buy a component.

The control an organisation holds over the relationship is another significant attribute of the relationship. Commensal relations often involve a trade-off and are not all positive or negative to a particular organisation. Bresser & Harl (1986) in describing the risks of collective strategies, prima facie considered commensal, say that they may also have several disadvantages such as the reduction of strategic flexibility, lowering of organisational adaptability, increasing the impact of external disturbances and attracting new entrants. A significant attribute of the technical relations is then the control an organisation holds over it's relations, that is, the extent to which an entity has the ability to renegotiate or to terminate the relationship in its favour.

THE INDONESIAN TEXTILE INDUSTRY

1. STUDY OBJECTIVE: The objective of this study was to examine the Indonesian textile industry to identify potential investment opportunities for Australian investors and problems and issues that existing foreign investors.

2. BOUNDARY SELECTION: The **vertical boundary** that was appropriate for this study is primarily the firm level with some attributes of firm's internal structure and operations being reviewed to identify productivity issues, other problems in establishing a business, and ownership patterns. The **horizontal boundary** appropriate to this study included early stage processing firms, spinning, weaving and garment manufacturing. Government (foreign investment law and policy,

Industrial development departments, infrastructure provision) and financial institutions were also included. The **temporal boundary** was generally limited to the past few years as the industry has been rapidly developing so that more distant past events have little relationship to the present situation.

3. DESCRIPTIVE MODEL OF THE INDUSTRY:

3.1 Technical Subsystem: The subsystem of materials, finished goods, resources(financial and infrastructure), and industry location are examined in this technical subsystem. The Textile and Garment industries are concentrated in the major cities on Java. The West Java cities of Jakarta (8.2 million population), the capital, and Bandung are, by far, the largest centres for textile and garment manufacture and have similar manufacturing capacities. Semarang and Yogyakarta, in central Java, and Surabaya and Malang in East Java are the next largest centres, having approximately 10 percent of the manufacturing capacity of the major two cities. Bandung has been a popular location for manufacturing by overseas firms since colonial days because it has a more temperate climate than Jakarta due to the higher elevation of Bandung (Sekbertal, 1990).

Many general managers of firms in Jakarta and Bandung interviewed suggested that there is a recent trend for firms to be attracted away from West Java towards Central and East Java, for several reasons, related to labour issues. One disadvantage, however, of locating mills in Central and East Java is that the infrastructure is even more limited than in West Java. The infrastructure problems are less of a limitation for garment manufacturing than for textile manufacturing, since fewer resources are required (such as water and waste treatment), and only limited electricity is required to run the equipment, mainly of sewing machines.

Labour intensive industries with relatively simple technology may have some overall advantage in being located in Central and East of Java. Most of the industry moving east now is garment manufacturing but there has recently been some increased capacity in earlier-stage processing of textiles as well.

Textile investment in Indonesia generally has commenced with garments and then developed backwards down the value chain to textile manufacture, followed by spinning and fibre processing. Garment manufacturing requires less capital investment, is more labour intensive, and requires simpler skills, which can be learned on the job, than earlier-stage textile processes, including spinning and weaving.

Garment manufacture is thus less of a business risk because of the lower capital requirements, and because investments may be recouped over a shorter time compared to spinning and weaving. The labour-intensive nature of garment manufacture takes advantage of low wages in Indonesia. It also conforms to a government objective for foreign investment, which is to provide employment for the growing population.

The textile and garment industry has now developed to the stage where there is significant critical mass at all stages of the value chain to ensure the industry's long term survival as a major centre in Asia for this industry. There is still further development needed in the spinning and weaving stages to provide the quality required for international markets. Several export-oriented manufacturers of garments said, in interviews, that although there were many fabric manufacturers in Indonesia, there were still insufficient supplies of fabrics of the quality required for international markets.

The high degree of vertical integration is a significant structural phenomenon in the Indonesian textile industry. Where many other countries in the region generally have separate companies engaged in fibre making/processing, spinning, weaving and garment manufacture, Indonesia has more integration of its spinning and weaving (and some finishing) than many Asian countries. A little less than half the private companies in Indonesia have integrated spinning and weaving facilities, and

of those companies about two-thirds also have finishing operations (MacIntyre, 1991, p 70-71). A smaller proportion of the state owned mills also have integrated spinning and weaving, as do more than half the PMA companies (foreign joint venture companies).

Japan, India and Hong Kong are the major foreign investors in spinning and weaving while Korea and Taiwan have relatively smaller investments. Taiwan companies, although small investors in spinning and weaving, have many investments across the garment manufacturing sector of the industry (Asosiasi Pertekstilian Indonesia, API). The level of foreign ownership is around 23 percent.

From interviews with textile firms, it appears that there is little subcontracting of the spinning and weaving processes mainly because of the difficulty in controlling quality. Printing, embroidery, dyeing and finishing are often subcontracted by the smaller and medium size firms. Garment manufacture is different, that is subcontracting is more prevalent. Garment manufacturers in Indonesia also tend to specialise in one type of garment, for example: shirts, nightwear, or sweaters & tracksuits.

The quality of infrastructure is a significant problem in Indonesia for the textile and garment industries. Electricity, particularly, is a major problem resulting in many firms having to buy their own generators. Water is also a problem for textile manufacturing, dyeing and finishing firms that require large volumes of clean water. In many places companies need to drill their own deep wells (40-60 meters normally but sometimes up to 150 meters), and then pay a fee to government based on metered usage. The road system in Java is very poor apart from the main highways, which are toll roads.

The regulations for foreign banks operating in Indonesia require that 50 percent of the bank's total lending and 80 percent of foreign currency loans be used to support exports. This requirement, along with the structure of investment incentives, makes it significantly easier to finance, and gain approval for, export-oriented investment.

From interviews with foreign banking, consulting and legal firms, the following relevant points were identified relating to the operation and policies of Indonesian capital markets:

* Indonesian financial markets are very simple, with limited financial products available,
* Banks are not attracted to small business loans because of the enforcement problems,
* It is difficult to liquidate a company in Indonesia,
* Mortgages can take six months to be approved,
* Foreign banks have great difficulty in employing quality staff,
* Banks generally aim for 50/50 equity-debt ratios, but will but often give 40/60 loans,
* Loans of more than US$20 million, or for more than two years, require approval from the Bank of Indonesia, which can take considerable time,
* There is a 'withholding tax' on interest payments on foreign loans that is simply a tax on foreign loan repayments,
* It is not particularly difficult to repatriate profits overseas,
* Loan terms are a significant constraint: three year maximum offshore loans; local state-owned banks may lend for 10-15 years, while local private banks usually lend for less time.
* Foreign currency loans are at a much lower rate than the rates charged by local banks, that is, 8 to 9 percent compared to over 21 percent for local currency loans.

The commercial legal system in Indonesia is based on Dutch colonial law and is difficult to interpret. It was also universally acknowledged in interviews for this study that legal remedies for commercial transactions are not reliable in Indonesia. Even with a very strong prima facie case it is not possible

to be confident of victory in court. This is another reason for taking care in selecting all business relationships and for the need to establish long-term relationships based on trust.

Given the difficulty with legal remedies and the fact that companies are not required to have their accounts audited it is particularly difficult for financial institutions to assess their clients for financing. Foreign investors need to pay particular attention to their relationship with their financier to be able to offer an acceptable risk profile.

3.2 Social Subsystem: To understand the dynamics of the textile industry in Indonesia, it is necessary to be aware of the ethnic mix of the owners of firms in the industry. It is difficult to collect information on ethnicity as it is a sensitive subject in Indonesia. Because of the ethnic diversity of Indonesia and a long history of independence movements, the Indonesian government has had a long term aim of creating a homogenous society. Part of this strategy has involved action to suppress ethnic diversity, which has been carried out through at times heavy-handed policies, such as closing all Chinese schools in 1965.

Most of the ethnic Chinese in Indonesia have now adopted Indonesian names and, those who could afford it, sent their children to Taiwan or Singapore for a Chinese education. Today it is more common for ethnic Chinese to send their children to the USA, the UK, Canada or Australia for their education, as English is widely recognised as the emerging international language of business and trade.

The ethnic Chinese Indonesians are most significant in the textile industry as they currently control around 90 percent of the privately owned local textile companies. A table was included in a book by Andrew MacIntyre (1991, p 70-71) showing the ethnic identification of the owners of spinning firms in 1987. Of the thirty-seven local private spinning firms listed, thirty-three were owned or controlled by ethnic Chinese.

The main significance of this ethnic mix is that it gives a significant advantage to Chinese speaking countries such as Taiwan over other countries, for example the USA, in doing business in Indonesia. It should not be assumed, however that the Indonesian-Chinese are perceived to be the same as the Taiwanese, as the cultures have significantly diverged over time. However having a common language is still a significant advantage which. As many younger managers now speak English this advantage may tend to erode in the future.

Indonesia as one of the lowest waged countries with textile workers usually earning US$30 to 70 per month. This gives Indonesia an advantage over other countries in the region in attracting labour intensive investment. From interviews with some Taiwanese companies, the minimum wages paid to textile workers in garment manufacturing was approximately US$35 per month (as at February 1993).

Textile company managers said that although there is an abundance of workers for unskilled and semi-skilled jobs, it is very difficult to find professional staff such as accountants and textile engineers. Therefore salaries for professional staff are often higher than may be expected given the low rates of unskilled and semi-skilled workers. There is a significant polarisation of income in Indonesia, with the gap between professional staff and factory workers being quite substantial. This degree of differentiation seems greater in Indonesia than in other low-wage countries such as Vietnam and China. This could lead to increasing social tension in future.

After a long period of quiet industrial relations, Indonesia is seeing early signs of some unrest. In February 1993, 1500 workers at a sweater factory in Tangerang went on strike over what the workers claimed as inhumane rules and working conditions imposed by the company (Jakarta Post, Feb 1993,

p 60). There was agreement among the managers interviewed that the recent unrest is not yet a major problem. What unrest has arisen is worse around Jakarta than in Bandung, Central and East Java. Apparently firms that offer above minimum wages and conditions do not have problems with industrial issues, and that the cases that do arise tend to be extreme situations.

Productivity also needs to be considered when looking at wage costs. It was unanimously agreed by the managers of foreign companies that the productivity of workers in Indonesia was significantly lower than in many countries in Asia, including Hong Kong, Singapore, Taiwan, South Korea, Japan and Vietnam.

Case 1: Company E is a Taiwanese based company with garment manufacturing operations in Indonesia and Taiwan. This company decided to set up a garment manufacturing operation in Indonesia because of the shortage of labour in Taiwan and the lower cost of labour in Indonesia. The company, despite providing above average working conditions, anticipates after some time in operation reaching a staff productivity at a maximum level of 60 percent of the equivalent operation in Taiwan. The break-even level of productivity needed in the Indonesian plant to achieve the same returns as the Taiwan plant, given the lower wages in Indonesia, was estimated to be 50 percent.

There has been much manoeuvring between various industry organisations in the textile and garment industry in recent years. Two key articles by Markarim Wibisono (1989) and Andrew MacIntyre (1991) specifically examine the complex dynamics of the different organisations. The key organisations are: Indonesian Textile Industry Federation (FITI); Joint Spinning Sector Association (SEKBERTAL); Indonesian Textile Association (API); Investment Coordinating Board (BKPM). There are also other informal organisations like the Textile Club, having a membership including mainly large spinning and weaving companies with Japanese partners, and the Bandung Textile Club with membership consisting of many firms in the Bandung area. Given the importance of establishing long-term relationships when doing business in Indonesia, both the formal and informal organisations provide an important opportunity for developing and maintaining such relationships.

Facilitation payments are a significant problem for foreign investors. Within Indonesia, and most South East Asian countries, it is common for payments in monetary or non-monetary forms to be made to facilitate or speed up acceptance or approval of business transactions. Although this practice is universally acknowledged, it is still a delicate political and legal issue. Both, a Ministry of Industry internal research report, which identified problems encountered by foreign investors, and comments by the previous USA ambassador to Indonesia, confirmed that companies new to Indonesia had more problems with corruption than more established companies (Jakarta Post, Jul 1992). The reasons are not entirely clear, but it appears that new companies are easier to take advantage of and there are many licences and approvals to obtain in a short time when setting up business. Established businesses that have developed relationships with local authorities appear able to obtain approvals and licences with little need for large payments. The following cases provide examples to illustrate how some foreign investors have dealt with this issue:

Case 2: Company Y's manager, who has been operating in the textile industry for some years, gives gifts at significant times of year, such as Ramadan, to key people in regulatory positions with whom he has an on-going business relationship This then obviates the need to pay continuously, as well as breaking the link between payments and transactions with regulatory authorities.

Case 3: Company P employs a military officer as a consultant to advise on security and act as an agent in facilitating minor issues, for example, obtaining phone lines.

The efficiency of official approval processes for foreign investment proposals are difficult to compare accurately between countries, as each investment case varies significantly even within a country. Asian Business (1990) attempted to quantify the time involved and the number of officials

that have to be seen in gaining project approvals. Of the ASEAN countries, Indonesia is identified as having the longest approval time (minium of 3 months and often more than 6 months) and the most officials to be seen (10 or more).

Investment in a developing country is more risky than in developed countries. The risk level is emphasised by estimates of 60 percent success rate for foreign investments and, according to one major foreign bank, only 50 percent of projects proceed past the planning stage to investment. There was a clear consensus among interviewees for this study that by far the primary critical success factor was the choice of a local partner. Thus, dealing with local partners is one of the most critical issues faced by foreign investors.

Following are several case examples of partnership strategies identified from company interviews:

Case 4: Company B invested in a textile mill in West Java. The manager had a contact with a garment manufacturer from his own country who was already established there. He relied on his contact for assistance in setting up his factory as well as a little help from the trade mission of his country to identify correct procedures. He had a local partner, as required by Indonesian law, but he relied little on the local partner. The time taken to establish the business was twelve months which included building a factory. The time taken to obtain an export licence was six months. He also employed a serving military officer as a consultant to help facilitate minor approvals.

Case 5: Company T found a local partner, who was a silent partner in that the partner did not put in capital but took a share of the profits. This complied with local legislation requirements. The local partner offered in return the influence of his position in government, to help facilitate business approvals and expedite the provision of services.

Case 6: Company R set up what is known as an 'Ali Baba' arrangement whereby a local company is set up which the local partner owns; but the local partner has a loan agreement with the foreign partner, and the foreign partner also holds the company's share certificates and a signed transfer form.

Case 7: To give the partner a share of profits but retain control over the partner, Company H gave the local partner a house in the country of the foreign partner but lent money to the local partner on security of the house, so the deeds can be held by the foreign partner.

Case 8: Company K, a foreign textile manufacturer, arranged with a local Indonesian textile manufacturer to supply the machinery for an additional knitting factory on the local company's premises. The foreign company then took clothing or cloth at a substantial discount over an agreed period of time to recover the cost of the equipment. The foreign company also provided technicians to establish the factory and monitor the operation.

Some of these case examples involve schemes to control attempt to control local partners. In practice, they are of limited practical use because, if the partnership goes wrong, there are many ways for the partner to subvert any efforts to control the partner's activities. In the end there is no substitute for a trusting relationship and enforcement schemes can only be seen as minor insurance and not in any way as complete protection against partnership problems.

The above case is a good mutually beneficial strategy as the local partner will eventually get the machinery and expanded business without having to find the capital at high local interest rates. The overseas company has control over expanded production facilities in a low-wage country, without the cost of setting up a new factory, and with less risk.

3.3 Information Subsystem

The lack of education of the work force is seen as a major disadvantage in Indonesia. Some main competitor countries for foreign investment, for example Vietnam, undertake more extensive education of their people at all levels of society. Education participation rates are quite low in Indonesia: only 20 percent of the population have completed elementary school; less than 5 percent have completed high school; and less than 1 percent have completed university (Price Waterhouse, 1989). The outgoing Japanese ambassador, Michihiko Kunihiro, commented that improving the skills of the work force was one major issue that needed addressing to improve the investment climate in Indonesia (Jakarta Post, 1992).

There is limited education capacity available to support the textile industry in Indonesia. The quality of this education does, however, appear quite high. The Institute of Research and Development of Textile Industries (Balai Besar Penelitian Dan Pengembangan Industri Tekstil) in Bandung selects 200 students each year, from 2,000 applicants, for a five-year diploma course, which is designed for textile technicians who will manage the production processes. With a 10 percent success rate among applicants, it could be expected that the quality of students is high.

There is another textile course at a Jakarta university that offers a three-year course, which is more management-oriented than the Bandung course. There is also another private textile school in Bandung offering a three-year course. These courses do not provide a sufficient supply of skilled technicians to meet industry demand. The textile industry has undergone such rapid growth in recent years that the supply of trained labour has not kept up. Most firms have to train many of their own technicians and operators.

Foreign investors in the textile and garment industries usually employ imported technicians to manage the production process and ensure that quality is maintained at the standard required for export markets.

In conclusion, the prime difference (and strength) identified between the approach outlined in this paper and other industry studies is the recognition of the importance of the Information and Social Subsystems to industry analysis. Some of the attributes of the textile industry in Indonesia identified in the social subsystem analysis, such as the significance of the ethnic composition of the firm owners in the industry, are vital aspects to be understood by any investor or policy maker planning to operate in this industry.

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