
International long term business relationship, communities of practice and innovation: a longitudinal case study of NDDB, India and Tetra Pak, Sweden

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Abstract: This paper is a longitudinal study of the impact of a long-term international business relationship on innovation. It traces the market entry of the Swedish Company, Tetra Pak into India. The case focuses on major packaging material manufacturing innovations carried out by the Indian Joint Venture (JV) managed by the Indian partner. A JV relationship is found to provide a context for technical specialists to interact and develop explicit and tacit knowledge and skills. These interactions create wider communities of practice involving networks of suppliers and customers, who in turn create further knowledge and innovation.

Keywords: business relationships; buyer-seller relationships; communities of practice; dairy; India; innovation; interaction; knowledge creation; longitudinal study; market entry; networks; packaging; sticky information; Sweden; tacit; technology transfer.

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1 Introduction

The importance of long term relationships in business has been emphasised by several scholars (Hakansson, 1982; Han et al., 1993). There is however a dearth of longitudinal studies of such relations (Kinch, 1993). This paper is about a long-term business relationship and its impact on knowledge creation (Nonaka and Takeuchi, 1995) and innovation.

There is a growing literature on the importance of trust in learning among firms (Dodgson, 1993; Buckley and Casson, 1988) and there is some agreement that higher levels of inter-organisational trust lead to higher levels of learning. Learning itself has been studied in a wide variety of perspectives, including 'learning by doing' (Arrow, 1962) and 'learning by using' (Rosenburg, 1982). The technology strategy literature (Ford, 1988) cautions firms about revealing too much knowledge to counterparts, while other parts of the technology transfer literature (Davidson and Fetridge, 1985; Dawson, 1987) encourage technology and knowledge transfer once a suitable agreement has been reached.

This case study describes the evolution of the relationship between the National Dairy Development Board (NDDDB) and Tetra Pak. To begin with we give some background information about the two organisations.

2 NDDDB – India

The NDDDB or Dairyboard of India is a statutory body of the Government of India. It was established in 1964 to spread the Anand pattern of Dairy Cooperatives throughout India, under a dairy development programme called 'Operation Flood'. The Anand or Amul (www.amul.com) pattern of cooperatives involves organising farmers across both caste and gender lines at the village level. The Village Milk Cooperative Societies are Indian democracy at the grassroots, with elected boards of directors. The Society collects milk from members and pays them depending on the quantity and quality of milk supplied. The District level cooperative, termed the Union, is responsible for transporting the milk from villages to the district headquarters and processing it into saleable milk and milk products, such as butter, cheese and milk powder. The third tier in the system is the state level marketing body, called the Federation, which manages marketing, including distribution and advertising, for the member Unions.

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With a very large population and a large number of rural people surviving as subsistence farmers, India has followed the cooperative model of dairy development. The flagship cooperative, Amul Dairy, collects one million litres of milk a day from 800 villages comprising one million farmers with one million animals. By way of contrast, the Dairy Vale Cooperative of South Australia collects 0.7 M liters of milk from 500 farmers (Roy, 1996). Amul is the single largest food brand in India and NDDB is credited with making India the second largest producer of milk in the world after the USA and it regularly consults with other developing countries like Sri Lanka and China on issues related to dairy development.

The NDDB was founded by Dr V Kurien and evolved from Amul Dairy, of which Dr Kurien was the first General Manager. Dr Kurien is widely considered the father of Indian dairying. Describing the success of Operation Flood, CII with McKinsey and Co. (1987) observed:

“Operation Flood has linked 8.4 million farmers in 200 districts into 70,000 milk societies. These milk societies supply milk to 170 milk unions for processing and marketing. As a result of the recent growth, the sector now employs 8% of the country’s labour force, including many small and marginal farmers. There are in total over 30 million small producers with an average herd size of just 3.7 animals. The cooperatives have a direct membership of one third of these farmers. Small and marginal farmers account for three-quarters of the households, and raise 60% of the cattle. Dairy is not these farmers only agricultural activity; typically 15 to 40% of their monthly income comes from dairy.”

3 Tetra Pak – Sweden

Tetra Pak¹ is the world’s leader in aseptic packaging of liquid foods. It is a family company with 1997 sales of US \$7.2 billion and 18,000 employees worldwide. The ubiquitous ‘juice box’ found in children’s lunch boxes around the world is the Tetra Brik, the biggest seller in the Tetra Pak range. The words ‘Tetra Pak’ have become almost synonymous with milk and juice paper cartons, which indicates the success of the product.

The company was founded in 1951, by Dr Ruben Rausing² as a unit of the company Akerlund and Rausing. In 1960 Dr Rausing sold his stake in Akerland and Rausing for US\$11 million and invested it in Tetra Pak. Tetra Pak cartons cannot hold carbonated drinks, because of the air pressure, and are therefore used only for liquid foods and non-carbonated drinks. It has 50% of this market in Europe, 40% in Japan and about a third in the USA. The Tetra Pak activities of the NDDB were looked after by its subsidiary Hindustan Packaging Company Ltd (HPCL) an 80:20 JV with Tetra Pak.

4 An overview of the packaging business and its sources of innovation

The locus of innovation (von Hippel, 1988) in the packaging business is in the packaging material manufacturing factory and packaging machines in the plant site where packages are filled.

In the dairy plants, where the packaging machines operate, the customer technicians are responsible for machine operation and routine maintenance. For this they receive training at a residential training school maintained by the packaging supplier i.e. HPCL/Tetra Pak. During the conduct of packaging operations the packaging supplier's technicians are called in for quarterly and annual maintenance and when serious problems occur. Given the division of responsibility, the community of technicians (Brown and Dugoid, 1991) has much more information and knowledge to share with respect to machine performance, compared, for example to the office equipment situation described in Orr (1990).

The packaging material is manufactured by HPCL, packaging machines were supplied from Sweden and spare parts were partly supplied from Sweden to HPCL and partly developed locally in India.

Packaging material manufacture within the Tetra Pak system has many similarities to the paper converting industry, which makes packaging for cereals, chips and soap. As a result, an industry network of suppliers and other professionals already exists in India with related technical knowledge and experience. These, as we shall see, can be important sources of knowledge and ideas with respect to problems and related to Tetra Pak products. In addition there are a series of technical journals related to the industry, such as 'The Paper Film and Foil Converter' from the US, which discusses the latest developments in packaging material manufacturing.

Tacit knowledge has been defined by Polanyi (1966) as one which involves skills that are difficult to articulate and thus difficult to transfer. Information is 'sticky' according to von Hippel (1994) when the information is costly to acquire, transfer and use. Tetra Pak technology of packaging material manufacture and packaging machine operation for good output is both 'sticky' and tacit to each location. Producing packaging material according to specifications is not enough, as it may still result in problems for the individual customer. Because of this, Tetra Pak operates its business as a system supplier taking responsibility for the packaging material and packaging machines. This is not the norm in the packaging industry, as very significant asset specific investment is involved and most organisations are not able to afford or sustain such a strategy.

At the paper-converting end of this industry, which corresponds to the HPCL packaging material making plant, suppliers are invited by customers to be present during trial runs with new inks, paper or plastic. This occurs even when customers are aware that the suppliers are likely to use the information gained from the trials in serving competitors in the field. This apparent altruism and camaraderie has been called a community of practice by Brown and Duguid (1991). This is important in this industry, because each aspect of packaging material production and filling machine usage involves major elements of tacit (Polanyi, 1966) and contextual knowledge (Araujo, 1996). Over repeated trials, and by working together, suppliers and customers come to understand each other's activities and, as a result, innovations occur and problems are identified and solved. This theoretical approach to technological development and innovation has been introduced in Hakansson (1987) which this case develops further.

5 Research questions and methodology

The focus of this case is on the NDDDB-Tetra Pak relationship and its impact on innovation in packaging materials. More specifically we seek answers to the following questions:

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- How did the business relationship develop between the parties? What events and actions were important in its development?
- How did NDDDB and its JV learn and innovate in the packaging area?
- What role did customer-supplier relations play in the learning and innovation process?

The first author was able to draw on first hand experience for some aspects of the case as he had worked for HPCL between 1982–1995. In addition, in depth interviews were conducted with senior personnel in December 1997 and January 1998. Interviews were conducted with the present Managing Director and the two past managing directors of HPCL. Dr V Kurien, the Chairman and founder of NDDDB was interviewed. Access was also obtained to archival material in the form of old Tetra Pak files. Lastly books which dealt with aspects of the case were consulted.

6 The beginning: 1957–1977

In 1957, Amul Dairy started to become important in India and Tetra Pak had started entering markets like India. At this time glass milk bottles were the main packaging method for milk. Milk pouches made of plastic had not made an appearance and Tetra Pak cartons for pasteurised milk were just being introduced in Europe. Compared to glass bottles, paper cartons were much lighter, safer and easier to handle. Erik Torudd who was then the Vice President of Sales of Tetra Pak for overseas markets was touring India and called upon Dr Kurien, the General Manager and Chief Executive of Amul Dairy. According to records this first contact was in May 1957 (Kamath, 1989).

By 1961, a major technological breakthrough occurred within Tetra Pak when UHT Sterilisation of milk became possible. UHT sterilisation involves heating milk briefly for 2–4 seconds at 140 Degrees Celsius, which kills any bacteria. Milk is then packaged under aseptic conditions in sterilised packaging material without any air in the package. These packages can be kept in ambient temperatures for up to one year. The initial packages by Tetra Pak, without aluminium foil, could keep for 15 days without refrigeration.

Being able to keep milk without refrigeration was a revolutionary concept in India in the 1960s. India is a vast subcontinent with high day temperatures and had an undeveloped cold storage chain. Hence, the concept of long life milk captivated the imagination of large sections of people and Dr Kurien ordered two AT 500 (Aseptic Tetra Hedron 500 ML) machines for Amul Dairy – about three years before NDDDB was formed.

This was a time when Western Europe had amassed a huge stockpile of butter and milk powder as a result of its farm price subsidies under the Common Agricultural Policy. Dr Kurien 's plan was to obtain these commodities as a gift from the FAO, reconstitute the milk in newly built mother dairies, and sell it in the metropolitan cities of India. The funds so generated would then fund Operation Flood. By controlling the marketing of liquid milk in urban India, NDDDB would have an assured market for rural milk. This would automatically make farmers give priority to dairying, as there would be an assured market and price. Quite independently of Dr Kurien, Dr Ruben Rausing wrote to U Thant the then Secretary General of the United Nations (Kamath, 1989) in September 1968 proposing the so-called Rausing plan. This involved the following elements:

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- The industrialised Western world has a surplus of milk and milk products. The surplus is not used and is becoming a headache.
- This surplus milk should be turned into milk powder and given to developing countries where it can be reconstituted into milk and distributed in aseptic packaging.
- Cows in developing countries should be upgraded, so that they produce more milk, thereby obviating the need to import milk powder from abroad.
- The Western nations – through the United Nations and its organisations like the FAO and the World Bank – should adopt this plan.
- As the health of people in developing countries improves, so would chances of implementing Family Planning.
- The green revolution would soon enable the developing countries to harvest enough grain to meet the needs of calories from starch food. However, that must be supplemented by proteins such as meat and milk – but mainly milk.

Dr Ruben Rausing was interested in improving the living standards of people in developing countries and was not motivated by the commercial desire to expand Tetra Pak. He was already enormously wealthy.

Dr Kurien submitted the Operation Flood project (Kamath, 1989) to the FAO in Rome in the autumn of 1968, at almost the same time as Dr Rausing's plan was submitted. and FAO Director General Dr Boerma³ asked Dr Rausing whether he had heard of Dr Kurien and he had not. The contact from Tetra Pak was at the operational level up to this time. Dr Boerma then organised a meeting between Rausing and Kurien, which was followed, by a meeting of Kurien, Tetra Pak and FAO representatives in April 1969. Tetra Pak was invited because the Rausing Plan was similar to the Kurien Plan. The meeting ended with a much excitement about the project and the stage was set for the approval of the Kurien plan- later called Operation Flood.

The FAO, in its general meeting in October 1969 approved Operation Flood. This was the single largest project on dairy development ever approved by the FAO and it depended on Dr Kurien alone for its implementation. Dr Rausing supported the Kurien plan and was thus instrumental in developing dairying in India. In June 1970, Dr Boerma called 500 delegates from other developing countries to discuss a plan called The International Scheme for Coordination of Dairy Development (ISCDD). The delegates knew that the Kurien plan was already approved and they wanted similar schemes for their countries. Ultimately, however, nothing came of this because, as Erik Torudd of Tetra Pak in 1978 explained (Kamath, 1989):

“What was the reason? A very simple one. No other receiving country had a Dr Kurien, with his intelligence, charisma, persuasive powers, effectiveness in administration, honesty and backing by his government and international organisations . . .”

Other countries should have been able to copy Operation Flood and made some vague efforts, but none had an administrator of his kind. FAO wanted him to join their organisation and if he had done so, there is no doubt that several countries would have had an Operation Flood or something like it. The Indian Government said ‘No’ – unfortunate for other countries, but fortunate for India that Dr Kurien stayed there.

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At the same time a decision was made that India would be the first developing country to have the Tetra Pak system and the Swedish Government, through the Swedish International Development Agency (SIDA) made US\$10 million available for the Project.

Soon after this, considerable controversy erupted in Sweden and in India regarding the Tetra Pak project, which would continue in India until the early 1990s. In 1969 in Sweden some newspapers reported that Indian and Swedish interests were going to loot the starving people of India via the Tetra Pak project. SIDA became anxious and decided that none of the development grant should be used to purchase Swedish machinery. A campaign was started in India against Dr Kurien and, when he visited Sweden to understand the issues, Swedish Government Officials 'gravely insulted' him according to Erik Torudd (Kamath, 1989) of Tetra Pak.

One of the main problems, according to Dr Kurien, was that India was not familiar with the Tetra Pak system. Hence in 1971 it was decided to exhibit a Tetra Pak machine at a Dairy Conference in India. It should be noted that several of the trainee engineers responsible for setting up and running the AT-300 machine at this dairy conference later worked as operations managers in the Tetra Pak joint venture. The machine was flown in from Sweden in 1971 along with an Alfa Laval VTIS steriliser and 800,000 packages. The engineers recalled, during interviews in 1998, the extraordinary kind of support which Tetra Pak offered and the resources, which Tetra Pak deployed. The engineers had recently graduated from the top engineering schools of the country and their mandate was to ensure that the packages were ready for the conference, in particular to ensure that no pack either leaked or curdled when the conference delegates tried them. The engineers recall that they faced tremendous problems in the meeting of this objective and resorted to night long quality checking of 100% of the packs produced. Even so, the engineers believe that the Tetra Pak technology had no fundamental defect. However, the experience of getting the AT-300 machine working was described as a 'baptism by fire' into real life engineering for these engineers.

7 Tetra Pak enters India as Coca Cola and IBM are compelled to leave: 1977–1978

The years 1971–1977 were a time of intense lobbying of the Indian government of which NDDB was considered a part. Kant and Co., a private Indian company, was supposed to be a joint venture partner with Tetra Pak for the manufacture of the packaging material. But an issue arose over the extent of government shareholding in the Joint Venture and, after many discussions, Kant and Co., finding itself to be a minority partner, withdrew from the project, leaving Tetra Pak with a 20% stake and NDDB with 80%.

The glass bottle lobby, who stood to lose if Tetra Pak products became popular, fuelled opposition to Tetra Pak in particular. Opposition to Tetra Pak was also part of the socio-political milieu of the time in India. For example, things like colour televisions and Tetra Pak were considered luxuries, as were refrigerators and cars. This was in keeping with Soviet type socialism, which found favour with the intelligentsia in India. Tetra Pak's opponents collected 400 signatures and presented a petition to Prime Minister Indira Gandhi. As a result of this lobbying Mrs Gandhi and her Government rejected the Tetra Pak joint venture proposal, on the grounds that it involved packaging too expensive for India. Dr Kurien tried to convince the Government that the consumer would have a choice

in buying milk packaged in plastic sachets, glass bottles or Tetra Pak cartons (Heredia, 1997) but this was to no avail. During the 1974 International Dairy Congress, Dr Kurien informed Erik Torudd that the Government would not approve the project.

A 'No' from Mrs Indira Gandhi in 1974 meant a great deal in India. Mrs Gandhi had become very dictatorial and, in 1975, had declared a national emergency, which subverted democratic processes for two years. The Tetra Pak project languished in Mrs Gandhi's regime.

The new Government of India in 1977 was pro-Kurien. The Prime Minister, Morarji Desai, was familiar with the Anand Cooperative since the days when he was Chief Minister of Bombay in the 1950s. The Finance Minister, H.M. Patel, was an old friend of Amul and a former civil servant turned politician, whose daughter was the senior manager of NDDB in New Delhi. In addition, there was a more understanding civil servant in the Agricultural Ministry, Mrs Malhotra, who was willing to resurrect the old files.

NDDB arranged a tasting of Tetra Pak milk for the Janata Government Cabinet members in 1977. An important factor here was that the milk used came from Tetra Pak's joint venture in Pakistan – the arch rival of India. Commercial relations had been strained between the two countries since the two wars of 1964 and 1971 and it was only due to help from a senior Pakistani minister, who had visited Anand that the packages arrived in time. Dr Kurien asked the Pakistani minister to send a few packs of UHT milk in the diplomatic bag and Miss Patel, the head of NDDB's Delhi office collected the packs and put them in a refrigerator, even though they were long life milk packages. Dr Kurien advised that cooling the packs would mask any milk that had gone off!

The tasting was a success. The Minister of Agriculture was a Sikh from Punjab, traditionally big milk drinkers. He drank a glassful and all cabinet members liked the long life milk. When the Finance Minister, found out that the milk was from Pakistan, the following exchange took place (Kamath, 1989):

"Finance Minister HM Patel asked, 'Where do these Tetra Paks come from?'

Kurien said: 'From Pakistan, sir.'

'From Pakistan? Are they ahead of us?'

'Yes sir.'

Patel said: 'I hope it is only confined to milk!'"

The cabinet members present tasted the milk and found it good. That clinched the argument. Tetra Pak was finally in!

On January 12, 1978 Erik Torudd of Tetra Pak finally got the following cable from Kurien (Kamath, 1989):

"For Mr Erik Torudd from Kurien Stop. Happy to inform you that our Tetra Pak proposals for introduction of Tetra Pak in India are being approved by Government of India Stop We must therefore immediately proceed with setting up of Paper Laminating Plant and at least four Tetra Pak installations in four different states of India to feed aseptic milk to four metropolitan cities of Bombay, Delhi, Calcutta and Madras Stop Speed of implementation will be greatly helped if you could visit us now with your planning engineer with full commercial and technical details Stop Regards Dairyboard."

At this time Torudd was 68 years of age and had waited for 16 years for this news. During the previous decade, which was spent convincing the Indian Government, Tetra Pak had expanded and now had 11 factories for packaging material in 11 countries.

The most hostile year for foreign companies in India's 50 years of independence was 1977. The Janata Government, which approved the entry of Tetra Pak, compelled

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Coca-Cola and IBM to leave India. Seen in this light, the entry of Tetra Pak into India can be termed extraordinary.

The NDDB and Tetra Pak JV started operating as the Hindustan Dairy Packaging Company. Thus, 20 years after the initial contact – the two organizations started working together.

8 Innovation and learning

Nineteen eighty two was a hectic period for commissioning the packaging material plant, which was designed for a Capacity of 7650 MT or 700 Million packages. It involved commissioning a 4-colour flexographic printing press, the largest in India, that would print on the paper board rolls. The 60 inch Egan plastic extrusion coating line was also the biggest such line in India.

Paper development was a major task and involved repeated consultations, trials and re-trials with Tetra Pak and the Indian supplier, Bhadrachalam Paper Boards. The paper had to be produced in India, as imports were not allowed. But, unlike Scandinavia, India does not use pine wood pulp in paper manufacture. Pine wood pulp has long fibres, that are essential if the paper is to go through the high stresses of the filling machine. Tetra Pak was able to coordinate and facilitate Indian supply, made from short fibre bamboo pulp. The Indian supplier also performed well and there seems to have been a lot of praise for them. Problems also arose in developing polyethylene, inks and splicing tape from Indian suppliers, who were new to this large scale of operation. Vendor development assistance, provided by Tetra Pak for the packaging material plant, was rated highly by the Indian managers involved.

During this time a community of practice (Brown and Duguid, 1991) developed between Tetra Pak's technical people in each function, HPCL technical staff and the Indian suppliers. So close-knit and 'underground' was this community, that almost none of the briefs which reached the NDDB ever named or complained about any individual within the technical departments of Tetra Pak. These briefs contained points to be taken up with Tetra Pak at higher level meetings pertaining to the Paper Laminating Plant or the Technical Service Division (related to filling machines). The only reference to a Tetra Pak technical man, which can be found in the JV files, is a condolence letter for the late Sune Patterson, a Tetra Pak Paper expert, mentioning his help in Indian paper development.

The first milk packaging stations to be commissioned were in Indore in Central India and the Surat-Aseptic Packaging Station (Surat-APS) in Bombay. The latter gave the biggest problems to the NDDB-Tetra Pak relationship.

Like other plants, the commissioning of Surat-APS involved producing three consecutive batches of packaged milk that met sterility standards. This did not prove very difficult, although it required considerable time and effort on behalf of Tetra Pak technicians from Sweden and local technical people from the HPCL. Demand in Bombay rapidly grew to about 20,000 litres a day but there were problems in the market every year. Tetra Pak engineers would come in from Europe and together with HPCL engineers, NDDB's Research Division and Surat Dairy management, they would wrestle with the problems. The plant would begin operations again but this irregular market supply meant that marketing in Bombay suffered. One manager recalls that the product had to be

withdrawn almost every year from the market, due to the inability of the plant to supply a reliable product. The other three production facilities at Indore, Jaipur in the north and Guntur in the South were smaller operations and had regional brands of a far lesser impact on the market.

It was clear by 1985 that the product was not marketable. In 1986, NDDDB decided that the main problem was with the non-alufoil packaging and it was decided to upgrade the filling machines to use alufoil laminates.

Meanwhile, criticisms continued to be made of the Tetra Pak project and the large investments made in aseptic packaging. Every Federal Parliament session included questions about the project, such as how much of the installed capacity was being used by the dairies, how much money was invested and whether the technology was unsuitable.

9 Juice packaging material – innovation, 1985–1988

Amidst the rather disappointing performance of the AT-500 system, Tetra Pak started marketing the TBA-200 machine system for 200 ML Brik shaped cartons. The first customers in India were NDDDB, Parle and Noble Soya. NDDDB ordered 16 machines, for a combination of 200 ML and 1 Litre products, to be used for the flavored milk and plain milk market. Parle, which since the 1977 exit of Coca-Cola, had been the leader in the aerated drink market, established four other franchises in different parts of India using the Tetra Pak machines. Noble Soya ordered six machines to pack soya flavored milks in 200-ML cartons.

The introduction of the Tetra Brik system boosted the market image of Tetra Pak cartons. 'Frooti', the Mango drink launched by Parle, became an outstanding success. Packaging material was supplied initially from the Singapore plant and then developed at the Itola, plant somewhat against the wishes of Tetra Pak. Parle wanted to buy Indian packaging material, which would be cheaper, and thus worked with HPCL on a 'will pay if it works basis'. HPCL agreed to take a trial run of a few reels and rushed it to Parle's Bombay plant. After a few trials the material started to work. This was a major innovation for the HPCL plant because the manufacturing equipment was not designed for manufacturing such packaging material. Instead of being plastic coated in one run, it called for repeat runs on the same paper, first to coat the printed side of paper with plastic, next to stick the aluminium foil with plastic and finally two layers of plastic on the product side. Thus, instead of passing the paper just once through the extrusion line, the above process needed four passes and thus very careful monitoring of the manufacturing process and parameters.

Had HPCL waited for the Tetra Pak recommended extrusion coating equipment needed for the single pass manufacture of aluminium foil juice packaging material, it would have taken about two to three years in terms of equipment lead times. By this innovation, HPCL was thus able to enter a growing market three years ahead and also start learning the many intricacies of aluminium foil laminates and how to use them in a different filling machine model. This knowledge would create the base for the next major innovation. In terms of business performance, the 15 day shelf life milk in the original Tetra Hedron without foil, was yet to reach 2 million packs per annum, whereas sales of the aluminium foil Brik cartons, within a year of introduction, had reached about 100 million packs.

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10 The plant inauguration

If there was one year that changed the relationship between NDDB and Tetra Pak it was 1988. It started with the formal inauguration of the JV packaging material plant by the President of India, on April 7. By this time Dr Rausing had passed away and his son Hans Rausing was the Chairman of the company. He was unable to attend the formal inauguration of the plant himself but Tetra Pak was represented by a high-powered team led by the worldwide CEO of Tetra Pak and other senior executives connected with India. The team included Erik Torudd – now a retired man and his wife. The celebrations included the presentation to Mr Torudd of a large and heavy metal bull, the symbol of NDDB as a token of appreciation for his efforts in introducing Tetra Pak to India. This gift is unique and given to very few people associated with Amul and NDDB and Erik Torudd is probably the only foreigner to have received it. In his 1988 Christmas card to Dr Kurien, Erik Torudd writes:

“Dear Verghese:

It was such a pleasure to be invited and to participate at the inauguration of the Itola factory. Something that I have looked forward to during the many years of our cooperation. It was made in such a beautiful and perfect way.

I want to thank you for the unbelievable endurance you have had with me and TPI have told you before and I repeat it again without you and your help TP could never have entered India. Of all my business deals I have made during my 50 years in the packaging field and on all five continents the Indian deal was the toughest, most interesting and satisfying one.

I am thankful and proud of the friendship I feel, that has developed between us during the years. The wonderful work of art – the old Indian bull will always remind me of you and what you have done for India and for TP and myself. Thanks my Dear Old Friend.”

At the inauguration the President of India, Mr R. Venkatraman drank some fruit drink from a Tetra Brik carton, shook hands with the Tetra Pak top management, and unveiled an oil portrait of the late Dr Ruben Rausing with an inscription commemorating his role in dairy development in India. The Tetra Pak executives felt that the Indian manufacturing plant was indeed worthy of acquisition by Tetra Pak.

11 Edible oil packaging material innovation

Meanwhile, the India business was stagnating with no second ‘Frooti’ in sight. Also, additional plant equipment had been added. NDDB had imported one-litre brik machines for milk, which had no takers. At this time the opportunity of packing edible oils presented itself to NDDB.

India is one of the world’s largest vegetable oil markets, with six million Metric Tons being consumed every year. But only about 200,000 MT of this is packaged. There is also a large amount of speculative trading in edible oils in the commodity markets, as a result of which farmers never know what price they will get. At the request of the Government of India, NDDB entered the edible oil procurement business by forming farmers’ cooperatives and tried to give an assured price to the farmer so that domestic production of oilseeds would be enough to not require imports of edible oil.

In 1987–1988, NDDB was asked by the Government to intervene in the consumer end of the market. This was needed as there was no really big player in the consumer branded edible oil business and the commodity market was a slave of unscrupulous trader-speculators. NDDB decided to launch edible oil under the brand name of ‘Dhara’. The pack chosen was Tetra Brik 1 Liter and it was launched in about four months.

Edible oil has peculiar packaging problems, as it tends to ooze through normal polyethylene and this makes the packs greasy. Linear Low Density Polyethylene (LLDPE) however, can be used to solve this problem but the HPCL extruder was not designed for LLDPE. Packaging material was therefore sourced from Tetra Pak in Europe.

After the packaging material landed at the oil plant in New Delhi, it was found that the packs were not sealing properly. Tetra Pak could do nothing to rectify the situation, as freight times and distance prevented more packaging material being imported in time. HPCL had no option but to improvise and create its own edible oil packaging material.

Tetra Pak was alarmed and issued a written denial of any responsibility for the new oil packaging material’s performance. NDDB claimed a royalty on the packaging material for oil, as it was developed by HPCL at the behest, cost and risk of NDDB. The payment of the royalty to NDDB was approved at an HPCL Board meeting in the presence of the minority Tetra Pak Board member.

Bickering between Tetra Pak and NDDB arose, and a formal letter was received by HPCL from, Tetra Pak in December 1990:

“Dear Sirs,

It is with great surprise that we have been recently informed about HPCL’s intention to enter into a technology license agreement with NDDB in relation with the production of packaging material for edible oil.

Although we acknowledge and appreciate the efforts and skills demonstrated by HPCL in adapting our technology for manufacturing packaging material for oil products, we do not believe that HPCL has thereby created a specific know-how, which could form the basis for royalty payments.

Furthermore, the results of such work done by HPCL certainly belong to HPCL and not to NDDB.

We therefore would like to inform you that we do not accept that HPCL shall remunerate in any way NDDB for the technology in question and that we are firmly opposed to the intended license agreement between HPCL and NDDB.

Yours sincerely,

TETRA PAK INTERNATIONAL SA.”

Prior to this crisis of confidence, minutes of a Stockholm meeting in October 1989 record that there was a lack of confidence between NDDB and Tetra Pak. The rest of the meeting revolved around who did what and the complaints of customers about the AB-10 system.

12 Acquisition of Alfa Laval by Tetra Pak and India’s economic liberalisation

Amidst the strains that developed in the relationship between Tetra Pak in India and NDDB, Tetra Pak decided to acquire Alfa Laval, the leading food processing equipment

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maker worldwide. With this acquisition, Tetra Pak became the owner of Alfa Laval India, which was headed by the dynamic Indian chairperson, Mrs Leela Poonawalla. Alfa Laval had a long relationship with Amul and NDDB and had supplied equipment and commissioning services to many NDDB projects over the last three decades. Mrs Poonawalla was also a leading businesswoman who had succeeded in a male dominated equipment-making industry.

Mrs Poonawalla shifted Tetra Pak from New Delhi to Pune, the headquarters of Alfa Laval. The Tetra-Laval group was much more familiar with NDDB and almost immediately dropped the earlier idea of the joint existence of the NDDB controlled HPCL and a Tetra Pak controlled Tetra Pak India in the market.

In 1991, India liberalised and the Soviet Union collapsed and the intelligentsia, who had supported the public sector on the grounds of the success in the Soviet Union, was left on weak ground. Suddenly, foreign investment was welcomed and increases in the shareholding of erstwhile foreign minority partners became common.

In 1991, Tetra Laval made a bid for 40% of the shares in HPCL. This was rejected by NDDB. In 1994, Tetra Laval sold two machines of the advanced AB-3/9 model, which had a recloseable spout, to a private oil company in Delhi. In addition, discussions commenced with juice customers for the supply of the slim pack with the pull-tab for Tetra Briks. For both of these, the HPCL's factory could not produce the packaging material. As a result Tetra Laval sought and obtained, the Government's approval to set up a second 100% owned factory for packaging material near Pune, which started production in 1996.

In December 1996, NDDB finally agreed to sell its 80% of shares in HPCL at a good price. Dr Kurien says that there was no choice, as the Government had granted permission to Tetra Pak to put up a second factory without consulting NDDB. With all technology inputs closed and the Government hostile, it was decided that it was best to sell the shares at a good profit.

As at 1998, NDDB executives believed that the Tetra Pak relationship would continue and they would buy packaging material. Tetra Pak itself has diversified into plastic pouches, PET bottles and may be able to keep up a high level of involvement, as a supplier, with NDDB.

13 Discussion

Trust has been found to be important if cooperative collaborators are to learn from each other (Dodgson, 1993). NDDB-Tetra Pak have cooperated, and in the worst of times, and will still deal with one another in terms of 'the devil you know' principle. Soon after Ruben Rausing and Erik Torudd left the scene the relationship seemed to deteriorate with Dr Kurien. Tetra Pak could not make milk a success in India and this was the core business of both, Tetra Pak and NDDB. They blamed each other for the lack of success of milk packaging and this probably assisted NDDB's decision to eventually disinvest in the JV.

From an inter-firm relationship perspective NDDB and Tetra Pak worked together for 20 years prior to putting up a JV factory. During this time Tetra Pak helped with the FAO in the approval of NDDB's Operation Flood proposal, while NDDB helped Tetra Pak to enter India. However, once the factory was established it was a question of technology transfer and making the technology work in India.

India was different from other developing countries in that it had a developed dairy industry where consumers had a choice of milk packaging. On the input side almost everything was new for the Tetra Pak system. The milk had a higher bacterial load, stable power and water supply at some dairies was a problem. The dairy plant personnel were familiar with making other Western products like cheese and butter but aseptic milk needed far more discipline. The packaging materials were different from those in Europe and, importantly, the Indian manufacturing equipment was not designed to produce material for the alufoil Tetra Briks. For example, with experience special milk routes had to be created in villages so that milk would reach the aseptic packaging dairy plant quickly, the village society collection centres were trained to wash milk cans with iodophor to improve hygiene and decrease the bacterial load. Similar but more technical tacit (Polanyi, 1966) and 'sticky' information (von Hippel, 1994) was being generated in India in many aspects of packaging material manufacture and filling machine operations. Because the solutions to the Indian problems needed local action following von Hippel (1994), innovation took place in India and not Sweden.

The two innovations were in juice packaging material in 1985 and edible oil packaging material in 1988. In the first, the slow milk market to which Tetra Pak had no answer created the need for innovation. The Indian-produced paper for juice material had lower technical properties than the European paper. To subject such paper to multiple conversion processing, input was needed from various technical people including those from Tetra Pak, equipment suppliers (Egan), plastic suppliers (IPCL, ICI and Dupont), paper suppliers (BPL) aluminium foil suppliers (Indal, Indiafoil) and others in the paper converting industry in India. In addition, the support of the customer, Parle and its Director Mr Prakash Chauhan, to take repeated trials and compare with the Swedish material was invaluable. Indian juice packaging material was marketed beyond Parle only when the 'community of practice' cleared the innovation. This community included the technical people of HPCL, Tetra Pak and Parle.

The second innovation was in edible oil packaging material. With an advertised launch date in New Delhi and the first Tetra Pak material not sealing properly, NDDDB had to find an Indian solution immediately. Again the process of finding a solution was from the 'community of practice'. Tetra Pak technology could not be followed, because the extruder could not extrude LLDPE. Using a sheet of LLDPE instead of melting it was technically audacious at the time. But when interviewed, even ten years later, the technical people responsible for the innovation do not wish to reveal names. They gratefully acknowledge the support and intellectual help of many others outside the JV plant at the time.

14 Locus of innovation and communities of practice

The locus of innovation across countries does seem to be where the main activities take place, which von Hippel calls the sites of 'sticky information'.¹ Many factors made information sticky in the case of the Indian business of Tetra Pak and these included equipment, utilities and raw materials peculiar to the locus of innovation i.e. India.

Further, the case indicates that the community of practice is active at the locus of innovation. This community includes people who know most about the problem and who feel more camaraderie among themselves than perhaps with their own organisations.

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At the inter-firm level the JV provided a rationale for working together and creating distinct communities of practice comprising printing, laminating, slitting and packaging machine service. This community included the suppliers of Tetra Pak in Europe and technically competent suppliers and customers in India.

15 Conclusions and future research

This case has attempted to understand the interplay of a long-term business relationship, communities of practice and innovation in organisations. Being a single case study it offers analytical insight (Yin, 1984) into inter-firm relationships and networks as they create communities of practice to innovate. In this case there is evidence that both sides tried to forbid their employees and suppliers to socially and commercially interact with each other and that all interactions were to be reported or be via respective top management. The evidence of cooperation however seems to be stronger than interfirm conflicts at every level of the two organisations. For example Dr Kurien still thinks highly of the late Dr Ruben Rausing.

This case study finds communities of practice operating at various levels in organisations creating innovations. Individuals are acclaimed in their own private community and members recognise this as sufficient reward. As global communication becomes cheaper and easier these communities are likely to become more effective. Further research would be both interesting and challenging given that these communities like to remain anonymous. Finally, the case indicates that as inter-firm relationships deteriorate communities go further underground, as they do when work is 'canonised' (Brown and Duguid, 1991) and employees are treated as replaceable parts in organisations.

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Notes

- ¹ <http://www.tetrapak.com> and correspondence with Tetra Pak International AB, November 1998.
- ² Tetra Pak thrives on risky strategies' (1994) The Hindu Business Line July 4 quoting *The Wall Street Journal*, July 3, at Lund Sweden. Dow Jones and Co.
- ³ Dr Abekke Boerma was Director General of the World Food Programme (WFP) of the FAO and was an invitee five years earlier at Anand, India during the inauguration of the Amul Cattlefeed Plant by the second Indian Prime Minister on 31st October, 1964. He was aware and impressed with the work which was being done in Anand.