

ROLE OF VENDORS AND TECHNOLOGY TRANSFER - A CASE OF INDIAN AUTOMOTIVE INDUSTRY

Arvind Bhardwaj , Anish Sachdeva and Vishal S. Sharma

Regional Engineering College, Jalandhar
India

Abstract The authors of this paper have attempted to bring out the learning issues for the vendors of Indian automotive sector. Literature review exercise is conducted to bring out the important issues concerning technology transfer. The issues, which have been taken for discussion here include Present Scenario, Technology transfer and Tierisation Process. A case study has also been taken up to illustrate technology acquisition and adaptation at Swaraj Mazda

INTRODUCTION

Though India is getting advanced technology in different fields, but still there is a huge technology gap as compared to developed countries in different industrial sectors in general and automotive sector in particular. Automotive makers and their vendors in India had no challenge earlier to upgrade their technology. After 1984, with the arrival of Suzuki Motors having joint venture with Maruti Udyog Ltd., came the new technology and bigger volumes. Situation changed very fast since 1991 with the arrival of multinationals as mentioned above. At present due to fierce competitive environment & presence of global players in Indian market, Indian companies are forced to go for technological collaborations, joint ventures and technology licensing etc. for developing capabilities in generating world class products for local and global market. In this context, for fast development, technology transfer from foreign players is of utmost importance to Indian auto sector companies. The process of technology transfer is a complex phenomenon, which includes various phases like technology need identification, technology selection, technology acquisition, technology adaptation and technology absorption etc.

For automotive makers, the world over, the trend is to outsource the majority of components and keep only those components for in-house manufacturing which are very critical and come under their core competence. The benefits obtained from outsourcing include lower investments, decentralized operations, speed, flexibility & competitive quality. The automobile industry in India is no exception to this strategy. In Indian automotive industry, the pioneer companies which started with vigorous vendorisation are Maruti Udyog Ltd., Swaraj Mazda Ltd., Hero Honda Motors Ltd., Eicher Mitsubishi Ltd. etc. Since all these companies are joint ventures, it was important for these companies to select right kind of vendors having appropriate technology

suitable to them and in number of cases help the vendors in acquiring right kind of technology.

LITERATURE REVIEW

Okko (1996) has attempted to identify suitable strategies for the technological innovation and transfer. An investigation into the experience of Finland in technology transfer has been done. Role of R&D in improving technology transfer and diffusion in Finland have been discussed.

Christian N. Madu (1990) reviews the technology transfer literature by integrating a set of process based models that would assist a team of LDC planners and MNC managers in making a decision with in a strategic perspective.

MNCs are highly motivated to transfer technology to LDCs. However what they transfer does not always meet the needs and objectives in LDCs (Doz and prahalad: 1980, Prasad: 1986, Todd and simpson:1983).

Legal bindings on receptors reduce the willingness to innovate and produce indigenous technology (Coughlin:1983, Das:1987)

Capital intensive rather than labour intensive technologies are often transferred to LDCs (Prasad : 1986)

Ram Kumar and K. Momaya (2000) conducted a case study at Sona Koyo to study the flexibility in technology transfer at various levels , to make it more effective for technology receivers. The need for flexibility in technology transfer is supported by a case study using (SAP-LAP) situation-actor-process-learning-action-performance paradigm.

Gee (1981), argues for a gradual implementation of new technology over a long period of time in order to effectively plan and manage the change.

Bowonder (1998) suggests that the over protection and inward looking growth strategies made India lag behind in building up technological capabilities needed for penetrating the world market. Developing countries have to use market based initiatives for introducing technological change and this can only be done by stimulating Competitive forces, Innovation, Technology acquisition and Technology assimilation.

J.B. Akarakiri (1998) suggests that lack of appropriate equipment has been major, barrier to technological development in many developing countries. According to author, in recent past, leasing of equipment has become an increasingly important method of equipment acquisition in Nigeria. A study of equipment leasing is reported.

Gibson and Smilor (1991) have discussed the importance of factors facilitating technology transfer, effectiveness of different methods of technology transfer, barriers in technology transfer, ways to improve effectiveness in technology transfer, key variables for technology acquisition success and have supported the hypothesis involving these variables with an empirical study.

Banerjee (1990) has mentioned that technology gap is a reality everywhere. The technology transfer, therefore becomes imperative in order to bridge the gap. The author has the opinion that the international market of technology is imperfect one as buyers are not adequately informed about the product and they are easily influenced by the seller.

Lee (1993) discusses the framework of technology transfer keeping competitiveness as the objective of technology acquisition. According to the author, acquiring know-how related to the product, process, people, procedures and performance are the forms of technology transfer. The reason for technology acquisition have been suggested as bridging the gap between actual and perceived performance and improved competitiveness.

Zafar and Sushil (1997) conducted a literature review exercise to identify the research issues in the area of Management of Technology. The reviewed papers are grouped under the headings – Strategic management of technology, Technology planning and forecasting, Technology transfer and acquisition, Development and innovation management, Technology and organizational issues, Adoption and implementation of new technologies and implications for developing countries. A brief review of technology management in automobile industry has also been presented. Joshi (1988) highlights the problems faced on the indigenisation front by firms in developing countries which have borrowed technology from abroad. The author has identified several categories of vendors as

regards the quality and technology. He has grouped them as ignorant vendors, confused vendors, disinterested vendors, proud vendors, monopolistic vendors and competent vendors.

Aggarwal (2000) brings out the fact that non equity based transfer of technology agreement, in spite of its pitfalls, is probably the most suitable form of alliance, specially where funds are in scarcity, risk is becoming difficult to measure, localness is preferred, customer is global in tastes, knowledge and product life cycles are becoming shorter and shorter. The author stresses the importance of formulation of agreements.

PRESENT SCENARIO

According to one prediction, by 2010, less than 10% of the organized auto ancillaries in India will survive.[Business Times] In other words, a bare 50 of the 500 that exist today will be around when the decade ends. There are an estimated 5000 small scale ancillaries in India. But just 400-500 of them account for 85% of the total original equipment supplies in value terms.

If the industry is small and fragmented, it is due to historic reasons. For more than 30 years up until the early 80s, the Indian auto industry was controlled by a handful of players. Thanks to zero competition, these vehicle makers had no incentive to upgrade their own technology or that of their vendors.

Profits were assured, and every year the suppliers would also get their inflation-plus mark-ups. In terms of technology, things improved a little with the coming of Suzuki in India. Since the Japanese auto company came from a competitive market, it helped Indian vendors improve their technological base by sourcing know-how from some of its own Japanese suppliers.

But the price, quality or delivery of components was still not a big issue. Maruti Udyog, Suzuki's Indian joint venture, had a stranglehold on the market and it could increase car prices every year to make up for its own and supplier's inefficiencies.

Big auto MNCs who have long-term plans for India, have made their global vendors to invest in India. Ford has Visteon, General Motors' Delphi is here and Toyota's Denso group is here too. Number of Korean companies are setting up their base in India for supply of components to companies like Hyundai and Daewoo Motors. Telco, of course, has formed a series of joint ventures with foreign suppliers to set up the Tata Auto components group (TACO). Component suppliers today need global economies of scale and technological skills that allow them to make better and cheaper products. Visteon, for instance, is present in 23 countries, operate 24 technical centres, and sells to 18 of the world's top

20 vehicle manufacturers. No Indian supplier today can claim to be a benchmark in the global industry. Barring a few exceptions like Sundaram Clayton, TVS and a few more, most of Indian vendors should not aspire to become tier one player. Reason for this is that global auto majors already have their own network of tier one vendors. Unless an Indian vendor can offer a breakthrough in terms of technology or price, there are only remote chances of it displacing the existing supplier. The best bet for average Indian vendor today is to plug into the network of one of the bigger global suppliers, and become a tier two or three player. Strength of Indian vendors lie in terms of low cost of manufacturing and also in the fact that their factories are tuned to manufacturing low volumes.

TIERISATION

Over the last six to eight years or so the worlds automotive industry has been going through a major change in the structure of its supply chain. Most vehicle manufactures have shifted, and some are shifting, to a tiering set up to respond to increasing pressure of competition.

In tiering structure, vehicle manufactures, instead of sourcing individual parts and assembling them in house, are able to source complete systems such as brake systems, dashboards, front and rear end panels etc., from Tier-I suppliers that procure smaller components from Tier-II suppliers and carry out adding value. The entire supply chain can go down to Tier 5 or 6 raw material suppliers.

One of the “ up-front” benefits of this supply chain restructuring is that makers and buyers will now deal with fewer vendors, have more efficient Quality Control & focused R & D thrust. All this spells leaner operations which, in turn, lowers the total cost of supply chain management.

Emergent supply pattern globally is that Tier-I suppliers are being positioned as OEM supplier with Tier –II feeding the former, in a neat reductionist hierarchy. In India only a few vendors are sure of retaining the Tier-I status. Scale of Investment is going to be one of the key factors for retaining Tier-I status. As a result existing Tier-I companies would become majority held by foreign partners, who can inject the

required funds or new ones would be freshly set up by foreign players. Traditional Indian vendors would then shift to Tier –II status. This would require a change in attitude on the part of component makers as this could be perceived as “ loss of prestige” particularly among small firms that operate single technology facilities. The only way to support component price in a scenario of large scale and competitive car manufacture, is by funding the project with low cost funds. Here a foreign partner plays a critical role.

The operations pattern mooted by Tata Auto Comp. Systems Ltd (TACO) , is example of the future in-store. TACO, which has invested very heavily , has a two tier set up. Joint ventures with major foreign component makers comprise the first row while venture with mostly Indian partners shore up the second.

TECHNOLOGY TRANSFER

Technology Transfer in automobile industry is a very complex phenomenon with number of actors involved in it at various levels .Description and relationship of the actors involved is as shown in Fig. 1.

Because of massive outsourcing in the automotive industry, 60-70 % of the technology lies with the vendors. In developed countries, vendors play a very important role in the product design and hence hold patents for the components designed by them . This is in contrast to the Indian scenario where barring a few tier-1 players , most of the vendors do not have the capabilities of designing the components. Therefore whenever technology transfer takes place for any automotive unit, vendors of licensor play a very important role in transferring technology and a major share of technology transfer takes place from the vendors of licensor to the vendors of licensee.

TECHNOLOGY TRANSFER AND VENDORS – A CASE OF SWARAJ MAZDA LTD.

Technology transfer in Indian automotive industry started significantly from the year 1983 with the setting up of Maruti Udyog Ltd., a joint venture with Suzuki Motors Ltd., Japan. Maruti Udyog Ltd. played a very important role in reviving the automotive industry and did a wonderful job of developing vendors for their product. They helped their vendors in acquiring the

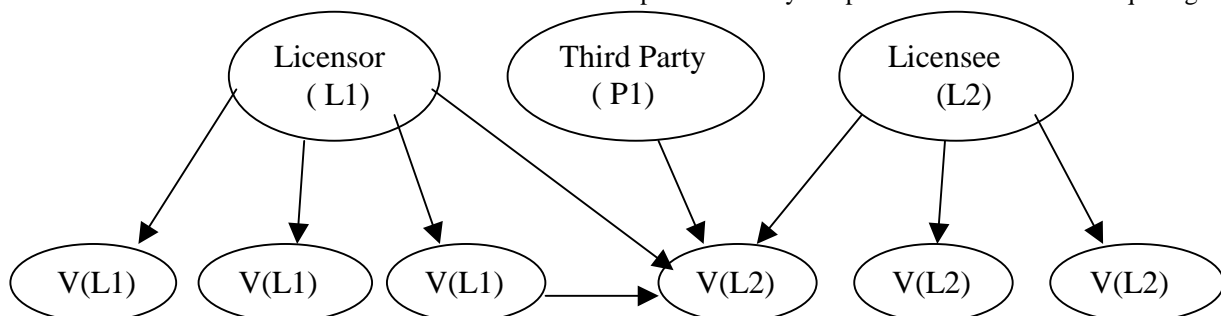


Fig.1 Possible Actors in Technology Transfer and their Relationship
V(L1): Vendor of Licensor (L1), V(L2): Vendor of Licensee (L2)

technology from abroad and successfully adapting it. The vendor base which was developed by the Maruti Udyog Ltd. proved to be very useful for the other automotive like Hero Honda Motors Ltd. and Swaraj Mazda Ltd. which were set up after a gap of few years.

The authors of this paper visited Swaraj Mazda Ltd. and few of their vendors. The purpose of the visit was to know the factors which contributed to the effective transfer of technology in their case. Interview and observation technique was used to bring out the various issues. Persons interviewed in various departments were of the level of manager and above. The factors which contribute towards effective transfer of technology are as follows.

- i. Economy of scale or Volume of production.
- ii. Training of the Employees.
- iii. Quality of raw materials.
- iv. Composition of agreements.
- v. Commercial factors in technology transfer.
- vi. Gaps in communication.
- vii. Environmental factors.
- viii. Government regulations.
- ix. Cultural differences.
- x. Inappropriate selection of technology.

Volume of production plays a very important role in transfer of technology. Technology which is available in the developed countries is suitable for very high production volumes, but in developing countries like India, production volumes are very low as compared to other developed countries. Therefore the transferred technology is not suitable under Indian conditions because of the low production volumes. Every firm which is transferring the technology must ensure that they have the suitable Research and Development facilities to adapt the transferred technology under local conditions. Case of Swaraj Mazda Ltd., is very relevant under these conditions.

The reasons for Swaraj Mazda to effectively indigenise the technology and adapt it at very early stages were manifolds. Most important of these is that, they imported technology at a time when "yen" was very strong and therefore cost of importing the technology was higher for Swaraj Mazda as compared to its competitors like DCM – Toyota, Allwyn-Nissan or Eicher-Mitsubishi. They therefore had no other choice but to produce maximum components indigenously from very beginning. Unlike all other competitors mentioned above, Swaraj Mazda began with 45% indigenously produced components. Such high indigenisation from very beginning has its advantages and disadvantages. The major advantage is that when peripheral parts of technology package are required to be indigenously produced then one begins by testing the appropriateness of the foreign designs to Indian conditions from the very inception. Their defects are removed before the customer gets a chance to

complain and their production technology gets stabilized.

Research and Development engineers and technicians of Swaraj Mazda played a very important role in adapting the technology under local conditions. Strength of R & D and Quality Control personnel in Swaraj Mazda together constitute almost 15% of their total strength. The advantage of possessing strong internal engineering strength is reflected in the innovative changes which they made to adapt the components under Indian conditions. The company played a vital role in developing and nurturing their vendors to upgrade their technology.

CONCLUSION

Role played by vendors can never be overlooked whenever we talk of technology transfer in general and for automotive industry in particular. Vendors have with them a major share of technology and therefore technology transfer can never be achieved without involving the vendors.

Indian automotive industry is undergoing a rapid change and therefore Indian automotive vendors have a great responsibility on their shoulders as they are to cater to the needs of multinational automotive industries from home and from abroad. If under present circumstances they fail to deliver the goods then multinationals like Daewoo Motors, Fiat, Ford, Honda and many others would be forced to bring in their own original vendors and hence in that case Indian vendors would be forced to take a back seat as Tier-2 or Tier-3 vendors.

It therefore becomes imperative for the Indian vendors to upgrade their technology by either getting licenses from the vendors of the parent companies in other countries or have joint ventures with them. While it is easy to get technology from abroad, it is rather more difficult to adapt the technology under Indian conditions. Various factors which contribute to the successful transfer of technology have been outlined in this paper and a study of Swaraj Mazda Ltd. has been given to illustrate the issues.

REFERENCES

- Madu, N., Christian and C., Nicholas, Cognitive Processes in Technology Management and Transfer, *Technological Forecasting and Social Change*, 38, 81-95, (1990).
- Okko, p., and Gunasekaran, A., An analysis of technology transfer and diffusion as a part of growth strategy, *International Journal of Technology Management*, 12(4), 477-487, (1996).
- Doz, Y.L., and Prahalad, C.K., How MNCs Cope with Host Government Intervention, *Harvard Business Review*, March-April 1980, 149-157.

- Prasad, B.S., Technology Transfer, The Approach of a Dutch Multinational, *Technovation* 4 (1), 3-15, (1986)
- Todd, D., and Simpson, J.A., The Appropriate-Technology Question in a Regional Context, *Growth and Change* 14(4), 46-52(1983)
- Coughlin, C.C., An Economic Analysis of Yugoslav Joint Ventures, *Journal of World Trade Law* 17(1). 12-33(1983).
- Das. S., Technology Transfer Through Multinational Corporations: a Theoretical Analysis, *Journal of International Economics* 22, 171-182 (1987).
- Sherman Gee, Technology Transfer Innovation and International Competitiveness, John Wiley & Sons, New York (1981)
- Bowonder. B., Industrialization and economic growth of India: Interactions of indigenous and foreign technology, *International Journal of Technology Management*, 15(6/7), (1998).
- Akarakire, J. B., Equipment Leasing: A strategy for technology acquisition in Nigeria, *Technovation*, 18(5),347-352, (1998).
- Gibson, D.V., and Similor, R.W., Key Variable in technology transfer- a field study based empirical analysis, *Journal of Engineering and Technology Management*, 8, 287-312, (1991).
- Banerjee, P., Technology transfer, the third world and the code of conduct, *Social Action*, 40 (Jan-Mar), 71-83.
- Lee, G., Closing the gap through technology transfer: linking theory and practice, *International Journal of Technology Management*, 8(1/2/3), 236-243, (1993).
- Ramkumar and Momaya,k., Flexibility in technology transfer: A case study of firm in auto components sector in India, *Global conference on New Business Paradigm : Global, virtual and Flexible*, GLOGIFT 2000.
- Agarwal, A.K., Transfer of technology at international level: Strategy lies in composition of agreement, *Global conference on New Business Paradigm: Global, virtual and Flexible*, GLOGIFT 2000.
- Joshi, P.V., Automobile ancillaries: The agony and ecstasy of indigenisation, *Purchase*, June 1988, pp. 14-19.
- Husain Zafar and Sushil, Management of technology: Learning issues for seven Indian companies, *Technology Management Strategies and Applications*, Vol. 3, pp. 109-135, 1997.
- Bhardwaj, A., and Sagar, H.S., Key issues in technology transfer: A literature review, *Global conference on New Business Paradigm: Global, virtual and Flexible*, GLOGIFT 2000.
- Bhardwaj, A., and Sushil, Learning issues for vendors of automobile industry – An Indian perspective, *International conference on CAD/CAM, Robotics and Factories of Future*, held at Univ. of Natal, South Africa, in July,2001.