

EXPLOITATION

Learning objectives

After studying this chapter, you should be able to:

- 1 Understand the complexity of exploitation.
- 2 Identify the key features of exploitation.
- 3 Understand the three major sub-processes of an exploitation activity: commercialization/marketing, technology transfer and utilization.
- 4 Appreciate the role of commercialization/marketing.
- 5 Understand the role of technology transfer.
- 6 Understand the role of technology utilization.

Introduction

The process of exploitation is concerned with generating profit or achieving other benefits from technology. Exploitation can be defined as the utilization of new technology or scientific developments to improve the performance of products, services or manufacturing processes.

Exploitation of technological capability is more than just commercialization, since the expected benefits might be accrued through effective and efficient implementation, absorption and operation of the technology. If there is not a fully working product/process/service at hand, there will be no commercialization activity. So the exploitation activity includes three sets of sub-processes: commercialization/marketing, technology transfer and utilization.

The commercialization process is the launch of a product/service into the market based on a selected **business model**. Technology transfer consists of processes related to transferring technologies internally from an R&D unit to a manufacturing department, from an external company/partner to the internal manufacturing department or from an internal R&D unit to a partner company's manufacturing department. Utilization aims to put new technologies into use in such a way that they will be fully utilized. Utilization refers not only to adjusting/customizing/improving but also to maintaining and integrating technologies for synergy. The utilization process is intertwined with technology transfer activities, because each implementation or launch involves reconfigurations that will demand alignments between technology and its actual application.

Commercialization is the process of introducing a new product or service into the market. The definition of innovation clearly indicates that the commercialization process turns an invention into an innovation, a sellable product or service in the marketplace. Many

Technology exploitation can take one of three possible routes:

- 1 *In-house development*: the production and distribution of technology are carried out within the company.
- 2 *Joint commercialization*: production and distribution are carried out in collaboration with other organizations through joint ventures or other forms of alliance.
- 3 *Selling technology*: can take place at any stage of technology development, including idea, prototype, patent and licence sales.

Ford and Saren (1996) provide a framework for choosing an exploitation method based on seven criteria:

- Company's relative standing.
- Categories of technology.
- Urgency of exploitation.
- Need for support technologies.
- Commitment/investment.
- Technology life cycle position.
- Potential application.

Based on these criteria, a company might choose its exploitation method among the following available options: (1) internal employment in own products/processes/marketing, (2) external contract out manufacture or marketing to others, (3) contract in manufacture, marketing or product design for others, (4) joint venture and (5) licensing out.

For example, the internal commercialization or make decision takes place when a company's relative standing is at all levels – technology is basic, urgency is the lowest, the need for supporting technology is lowest, commitment is highest, technology life cycle is earliest and potential application is narrowest.

Marketing theory and practice are justified in the belief that customers use a product or service because they have a need or it provides a perceived benefit (Kotler and Keller,

For a marketing plan to be successful, the mix of the four Ps (product, price, promotion and place) should reflect the wants and desires of consumers in the target market (Dibb

Table 3.1 Methods of direct and indirect relationships with customers

Direct relationship	Indirect relationship
<p>Direct business relationship could be development through methods such as:</p> <ul style="list-style-type: none"> • Requirements specification • Contract or order • Customer meetings • Warranty and repair data • Customer representatives 	<p>Distributors and retailers interface with customers and try to capture requirements by applying methods such as:</p> <ul style="list-style-type: none"> • Surveys • Focus groups • Market research • Interviews • Customer service feedback

The diffusion process is related to five main elements

- 1 The characteristics of an innovation that may influence its adoption.
- 2 The decision-making process that occurs when individuals consider adopting a new idea, product or practice.
- 3 The characteristics of individuals that make them likely to adopt an innovation.
- 4 The consequences for individuals and society of adopting an innovation.
- 5 The communication channels used in the adoption process.

Among the elements of the diffusion of innovation, the adopter categories have a specific importance for marketing activities. Their role in marketing is discussed on the basis of four major marketing processes (Easingwood and Koustelos, 2000; Jobber, 2001):

- 1 Market preparation.
- 2 Targeting.
- 3 Positioning.
- 4 Execution.

- Awareness, educate(benefits), Built relationship(C&S)
- Right Customer & learn char, Innovator, Early & Late Adopter
- Tangible/intang, Image of firm w.r.t Competitors, superior
- Resources target specific segment, trust

Technology transfer

Technology transfer is the process by which the technology, knowledge and information developed by a creator is applied and utilized by an applier (Khalil, 2000). Creators might be an individual, an R&D department within a company, another commercial developer company, a partner company doing collaborative R&D, a non-profit organization or a government agency. The applier might be a manufacturing department of the company where technology is developed internally or cooperatively, it might be a commercial company, a competitor or the government. If either the creator or applier is from a different country, technology transfer takes place at the international level.

Technology transfer processes

Transferring a technology can be considered as a stand-alone project, so project management steps are the usual activities that need to be carried out. However, four specific managerial tasks are considered here

- 1 Determining the transfer method, actors and timing.
- 2 Pre-transfer activities.
- 3 Transfer activities.
- 4 Evaluations and improvements.

Some modes of technology transfer are

- *Over-the-wall mode*: Receivers have no close contact with developers. Examples are licensing and turnkey plants.
- *Receivers-as-consultants mode*: Developers have the main responsibility but they consult frequently with receivers. Some licensing and collaborative R&D might be performed in this mode.
- *Team mode*: Receivers and developers work together to develop and transfer technology, for example through collaborative R&D.
- *Apprenticeship mode*: Receivers become developers under the direction of the main technology or knowledge owner, for example OEM.

After determining the technology transfer method, timing issues need to be decided, such as when the technology is ready to move from R&D to production and finally to market.

Formal technology transfer relies on legal documentation, a contract including binding conditions on what will be transferred, between whom, when, how and for what price. Depending on the actors involved in the agreement, the type and extent of the contract might change. For reliable partners, the contract might be more flexible, while for developers who are not trusted, it might need to be more detailed.

Before the technology transfer starts, there might be a number of adjustments to physical facilities and workforce. Depending on the location of the technology transfer, in an existing or new portion of the enterprise, there might be new installations or changes needed for the incoming technology to function. The new technology might work with special inputs that might not be available in the premises of the receiver organization and it might take time to acquire them. So the pre-transfer phase should consider all inputs and make a procurement plan accordingly.

After physical installation, tests are carried out at different levels and, depending on the results, new sets of arrangements are undertaken. Other actions are needed during the actual start-up of the new technology, involving migration from the old process to the new

When full production starts, feedback starts to flow either from internal production departments or from markets/customers, which creates another round of evaluation and improvement activity. This is why, in the days immediately following the start-up, a process of refinement and improvement of the new technology takes place in order to fine-tune the operations involved in the new technology. The process is monitored closely and any substandard performance is identified, the cause isolated and the problem rectified (ICS

Technology utilization

Utilization processes consist of three major steps:

- 1 Measure technology utilization/performance.
- 2 Identify priorities and develop a business case to improve utilization.
- 3 Implement changes.

benchmarking. Benchmarking is the systematic comparison of organizational processes and performance to create new standards or to improve processes. Benchmarking models are used to determine how well a business unit, division, organization or corporation is performing compared with other similar organizations. A benchmark is often used for improving communication, professionalizing the organization/processes or for budgetary reasons.

- **Reliability** is centred on the frequency of breakdowns.
- **Maintainability** is focused on the time of breakdown.
- **Availability** is the consequence of reliability and maintainability. It is measured by the proportion of time during which a product is effectively available for operational use.

Improving performance requires the management of a wide range of issues, including ideas, technologies, culture and organizational change. Therefore learning and change management become indispensable parts of the implementation

Reverse innovation

Reverse innovation is a set of innovations targeted for emerging/developing country populations. Reverse innovation attempts to understand the customer problem and come up with a solution that will take into consideration a variety of factors: availability of electricity, portability, durability and price. This type of innovation is not limited to disruptive innovations. The goal is to fill five gaps in a developing country that lead to reverse innovation: the performance gap, the infrastructure gap, the sustainability gap, the preference gap and the regulatory gap (Govindarajan and Euchner, 2012). For example, an Indian cardiac hospital offers cardiac surgery for \$2,000 whose American equivalent would cost up to \$20,000. It is important to note that the difference in price doesn't mean it is bad quality. This cardiac hospital has built a facility in the Cayman Islands to attract customers from advanced countries, because they create solutions that are affordable and of good quality.

Summary

The exploitation activity consists of a number of critical sub-processes, the three major ones being commercialization/marketing, technology transfer and utilization. All these sub-processes help to find the right business models for commercialization, transferring technology in an effective and efficient manner and achieving incremental improvements continuously in order to achieve day-to-day operational efficiency. If exploitation capabilities are not developed, returns on technologies are low.

Suzlon: India's major wind power provider

Suzlon has become the world's fifth largest wind turbine manufacturer with a market share of 6%. Suzlon's founder Mr Tanti was unhappy with the erratic power supplies and rising energy costs at his textile mill in Gujarat, India. Therefore, he set up two windmills in 1990 with turbines imported from the German company Suedwind. He soon discovered that the windmills provided a reliable source of cheap energy, much cheaper than conventional energy and they were also environmentally friendly. Mr Tanti exited his textile business and set up Suzlon Energy in 1995 with a strategy of capitalizing on India's low manufacturing costs and providing end-to-end customized solutions at affordable prices to its Indian industrial clients.

When Suzlon's initial turbine supplier failed in 1997, Suzlon bought it and kept its R&D centres and turbine manufacturing facilities in Germany. Suzlon also acquired a rotor-blade manufacturer in the Netherlands; the acquisitions broadened Suzlon's reach, bringing a product range that now includes wind turbine generators in capacities from 350 KW to 2.1 MW with customized versions suitable for a variety of climates. Although Suzlon's products are not suitable for conventional power generation in urban areas, they were welcomed by customers with large manufacturing or other operations in rural areas that had poor or costly access to conventional power supplies.

Soon, Suzlon discovered that its products could find markets globally, including in developed countries seeking greener energy sources to supplement conventional power plants. Suzlon's business grew rapidly and has captured more than a 50% share of the wind power market in recent years. While its Indian business continues to grow steadily, its overseas sales have seen even greater growth, rising from 8% of total revenues in 2004 to over 70% in 2006. Orders have come in from Australia, China, South

Korea, Brazil, Italy, Portugal and Spain. Its global revenue in 2007 exceeded \$900 million. Suzlon has a bright future as the global wind power market is expected to grow at an annual rate of over 25% during the next five years.

Suzlon succeeded where Suedwind had failed because it understood the market position of its products. Tanti perceived the potential of the wind turbine generators as disruptive products in the energy market and pursued a market strategy to exploit that potential. Understanding and developing the disruptive potential of a product is a key component of a disruptive innovation strategy.

? Key Questions

- 1 What are the key features of exploitation?
- 2 What are the types of commercialization?
- 3 What is the process of commercialization/marketing in TM?
- 4 What is the process of technology transfer in exploitation?
- 5 What is the process of technology utilization in exploitation?