

---

# Unit 11 R& D and Strategy

---

## Objectives

The objectives of this unit are to

- highlight the importance of R&D Strategy to the competitiveness of a firm
- assess the contribution of R&D activities to the competitive strategies of the firm
- discuss the steps involved in developing R& D Strategies
- state the reasons for limited progress process made by firms in R&D Strategy

## Structure

- 11.1 Introduction
- 11.2 Competitive Strategy and Competitiveness.
- 11.3 Competitive Advantage and R&D
- 11.4 Value Chain and Value Chain Analysis
- 11.5 Research and Development
- 11.6 Development of R& D Strategy
- 11.7 Steps Involved in Developing R&D Strategy
- 11.8 Progress of R&D Organizations in Strategy Development
- 11.9 Summary
- 11.10 Self-Assessment Questions
- 11.11 Further Readings

---

### 11.1 Introduction

---

An essential component of competitive strategy is recognizing the role that Research and Development plays (R&D) in the competitive success of a firm, and acting to ensure that technology decisions and policies contribute to the firm's competitive advantage. This unit provides a framework, which can be used to analyze and understand the linkages between R&D and competitive strategy and/or competitive advantage of a firm.

---

### 11.2 Competitive Strategy and Competitiveness.

---

The conventional approach to strategy has emphasized setting goals and developing the means to achieve them by matching the resources of the firm (strengths and weaknesses) with opportunities and threats in the external environment, which includes, especially, customers and competitors, and deciding which industries, businesses, or product-market segments to compete in. At the highest corporate level, there is the multi industry-business firm, conglomerate or the diversified firm, such as Reliance Group, Tata Group, etc. At this level, corporate strategy addresses issues like as choosing a balance among the industries or businesses chosen, and-in the case of a firm-achieving synergy among the industries or businesses chosen.

Moving down a notch, there is the single industry-business firm such as -- cement, or the division of the multi industry-business firm such as Aditya Birla Group. At this level, the issue of which business or industry to be in is important and the only issue is how to enter or exit of a business or industry. This chosen the level at which competitive strategy operates. Developing a competitive strategy essentially involves building a broad framework for a firm on how it is going to compete, what its goals should be, and what

policies will be needed to carry out those goals. Moving down to the next level, there are the functions of the firm—the engineering, manufacturing and production, marketing, sales, service, personnel, human resources, purchasing, accounting, finance, planning, etc. The term ‘functional strategy’ is widely used at this level. The important point to note is that functional strategies must all support, reinforce, and contribute to the competitive strategy of the firm in order for the firm to effectively compete. In a free-market economy, the generic goal of any firm is to enhance its competitiveness, which can be defined as the ability of a firm to get customers to choose its product or service over competing alternatives on a sustainable basis. Competitiveness is measured by market share trends over time, and can be described in terms such as increasing, decreasing, or stable. There means an important stipulation contained in the definition described above, however, which is that competitiveness must be built *on a sustainable basis*. It is possible, in the short run, for a firm to get customers to buy its products or services over competing alternatives on an unsustainable basis by, for example, mortgaging its assets and using the proceeds to subsidize and lower prices, thus attracting customers until the earnings run out and the firm collapses.

---

### 11.3 Competitive Advantage and R&D

---

A firm can enjoy competitive advantage in several ways. For instance, a firm may gain competitive advantage because:

The *price of its product* is lower.

The *quality of its product* is higher.

*Availability of its product* is sooner, or more dependably just in time.

*Customer service* is better.

*Attractiveness of its product* is greater.

*Awareness of its product* is greater.

Other social, psychological, and ideological factors.

In practice, customers shop around amongst competitive alternatives by setting parameters for some of these advantages and then making the final choice on the basis of the key or critical advantage. Customers today expect high reliability and low prices and these are mutually reinforcing attributes that a supplier is expected to achieve just to be in the competition. But these are not often enough. The winning competitor must have both the lowest price and highest reliability or achieve one of the other competitive advantages that customers value. A firm, which has a strong R&D programme, can influence all these factors positively and contribute to the competitive advantage of a firm. Competitive advantage views R&D activities as a way of improving a process, thus reducing costs, or providing customers with a best-of-class benefits.

Porter defined and discussed three types of generic strategies: cost leadership, differentiation, and focus. Low cost leadership means essentially what it says ; achieving the lowest-cost position possible in each operation of the firm, not just manufacturing, through such means as vigorous cost reduction programmes, strict cost and overhead controls, economies of scale, and learning curve efficiencies. Differentiation refers to unique feature of a product or service as perceived by a customer, which directs the customer to prefer it over competing alternatives. A differentiating uniqueness is typically achieved through such means as design features, establishing a brand-name identity, or offering superior customer service. The linkage between the earlier list of

competitive advantages and Porter's strategies should be obvious; low-cost leadership corresponds to a potential competitive advantage; differentiation corresponds to uniqueness in terms of quality, sooner availability, better customer service, etc.

---

## 11.4 Value Chain and Value Chain Analysis

---

This now the unit has dealt with competitive strategy by emphasizing customers and their ultimate role in determining competitiveness by collectively choosing to buy the products or services of one firm over competing alternatives. In this section the focus shifts to firms and what firms do to achieve competitive advantage in implementing their competitive strategies. To address this set of issues, the value chain analysis, a tool developed by Michael E. Porter is utilized. According to Porter, the value chain is "a systematic way of examining all the activities a firm performs and how they interact for analyzing the sources of competitive advantage."

The value chain can be used to organize all the activities of a firm into categories of primary and support activities. value chain Activities are processes or things that are done in a firm. In order to be identified and categorized, they must be distinct; they must have a beginning and an end, which distinguishes them from other activities or operations. Primary activities constitute the processes by which firms receive inputs (inbound logistics), convert those inputs into outputs (operations), get those outputs to customers (outbound logistics), persuade customers to buy the outputs (marketing and sales), and support customers in using the outputs (service). Support activities are processes which provide support to the primary activities and to each other in terms of purchasing inputs (procurement); improving existing products or developing new products (research and development); dealing with personnel (human resource management); and general management, accounting, finance, and other activities which support the entire organization rather than individual activities (firm's infrastructure).

Using the value chain and focusing on categories, of activities enables one to see the firm as a collection of activities rather than as an organization chart and administrative units such as the purchasing department, the R&D, the manufacturing division, and the personnel department. This is important because the value chain activities be analysed much more effectively by using the value-chain analysis, firms can then create competitive advantage in the following three ways:

- 1) By placing greater or lesser emphasis (allocation of resources, management time and attention) on specific activities than competitors do.
- 2) By performing specific activities better (better management, more highly trained people, better-maintained equipment) or differently (using an alternative-presumably new or improved-technology) than competitors do.
- 3) By managing linkages among activities better than competitors do.

### **R&D and Competitive Advantage**

On the basis of the previous discussion, the choice of which value chain activity should a firm focus on should be governed by the competitive advantage(s) that the firm is pursuing in implementing its competitive strategy. In other words, if low cost-low price is the strategy, then low-cost technologies should be used, consistent with maintaining acceptable levels of quality, availability, attractiveness, and so forth. (obviously,

technology choice interacts with other strategic variables. For example, low unit costs are often achieved through economies of scale which in the past have depended on mass-production technologies and large customer markets demanding standardized products and services.) Similarly, if differentiation is the strategy, then activities such as R&D which maximize the specific competitive advantage in terms of providing products capable of higher performance, innovative products, etc, should be used, consistent with the price premium customers are willing to pay for the uniqueness.

Activity 1. Think of an organization of your choice and apply the value choice analysis by categorizing the firm into organization into primary and second support activities.

---

## 11.5 Research and Development

---

One standard definition of research and development states that research is an undirected basic science or a directed or applied science where development in research can result in innovative products and processes from either of these sources. Research differs from development of a product in that it is an exploration of ideas rather than a tangible output to be marketed. There is no guarantee that a new idea will be successful. R&D must provide a high degree of insurance so that future gaps can be closed to meet corporate goals, such as profitability. Therefore, many innovations are necessary and should be allowed to flourish to assure the achievement of these goals. Invention is an idea that must be converted to practice, i.e., one must show that the technical idea is feasible and can be demonstrated. The payoff of a timely invention can make a firm gain a market edge by lowering price, even with a strategy that places it below production cost. The belief is that increased sales would ensure future cost reductions from increased volume of output due to increased sales.

---

## 11.6 Development of R& D Strategy

---

The selection of R&D projects is the most important of all the R&D management activities. Unless an R&D department is working on the right R&D projects, all its efforts could come to zero. Consequently, most R&D organizations spend a great deal of time trying to select the right projects. What is rarely seen in these efforts to select the right R&D projects, however, is the value of having an overall R&D strategy before selecting R&D projects. A R&D strategy is important because it helps a R&D organization select projects in terms of a broader outlook rather than just bit by bit. When a R&D department has an overall strategy and has some strategic goals, it will more likely select projects that are in tune with its technical strengths, the capabilities of the company, and the demands of the marketplace. In order to develop a sound R&D strategy, certain prerequisites must be in place.

### **Preconditions for Effective Development of an R&D Strategy**

In order to develop a R&D strategy, a R&D organization first must make sure that certain conditions are in place. There are seven prerequisites for developing a R&D strategy:

- 1) A belief that a R&D strategy can solve problems
- 2) Creation of a planning staff within a large R&D department or the establishment of a strong commitment by the R & D line managers in a small R & D organisation to devote enough effort to doing R&D strategic planning

- 3) A method of linking R&D strategic planning to R&D operations
- 4) A mode of getting strategic marketing done
- 5) The active support from senior management
- 6) Prior efforts to develop a R&D strategy
- 7) A series of substantial and solid efforts that produce tangible results on their own, but allow R&D people to get better at R&D strategic planning

---

## 11.7 Steps Involved in Developing R&D Strategy

---

### **A) Belief that R&D Strategy solve Problems**

Although the idea of developing a R&D strategy may be accepted, usually development of an R&D strategy will not come about unless a R&D strategy is used for solving a problem. Which means, the effort that goes into developing a R&D and the conflicts that may occur about how R&D resources should be allocated are so great that unless a R&D organization has a clear R&D strategy it rarely will make the effort or face the conflicts. On the whole, R&D organizations require a strategy when they wish to use new technologies for future products. If, on the other hand, a R&D organization relies solely on utilizing existing technology to develop new products, then it may not need a R&D strategy.

Usually, R&D managers recognize that a R&D strategy will help them when they have doubts about how R&D resources are being used. For instance, the R&D managers of a FMCG company perceived the for need R&D strategy when they were forced to consolidate all the R&D on coffee that previously was carried out in several laboratories. To accomplish this task, they recognized that they had to have a R&D strategy to prioritise and coordinate all the R&D being done on coffee. Later they perceived the need to develop a R&D strategy related to R&D being done on beverages in a few laboratories. In short, although developing a R&D strategy is a nice idea, this idea will not be put into practice unless R&D managers perceive that a R&D strategy can solve a problem.

### **B) Creating Planning Staff within a R&D Organization**

Creating a planning staff or establishing a strong commitment by the R&D managers in a small R&D organization to devote enough effort to R&D strategic planning is necessary. Although line managers within a large R&D organization by themselves can develop a R&D strategy, in practice, if there is no planning staff to facilitate the development of a R&D strategy, there will never be a R&D strategy. Although some companies have a R&D strategy, it was not easy to develop one. The R&D planners normally run into two types of problems: analytical and organizational problems. The analytical problems surface when the R&D planners first attempt to facilitate the development of a R&D strategy. They find that there is no accepted methodology for developing a R&D strategy. Although R&D managers in some companies, consultants, and academicians all had their opinions on what a R&D strategy should be and on how it should be formulated, almost none of them have a complete picture of the process. In addition, the opinions of these various R&D managers, consultants, and academicians often were in conflict with each other or were irreconcilable. Thus, the R&D planners have to develop their own methodology. In addition, R&D planners also find that members of the R&D staff are generally not interested in developing a R&D strategy. Because of this, R&D planners have to spend majority of their time during the first few years persuading the R&D staff to do R&D strategic planning and then educating them

with regard to how a R&D strategy can be developed.

The experiences of these R&D planners are typical. Someone usually has to develop the methodology to be used in doing R&D strategic planning. Someone also has to be the champion of R&D strategic planning, or it will not get done. In theory, R&D managers in a large R&D organization can handle these responsibilities. In practice, R&D line managers in a large R&D organization normally have so many other responsibilities that they neglect R&D strategic planning. Thus, a R&D planning group usually proves to be necessary to getting R&D strategic planning done.

In a small R&D organization, on the other hand, R&D line managers are the only ones who can develop an R&D strategy because staff positions rarely exist. Thus, to get R&D strategic planning done, the R&D line managers in a small R&D organization must add the responsibilities of an R&D planning group to their normal responsibilities. These R&D managers usually will not be able to devote much time to developing a planning methodology. On the other hand, because they have responsibility for managing the R&D groups, if the R&D managers in a small R&D organization do develop an R&D strategy, they should have less difficulty in getting this strategy accepted and implemented. The key to planning in either situation is that the doers, not the planners, must do the planning. The role of the planners is to facilitate the planning process, which is an important, although seldom appreciated, role.

### **C) Connecting R&D Strategic Planning to R&D Operations**

To get a R&D staff to develop a R&D strategy, R&D planners (or R&D line managers) have to find ways to relate R&D strategic planning to R&D operations. This connection between R&D strategic planning and R&D operations has two aspects.

Members of the R&D staff have to be able to see that their interests are served through developing a R&D strategy. Thus, R&D planners must find a mechanism that involves R&D strategic planning and at the same time the R&D staff. One of the primary purposes of such forums is to get these R&D people to talk with each other. This cross disciplinary forum can turn out to be a useful mechanism not only for improving communication, but also for getting R&D strategic planning accepted. Once involved in interdisciplinary forum, these R&D people can get interested in technical activities as well.

The R&D projects that are actually selected and the R&D strategy need to be meaningful. In other words, a R&D strategy is not meaningful if it does not influence which R&D projects are selected and carried out. A R&D organization in a household products company addressed viewing the development of a R&D strategy as involving two phases. In the first phase the senior R&D managers defined the overall direction of the R&D strategy. During the second phase, middle-level R&D managers defined the R&D strategy through the projects they selected and carried out.

### **D) Linking R&D Efforts/Strategy to Customers' Needs**

Although it is important for a R&D organization to link its strategic operations, this is not enough. For a R&D organization's strategic plans, this strategic plans must be clearly linked to customers' future needs. Therefore, besides doing R&D strategic planning, a R&D organization must also get marketing done in its company. Two of the hard questions that must be addressed in a strategic marketing are

- 1) Who will the company's customers be in the future?
- 2) What will those customers need in the future ?

In answering these questions well, one must understand economic, regulatory, geographic, and social trends and opportunities.

### **E) Active Support of the Senior Management**

To get its R&D strategy integrated with business plans, an R&D organization must have the active support of senior business managers. To gain the active support of senior business managers, an R&D organization must explain the value of R&D in business terms—for example, with regard to how R&D will help the company (1) satisfy customers' needs, (2) cut costs, (3) expand into new markets, or (4) minimize distribution problems.

Those R&D organizations that have been able to gain the active support of senior business managers for their R&D strategy were helped by organizational factors. For example, in a chemical company the R&D organization was able to gain the active support of senior business managers because the chief executive officer is one of the major proponents of R&D in the company. As opposed to most of the other senior business managers in this company, this chief executive previously managed the division of the company that sells to industrial customers. Because the customers of this division are more knowledgeable about what R&D can contribute, this CEO realized how valuable R&D can be and thus has not only supported R&D strategic planning but also has actually encouraged the R&D organization to do it.

At another company, a key factor that allowed the R&D organization to first gain and then maintain the support of senior business managers was leadership among senior business managers. Stability and continuity in leadership was important because it took a few years for the senior business managers of having a R&D strategy. By learning year after year what the R&D was trying to accomplish with a R&D strategy, the senior management was able to appreciate the benefits. The R&D department, in turn, could build progress that it had made with these senior business managers in previous years.

The key to taking each of the steps discussed above is picking a problem that the R&D organization is facing that also calls for a more systematic analysis of the use of R&D resources. The value of carrying out a series of concrete steps is that together they serve as stepping-stones to improve R&D strategic planning. Moreover, because they produce tangible results along the way, they also help elicit support for the R&D strategic planning process.

One way in which a R&D organization can maintain the vitality of planning process is through carrying out a series of concrete efforts that produce tangible results on their own, but also allow R&D people to improve planning expertise. A second method involves benchmarking studies in which the R&D people compare the strengths and weaknesses of their company's technologies in relation to the strengths and weaknesses of their competitors' technologies. The R&D people can gain two things through this effort: 1) they gain a much better understanding of how their company stands in relation to competitors and 2) they learn how to analyze their technologies. For example, they learn how to think more precisely about how their technical work could improve the

performance of the company's products. A third effort that the R&D organization can consider involves using the techniques of portfolio management to evaluate the potential and payoffs of various technologies.

---

## 11.8 Progress of R&D Organizations in Strategy Development

---

Few R&D organizations in India have a R&D strategy or have established the conditions required for developing a R&D strategy. For example, few R&D organisations have perceived a R&D strategy as a way to solve a problem. Many large R&D organisations do not have a R&D planning group, and organizations do not do R&D strategic planning. Also, few R&D found a way to get strategic marketing done. Finally, in most companies R&D strategic planning do not have the active support of senior management. In addition, if one looks closely at the strategic goals of those R&D that have them, one also finds that many of these goals were arrived analytically. That is, many of the strategic goals of such R&D organisations have are intuitively obvious. For example, most of the strategic goals that organizations have formulated are similar and quite predictable 1) to ward out fundamental threats to the company's businesses. (2) to comply with government regulations.

Few R&D organizations have conducted benchmarking their technologies to competitors' technologies. Few R&D organizations carry out technology forecasting studies aimed at understanding 1) what technological changes may be occurring in the next 5 to 10 years and 2) what those technological changes may mean. Even those R&D organizations that have made significant progress in an R&D strategy admit that they still have much to do to improve the planning process. For example, the R&D organization may have a R&D strategy, but the top management does not accept this R&D strategy. Many R&D departments develop a R&D strategy, but they do not find a way to integrate their R&D strategy with the marketing and manufacturing strategies in the companies. In addition, the R&D strategy can be altered at the whim of anyone who at a later date becomes involved in the planning process without necessarily informing any one else about the changes in the plans.

In summary, some R&D organizations have made significant progress in developing an R&D strategy. Most R&D organizations, however, have barely started developing an R&D strategy. The immediate challenge facing most R&D organizations, therefore, has to do with first establishing the preconditions required for developing an R&D strategy. After doing this, they will then be able to meaningfully deal with issues as to what the R&D priorities should be and how R&D resources should be allocated. Activity 2. Give examples of any five firms (in the Indian context), which have adopted R&D strategy as a part of this competitive strategy.

- 1)
- 2)
- 3)
- 4)
- 5)

---

## 11.9 Summary

---

An essential component of competitive strategy is recognizing the role that Research and Development plays in the competitive success of a firm, and acting to ensure that

technology decisions and policies contribute to the firm's competitive advantage. A firm, which has a strong R&D programme, can influence all these factors positively and contribute to the competitive advantage of a firm. Competitive advantage views R&D activities as a way of improving a process, thus reducing costs, or providing customers with a best-of-class benefit.

The selection of R&D projects is the most important of all the R&D management activities. Unless an R&D department is working on the right R&D projects, all its efforts could come to naught. A R&D strategy is important because it helps an R&D organization select projects in terms of a broader outlook rather than just bit by bit. When a R&D department has an overall strategy and has some strategic goals, it will more likely select projects that are in tune with its technical strengths, the capabilities of the company, and the demands of the marketplace. In order to develop a R&D strategy, certain prerequisites must be in place such as belief in R&D strategy as a tool to solve problems, establishing a dedicated strategic planning group within the R&D department and the top management commitment's to the R&D strategy.

Some companies in India have made significant progress in developing a R&D strategy. Most companies, however, have barely started developing a R&D strategy. The immediate challenge facing most firms, therefore, has to do with first establishing the preconditions required for developing an R&D strategy. After doing this, they will then be able to meaningfully deal with issues as to what the R&D priorities should be and how R&D resources should be allocated.

---

### 11.10 Self-Assessment Questions

---

- Q1. Explain the importance of R&D strategy in enhancing the competitiveness of a firm?
- Q2. How does R&D Strategy support the Porter's generic competitive strategies?
- Q3. Discuss the various steps involved in development of R&D strategy.
- Q4. Give reasons for R&D strategies not taking root in the Indian context.

---

### 11.11 FURTHER READINGS

---

- Allio, Robert J. and Desmond Sheehan (1984), "Allocating R&D Research Effectively," *Research Management*, (July-Aug.), 14-20
- Bachman, Paul W. (1972), "The Value of R&D in Relation to Company Profits," *Research Management*, 15, (May), 58-63.
- Bitando, Domenic and Alan L. Frohman (1981), "Linking Technological and Business Planning," *Research Management*, (Nov.), 19-23.
- Boer, John Seely (1991), "Research that Reinvents the Corporation," *Harvard Business Review*, (Jan-Feb), 102-111.
- Chester, Arthur N. (1994), "Aligning Technology with Business Strategy," *Research Technology Management*, (Jan-Feb), 25-32.
- Cohen. W.M. and D.A. Levinthal (1989), "Innovation and Learning: The Two Faces of R&D," *Economic Journal*
- Menke, Michael M. (1994), "Improving R&D Decisions and Execution," *Research Technology Management*, (Sept-Oct), 25-32.
- Mitchell, Graham R. and William F. Hamilton (1988), "Managing R&D as a Strategic

Option,” *Research Technology Management*, (May-June), 15-22.

Porter, E. Michael. (1985). *Competitive Advantage – Creating and Sustaining Superior Performance*. The free press

