The 12 Critical Activities of R&D Management: A Comparison of Two Cases

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To manage R&D effectively, R&D managers—and their companies—must successfully carry out the following 12 critical activities:

- Selecting R&D.
- Planning R&D projects.
- Generating new ideas.
- Maintaining the quality of the R&D.
- Motivating R&D people.
- Getting R&D people to play an effective role in commercializing technology.
- Facilitating communication among R&D people.
- Coordinating R&D and marketing.
- Transferring technology to manufacturing.
- Linking R&D to business planning.
- Evaluating the financial aspects of R&D.
- Maintaining teamwork within senior management concerning technology.

To evaluate how effectively R&D managers carry out these activities, this chapter presents two case studies. The first involves a health care products company with approximately 25 R&D people. The second case involves a food processing company with five researchers and approximately 20 technical support people.

The health care products company—called Company HCP—is part of a much larger corporation that has numerous divisions that produce and sell health care products. The particular division highlighted in this chapter is relatively young. It was formed 20 years ago by combining two major businesses in the corporation. In some of its markets, Company HCP is a leader. In these markets it tries to maintain its edge by developing newer versions of its products that provide additional benefits with fewer dosages. In
other of its markets, Company HCP is engaged in market development—that is, creating a market for its new products. In these markets it faces major challenges in expanding its user base.

The food processing company—called Company FP—is a newly created company that was formed by combining parts of three independent companies. Because of consolidation throughout the industry, many food processing companies are merging or acquiring other companies. Two of the three companies that were combined competed against each other in many markets. The third company is based outside the United States and only slightly competes with the two other companies. In most markets all three companies face stiff competition. To compete more effectively, this food processing company needs to develop new products, particularly new products based on technology.

This chapter examines both companies with respect to how effectively they address the 12 activities of R&D management then discusses each of the 12 activities. In comparing companies HCP and FP, four potential situations could occur regarding how strong they are in the 12 activities:

- Both companies are strong.
- Company HCP is strong, while Company FP is weak.
- Company HCP is weak, while Company FP is strong.
- Both companies are weak.

Each of these situations is also discussed, and the lessons learned can be very useful to other companies hoping to improve their operations.

**EFFECTIVENESS IN THE 12 ACTIVITIES OF R&D MANAGEMENT**

Exhibit 1 provides an overview of the evaluations of companies HCP and FP in the 12 areas of R&D management. Although both companies are strong in half of the 12 R&D management activities, they are not strong in the same six activities.

In examining Company HCP, the health care products company, only one evaluation is made. In examining Company FP, the food processing company, sometimes two evaluations are made—one concerning the researchers and one concerning the technical support people.

**Activity 1: Selecting R&D**

Company HCP selects the right R&D. For example, even the chief financial officer of Company HCP—who in most companies is someone who would question the direction of R&D—believes that Company HCP selects the right R&D. The main reason for this is that the president of the company is intimately involved in selecting R&D. In working closely with the R&D managers, the president helps evaluate how R&D could add value to the company’s businesses.
Company FP also selects the right R&D, but this is done primarily by the R&D managers themselves. The R&D managers of Company FP have not succeeded in getting the business managers to participate in selecting R&D. Because the R&D managers are close to the businesses, however, they usually accurately gauge what is needed.

Unfortunately, because the business managers of Company FP are not very involved in selecting R&D, when the R&D is transferred to the businesses, these business managers find it difficult to market the new product based on this R&D. Many times new technical questions have to be addressed during the marketing phase of new product development because the business managers did not participate earlier in selecting the R&D.

In addition, some business managers do not know what the process for selecting R&D is. Because in Company FP discussions about selecting R&D do not occur often enough—and because the discussions that do occur are not always as candid as they should be—some business managers do not know what R&D projects are being done.

**Activity 2: Planning R&D Projects**

Both companies plan R&D projects well. Company HCP’s R&D people plan their R&D projects using an approach with specific phases to be followed. In
addition, they have developed a system for tracking the time lines of all of their projects. Company FP’s R&D people also plan their projects well, particularly those that lead to new products.

Activity 3: Generating New Ideas
Within the R&D organization of Company FP, there is an excellent climate for generating new ideas. Company FP’s R&D organization recruits many professors and students from universities, which helps the R&D organization stay abreast of new ideas. In addition, one of the managers of Company FP’s R&D organization is exceptionally good at stimulating R&D people to be creative.

The climate for technical support people in Company FP, many of whom are located in two of the three businesses, is not conducive to creativity. Technical support people in these two businesses spend almost all of their time reacting to the needs of the existing businesses and have little chance to be creative.

Although the climate within Company HCP’s R&D organization is supportive of creativity, the R&D people in Company HCP are not as creative as they should be. The reason for this is that Company HCP’s R&D people are too distant from the marketplace. Because of this, they follow the lead of the marketing people and execute the projects that the marketing people propose.

Activity 4: Maintaining the Quality of the R&D
The R&D organizations in both companies are strong in maintaining the quality of their R&D. The R&D organization of Company HCP has made great progress in establishing standard operating procedures for all of the repeatable activities that take place within the laboratory, such as the conducting of tests and the documenting of results. The R&D organization of Company FP has made exceptional progress in harmonizing the activities related to formulating ingredients for the diverse products of the three companies that were combined.

Activity 5: Motivating R&D People
Within Company FP, the researchers and the group of technical support people who report to the exceptionally inspirational R&D manager are extremely motivated. Most of these technical people greatly respect their manager and are inspired to do excellent technical work.

On the other hand, within Company FP, the other technical support people—those who report to business managers in two of the three businesses—struggle much of the time. They lack managers who understand their technical needs and problems. In these businesses the technical support people are used almost solely as troubleshooters. Moreover, the business
managers to whom they report do not recognize the technical people’s need for professional development.

In Company HCP, the R&D people are motivated to do good work. They are not, however, given much responsibility. The manager of the R&D group in Company HCP serves, in practice, as the project manager for all the projects with regard to the ways in which the technical results are to be used. The manager of the R&D group in Company HCP also tracks all of the projects and thus manages the resources across all the projects. The R&D people in Company HCP, therefore, stay within the realm of doing only the technical aspects of their projects.

**Activity 6: Getting R&D People to Play an Effective Role in Commercializing Technology**

In Company HCP, the R&D people are motivated to do good work, but are not encouraged to use all of their talents for the good of the company. Because the R&D people function usually as just executors of technical projects, they resign themselves to view their technical assignments narrowly. Because they are so divorced from the marketplace, they give little advice on how to commercialize technology more effectively.

In Company FP, the researchers function to some degree as if they were working in an academic environment. The research managers—rather than the researchers themselves—carry out most of the coordination with the marketing, manufacturing, and financial functions of the company. Consequently, the researchers often do not fully understand the business implications of their research. In addition, they have little understanding of how their research needs to be viewed as a financial investment.

The technical support people in Company FP have a better understanding of business operations. Due to their limited role though, they have little impact on business strategies.

**Activity 7: Facilitating Communication Among the R&D People**

Within Company FP, there is excellent communication among the R&D people within each of the groups. The researchers communicate well with each other, and the technical support people communicate well with the others in their technical group.

The communication between the researchers and two of the technical support groups, however, is not good. (The communication between the researchers and the third technical support group, because they were located together in their company before the three companies were combined, is excellent.) Also, the communication between the three technical support groups is extremely weak.

Many of these problems exist because of conflicts that occurred between the technical staffs when the three companies were combined. Some of these
conflicts occurred because of differences in perspective on what the role of R&D needed to be. For example, whereas the R&D managers in one of the companies had a tradition of carrying out research in isolation, the R&D managers in another of the companies traditionally sought guidance from the business managers. Other conflicts occurred because of organizational difficulties that arose in assigning people to different positions in the R&D staff. For instance, because only one of the two research directors of the two United States-based companies could become head of the company research group, the other research director had to settle for being the leader of one of the technical support groups in the businesses. Last, the communication between R&D people was further weakened by orders from the senior business managers that the three groups of technical support people should not talk to one another because of competition between their respective businesses.

In Company HCP, the communication among the R&D people is good. It is also good among the technical services people, who handle the transfer of technology to manufacturing. Although personality conflicts exist that keep communication from being optimal within these groups, information is passed well between people on the whole.

The communication between the R&D group and the technical services group, however, is weak. Part of the reason for this is that the technical services group does not have enough influence in planning the R&D projects. Consequently, the technical services group is often rushed in transferring technology to manufacturing. Another part of the reason is that the R&D people do not fully appreciate what the role of the technical services group should be in Company HCP.

**Activity 8: Coordinating R&D and Marketing**

In Company HCP, the coordination between R&D and marketing is excellent. In one of Company HCP’s businesses, the same person manages R&D and marketing—and consequently, works hard to improve this coordination. In the other of Company HCP’s businesses, the coordination between the R&D manager and the marketing manager is extraordinarily close. In this case the two managers share information with each other extremely well.

There are a few areas in Company HCP, though, that need to be strengthened, specifically with regard to coordination between the R&D and marketing organizations. For example, the R&D people and the marketing people—as opposed to the managers—need to communicate better, market research needs to be done earlier so that the technical work of new product developments is not conducted before a market is defined adequately, and more wide-ranging discussions should exist regarding how new product developments could be managed more effectively.

In Company FP, the coordination between R&D and marketing is poor, mainly because the marketing function throughout Company FP is weak. Traditionally the three companies that combined to make up Company FP relied
on a strong sales staff. Seldom did these salespeople attempt to define the
future needs of their customers.

Over the last two years all three companies have recognized their
weaknesses in marketing and have tried to strengthen this area. Company FP,
however, has had difficulty in finding good marketing managers. Conse-
quently, many of the current marketing managers in Company FP are sales
managers who have been retrained and who are still learning about
marketing.

At the working level in Company HCP—that is, between individual R&D
people and individual marketing people—some progress has been made.

With regard to the identification of market opportunities across all of the
businesses and the overall planning of R&D resources, however, commu-
nication in Company FP is poor. There are, on the whole, no clear marketing
strategies. The planning of the use of R&D resources, consequently, also
suffers.

**Activity 9: Transferring Technology to Manufacturing**

In Company FP, the transfer of technology is not much of a problem. Although Company FP’s manufacturing plants need to become more efficient, they are, on the whole, able to manufacture most of what the R&D organiza-
tion develops. In addition, very experienced personnel are available in
Company FP’s R&D organization, particularly in the formulations depart-
ment, to help transfer technology to the plants.

In Company HCP, the transfer of technology to manufacturing is a major
problem. Part of the reason for this problem is Company HCP’s reliance on
contract manufacturing, which is done either by another division of the cor-
poration or by independent contract manufacturers. Because Company HCP
is a small division within its corporation, it has little influence with the man-
ufacturing plants in its corporation and suffers from poor communication
with manufacturing managers who are not interested in Company HCP’s
products. Company HCP’s efforts with independent contract manufacturers
have been more successful where there has been a good fit between the
contract manufacturer’s interests and Company HCP’s interests. When there
has not been a good fit though, Company HCP also has run across difficulties
with independent contract manufacturers.

Another part of the reason for this company’s problem with transferring
technology to manufacturing is the capabilities of the technical services
people. Some of Company HCP’s technical services people lack the technical
skills needed to design the manufacturing processes appropriately for a new
product development.

Finally, the technical services group is represented only at the level of
middle management within Company HCP. The concerns of manufacturing
are seldom heard by the company’s senior business managers when there are
discussions about how to launch a new product development.
Activity 10: Linking R&D to Business Planning

In Company HCP, R&D is linked to business planning exceptionally well. The president generally has a clear idea about the business direction of the company. Although his communication of this direction to the whole company could be improved, the senior managers of the company understand where the company is going. In addition, the president is very involved in selecting R&D projects to make sure that R&D planning is integrated fully into business planning.

In Company FP, there is little business planning. Nonetheless, the R&D strategy, which is developed by the R&D managers in isolation is quite good. Because the R&D managers understand the long-term needs of the businesses—even though the business managers themselves do not articulate them—the R&D managers do a good job of linking R&D to business planning.

The problem comes, however, after the R&D is completed. Because the business managers have not been planning on the introduction of new technology, they must start from scratch in developing a business strategy that exploits the new technology. In some cases, moreover, the business managers resist the introduction of new technology because they do not appreciate its value.

Activity 11: Evaluating the Financial Aspects of R&D

In Company HCP, there are excellent evaluations of the financial aspects of R&D. At the management level, the finance group is exceptionally close to the R&D organization. The finance group works with the R&D managers to improve the analysis of new product developments. For example, rather than just using overall sales and expenses to evaluate new product developments, the finance group analyzes new product developments in terms of net present value. Because the sales and costs follow different paths over time, a simple calculation of overall sales and costs is not adequate. The finance group is also developing ways to help the R&D organization use accounting information more effectively for evaluating ongoing R&D projects.

In Company FP, the finance group has distant relations with the R&D organization. In addition, the head of finance—and a small minority of the business managers—question whether their company should spend money on research. Within Company FP, there are no joint efforts involving finance managers and R&D managers to improve the evaluation of the financial aspects of R&D.

Activity 12: Maintaining Teamwork within Senior Management Concerning Technology

Within Company HCP, despite the fact that R&D is coupled closely with business planning, there is no teamwork within senior management
concerning technology. This is because the president of Company HCP makes most of the major decisions by himself. The heads of the various functions (i.e., R&D, marketing, and finance) have to follow the direction of the president on almost aspects of the businesses.

Consequently, although the management of R&D within Company HCP is quite good in general, there are other serious weaknesses related to how people work together. For example, because the president dominates all aspects of the businesses, many employees do not feel empowered to improve things in the company. In addition, because many of the managers fear the president, communication throughout the company suffers. For instance, there are weaknesses in communication at the working level between:

- R&D and technical services.
- Marketing and regulatory compliance.
- Quality assurance and marketing.
- Technical services and regulatory compliance.
- R&D and marketing.
- Finance and R&D.
- R&D and consumer affairs.
- Technical services and marketing.
- Clinical and all other company groups.

Due to these weaknesses in communication throughout the company, morale is low, and many members of the company do not trust each other.

In Company FP, on the other hand, some minor improvements in teamwork among senior managers are occurring as the three companies—and the R&D organization and three technical support groups—slowly combine. Although there are many organizational difficulties in combining the three companies, particularly organizational difficulties related to the use of technology, teamwork is being built in Company FP through reorganizations. Thus, step by step, the president of the new company, the heads of the three divisions, and the head of R&D are slowly developing a modicum of teamwork.

**EVALUATING AND COMPARING THE STRENGTHS AND WEAKNESSES OF THE TWO COMPANIES**

As discussed, four situations arise with regard to how strong these companies are in each of the 12 R&D management activities:

- Both companies are strong.
- Company HCP is strong, while Company FP is weak.
- Company HCP is weak, while Company FP is strong.
- Both companies are weak.

See Exhibit 2 for an overview of the 12 activities of R&D management in relation to the four situations.
Situation 1: Both Companies Are Strong
In two of the activities—planning R&D projects and maintaining the quality of the R&D—both companies are strong. These two activities involve activities in which techniques play an important role and that the R&D organizations themselves can control to a great degree. Although R&D project planning and maintaining the quality of R&D obviously must be managed well in order to succeed, specific planning techniques, such as Gantt charts, and specific quality tools, such as work-flow diagrams, play an important role in making improvements. In addition, the R&D organizations can control most aspects of both of these activities. Largely because they do not have to depend on the cooperation of other functions in the company, both R&D organizations are strong in these activities.

Situation 2: Company HCP Is Strong; Company FP Is Weak
In four of the activities—selecting R&D, coordinating R&D and marketing, linking R&D to business planning, and evaluating the financial aspects of R&D—Company HCP is strong, while Company FP is weak. Company HCP is strong in these activities mainly because the president takes such an active interest in the use of technical resources and creates an environment in which R&D is closely linked to business operations. In Company FP, on the other hand, the president has been forced to focus much more on consolidating the company than on linking R&D to business operations. In addition, marketing...
within Company FP has traditionally been weak. Therefore, R&D managers in Company FP have to select R&D projects on their own and to work on their own to link R&D to business operations.

**Situation 3: Company HCP Is Weak; Company FP Is Strong**

In three of the activities—generating new ideas, motivating R&D people, and transferring technology to manufacturing—Company HCP is weak, while Company FP is strong. Company FP is strong in these activities mainly because of an outstanding R&D manager who inspires the R&D people. Because of this R&D manager's leadership, new ideas are encouraged—and R&D people are eager to do good technical work and to see that their work is transferred effectively to manufacturing. In Company HCP, on the other hand, the R&D people are considered to be implementers rather than full partners in the development process. In contrast with the R&D manager in Company FP, one of the key R&D managers in Company HCP acts as the project manager for all projects on nontechnical matters. In addition, Company HCP lacks skills in manufacturing engineering, which hampers the transfer of technology to manufacturing.

**Situation 4: Both Companies Are Weak**

In three of the activities—getting R&D people to play an effective role in commercializing technology, facilitating communication among R&D people, and maintaining teamwork within senior management concerning technology—both companies are weak. All three of these R&D management activities are particularly difficult to do well, principally because they require one or more groups within a company to go against the grain.

First, R&D people, on the whole, are much more comfortable doing technical work than in commercializing technology (i.e., analyzing markets and dealing with marketing people or customers). Most R&D people are much more interested in technical matters, for which they were trained, than in market analysis. In addition, many R&D people feel more comfortable working with things than with either marketing people or customers.

Second, members of R&D groups also tend to be much closer to people in their technical group than to people in other technical groups. R&D people in the same technical group often share many perspectives on how to solve technical problems, whereas R&D people in different technical groups often compete both in terms of technical approaches and resources.

Third, teamwork is always easier to accomplish at the working level within companies than at the level of senior management. For example, at the working level, requirements are usually fairly clear and the work is concrete. For example, the requirements, schedule, and projected costs of a new product development are usually defined fairly clearly. In addition, the work is concrete—there is a specific product; there are specific customers in mind;
there are specific technologies that have to be used; and there is a specific manufacturing plant that will manufacture the product.

At the level of senior management, on the other hand, requirements are not nearly so clear. For example, it often is not clear what a company’s business strategy should be, and different managers in a company often have different ideas about the business strategy. In addition, the issues that senior management deals with are often quite difficult. Senior managers must decide about priorities across a wide range of matters—from maintaining current advertising budgets to developing new markets—and must deal with coordinating the various functions’ operations as a whole. Finally, the issues that senior management deals with are often abstract. For example, the goal of improving productivity in new product development is not easy either to define or to measure. Each of these three areas is discussed more specifically in relation to the two companies in the following sections.

**Getting R&D People to Play an Effective Role in Commercializing Technology.** In Company HCP, the R&D people are not encouraged to get close to the marketplace and thus do not take an active role in commercializing technology. In Company FP, the researchers function as if they were in an academic environment—and the technical support people have little impact on business strategies.

**Facilitating Communication Among R&D People.** In Company HCP, the R&D people and the technical services people do not communicate effectively with each other, which hurts the transfer of technology to manufacturing. In Company FP, communication between the researchers and two of the three technical support groups is weak. In addition, communication between the three technical groups barely exists, which is something that is encouraged by the senior business managers of Company FP.

**Maintaining Teamwork Within Senior Management Concerning Technology.** In Company HCP, teamwork within senior management concerning technology does not exist because the president dominates all business activities. In addition, some of the heads of the function fear the president. In Company FP, teamwork is slowly improving, but there are still major differences among the managers of the companies that were combined.

In considering the four situations as a whole, three lessons could be drawn. First, if an R&D organization is interested in improving, it can most easily improve in those areas that it controls, such as planning R&D projects and maintaining the quality of the R&D. Second, individual managers can make an enormous difference in improving R&D management. For example, Company HCP is so strong in selecting R&D, coordinating R&D and marketing, linking R&D to business planning, and evaluating the financial aspects of R&D primarily because the president of the company supports
such activities. Likewise, Company FP is so strong in generating new ideas, motivating R&D people, and transferring technology to manufacturing primarily because an exceptional R&D manager supports these activities.

Third, to improve in those activities that require one or more company groups to go against the grain—activities such as getting R&D people to play an effective role in commercializing technology, facilitating communication among R&D groups, and maintaining teamwork within senior management concerning technology—great dedication is needed. To encourage R&D people to become more like business people, to persuade R&D people to communicate openly with all of their colleagues, and to achieve close coordination among senior managers requires dedication that some companies do not have. To go against the grain in these ways, therefore, represents truly world-class R&D management.

CONCLUSION

Company HCP and Company FP are not unlike many organizations today, and their R&D groups in particular help provide an accurate picture of what is going on in many R&D organizations throughout the business world. It is safe to say that most of the reasons for their proficiency—or lack thereof—in carrying out each of the 12 activities that are crucial to success in R&D are likely repeated in companies throughout the world. R&D managers who recognize themselves or their group’s situations in this chapter should consider their capabilities in each of these activities as well as the reasons for success or failure in each because knowing there is a problem and understanding why it exists are the first steps to finding a solution.