

5.1 INTRODUCTION

This chapter presents and analyses policies and policy making with reference to R&D in the corporations studied. The presentation will be descriptive rather than normative in order to provide empirical insight. There is a gap between empirical observations and normative literature on policy making in general. At present, it seems more meaningful to try to narrow this gap mainly from the descriptive, inductive side than from the normative, deductive side. There is also a gap between R&D and corporate policies (or strategy), and it is of primary concern to discuss policy making in the light of this lack of integration.

The concept of policy will be used broadly and will not in any important way be distinguished from strategy and similar terms where empirical material is concerned. An important distinction is made between pursuing a policy (or a strategy) and mere behaviour. A policy, as the term is used here, has to include some degree of conscious determination of future action. Of course, it then becomes difficult to apply this distinction in retrospect. Analytically, several distinctions are relevant and a variety of terms are in use.

Etymologically the term 'policy' has the same origin as 'police'. A common dictionary description of 'policy' refers to a course of action adopted and pursued by a government, ruler, political party, etc. (Note how 'strategy', on the other hand, has been associated with military courses of action.)

It is not difficult to find, in the literature, different conceptual positions, sometimes involving inconsistencies, tautologies or mere vagueness. In trying to synthesize, some common underlying conceptions may be identified, as shown in Figure 5.1. These ideas give rise to overall value statements about desirable future states for a distinct whole and corresponding guidelines or outlines for possible future courses of action or behaviour for different parts of the whole.

Often policies are used for decision making in repetitive situations or as general guidelines. Strategy, on the other hand, is sometimes used for decision making in competitive situations but often also as an overall concept at the highest level of importance for the whole. Different wholes may be considered (e.g., a corporation, a division, a department or an individual) and strategy may correspondingly be used as a relative concept. The same goes for policy and objective.

A conceptual review reveals a variety of views on what could be meant by a policy. Is it not important, then, to make a choice between the possible distinctions? The standpoint taken here is that it is more important to be inclusive and make the necessary distinctions, when called for, in an analysis.

What actually produces policies of different kinds in different situations with different impacts is not well understood. This is especially true of R&D and technological innovation in general, since uncertainty is high and repetitiveness low.

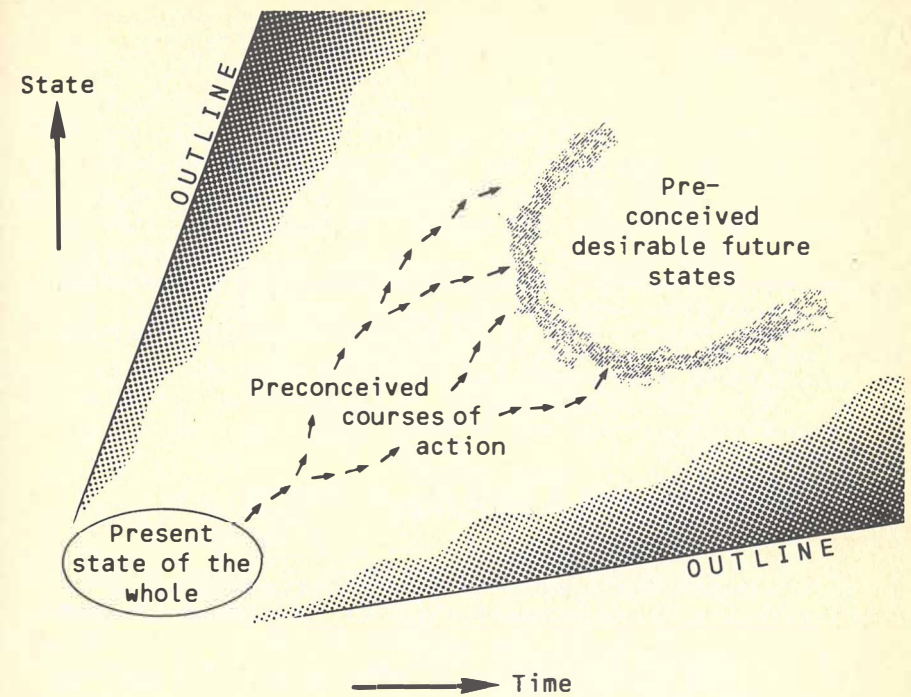


Figure 5.1 Elements of concept formation in policy making

The affluence of the 1960s and the crises of the 1970s seem to have stimulated a demand for improvements in policies and policy making, both public and corporate. Science and technology have been focused on, both as a promise for industrial prosperity and as an evil 'force' that has to be harnessed by better policies, if it is possible to harness at all. The limitations of different ways of making policies and the design of proper ones have gained increased attention as the insufficiencies of traditional rational-deductive approaches become evident. At present a central problem is maybe not so much under what circumstances a specific policy is good in some sense and what policy to use in a specific situation, but how to create insight into the process of policy making.

5.2 EMPIRICAL FINDINGS

5.2.1 Corporate policies

Table 5.1 gives an overall picture of the policy situation with respect to some basic dimensions of corporate development. The information in this table is ex-

Table 5.1 Emphasis in corporate policies 1975

Corporation	Profit	Growth	Diversification*	Internationalization [†]	R&D
KemaNobel	↗	↗	↘	↗	↘
Philips-Sweden [‡]	↗	↗	↘	↗	↘
Alfa-Laval	↗	↗	↘	↗	↘
SKF	↗	↗	↘	↗	↘
Boliden	↗	↗	↘	↗	↘
Iggesund	↗	↗	↘	↗	↘
Astra	↗	↗	↘	↗	↘
Volvo	↗	↗	↘	↗	↘

*Diversification refers to product areas. Different types of diversification are not distinguished here, but strong synergetic diversification is preferred.

[†]Internationalization may be carried out in several ways with respect to location of operations and markets, but no such distinctions are made here.

[‡]No accurate data available for Philips as a whole.

Notation:

- ↗ Emphasized elements in corporate development.
- No special emphasis.
- ↘ De-emphasized element in corporate development.
- ↔ Changes in emphasis during the 1960s and first half of the 1970s.

tracted from documents and interviews and reflects an aggregated, qualitative judgement based on several sources of information. As will be discussed later, a policy situation is heterogeneous in several respects, and the arrows in the table are only rough indications of explicit stands taken in policy matters as expressed in documents and interviews.

First, Table 5.1 shows that profit, growth, internationalization and R&D have at least some emphasis in corporate policies, while diversification is de-emphasized in half of the corporations. However, there are several ways of emphasizing diversification, internationalization and R&D. While Philips-Sweden and Volvo are trying to concentrate their range in general, they are at the same time trying to weaken their dependence on military markets through diversification. That KemaNobel and Volvo de-emphasize diversification in general is due to bad experience from previous efforts to diversify. Astra has only partially failed in diversification outside pharmaceuticals but de-emphasizes diversification due to successes in the pharmaceutical area. The return on investments is higher in this area, and the perceived need to spread business risks as a response to a nationalization threat has decreased. Some corporations, especially Alfa-Laval, try to develop an increased capability to market product systems, but they also make disinvestments and concentrations in their product portfolio. Similar comments may be made about internationalization. The table also shows that R&D is in general emphasized. This is so in terms of both resources and top management attitudes and attention. The distribution of emphasis on different kinds of R&D naturally varies among the corporations.

Secondly, changes in policy emphasis have occurred to different extents depending upon how the corporation has developed in relation to expectations and standards for comparisons. Policies for diversification and R&D have, however, been the least stable in this respect and, with some exceptions the changes emanate from distorted expectations on behalf of top management.

Thirdly, two groups of corporations may be distinguished on the basis of similarities in policy emphasis. One group includes KemaNobel, Philips, Alfa-Laval, Astra and Volvo, and the other SKF, Boliden and Iggesund. The emphasis on diversification is the main discriminating variable; SKF, Boliden and Iggesund are typically vertically integrated. In addition, they are at least partially based on raw materials such as ore and timber. (KemaNobel has changed its raw material base, see Chapter 2). Thus, in this sample, policy emphasis on diversification is correlated with degree of vertical integration and raw-material dependence. Table 5.2 illustrates corporate goals and strategies as formulated in KemaNobel.

The rationales behind statements about goals and strategies are inter-related in complex patterns. The strategies are generally thought of as a means of reaching the financially oriented ends, but enduring profitability, for instance, is both a means of survival in the economic system and a means of increasing the competence of corporate personnel or increasing R&D efforts. The latter two

Table 5.2 Written corporate goals and strategies in KemaNobel 1975

Corporate goals	Corporate strategies
The overall goal for KemaNobel is good enduring profitability.	The competence of corporate personnel is to be increased.
Corporate return on equity is within the planning period to be increased to 20 per cent before tax.	Environmental and safety issues are to be given great and increasing attention.
Corporate debt-equity ratio is within the planning period not to fall below 30 per cent and preferably be closer to 40 per cent.	Corporate development is primarily to be based on advanced knowledge about production, marketing and use of chemical products.
Corporate liquidity is to be held at high level.	The corporation is to be developed towards increased internationalization.
The average return on net operating assets for operative units is within the planning period to be increased to 13-15 percent.	The corporation is to be developed towards a maintained or increased degree of distribution of risk and independence of business cycles.
(Note: Increased rates of inflation forced later revisions of certain figures.)	Sectors that do not fit into the corporation and/or which cannot be developed with reasonable effort, are to be separated from the corporation.
	Knowledge-intensive projects are to be given priority.
	The R&D efforts are to be increased in intensity and efficiency.
	The corporate information systems are to be developed—as well as the ability to utilize them.

strategies are thought of as a means of operating with knowledge-intensive products. Such products are thought of as a means of reducing risks and smoothing out results over business cycles. A depression might, however, force KemaNobel to cut down R&D efforts even at the expense of long-term profitability according to the Corporate Managing Director.

These features of goal (policy, strategy) inter-relatedness apply to all corporations. Moreover, different key individuals and groups of people inside and outside the corporation have different ideas about the corresponding causal relations, and they place different values on the perceived structure of means and ends (or causes and effects). Thus, there are neither simple hierarchies of means and ends nor any deep, wide, or stable consensus about a specific means/ends structure as reflected in written policies. The inter-relatedness of policy matters, however, makes it possible to some degree to reconcile different ambitions in a corporation. In Astra, for example, profitability, internationalization and R&D have been correlated, and it has been possible to reconcile business-oriented ambitions with R&D-oriented ambitions.

5.2.2 R&D policies

The R&D policy situation in the corporations was heterogeneous with respect to:

- specificity of policies on different organizational levels such as corporate, divisional, departmental, product, programme, and project level;
- form (written/unwritten, explicit/implicit);
- degree of secrecy (internal/external restrictions on distribution);
- area of application such as research, development, patents, licensing, relations to production and marketing, external cooperation and bodies of management;
- consensus and acceptance in the corporation;
- stability of policies over time;
- sources of influence in policy matters;
- motives behind a policy, for example, to guide decision making, motivate selective behaviour, co-ordinate, direct attention, support a manager, or create an image for internal or external use;
- content with respect to sciences, technologies, products, processes, markets and applications;
- relations between R&D policies and other policies, for example, the coupling between corporate policies and R&D policies.

With respect to the content in statements about policies, goals, strategies, etc., for R&D, it is possible to discern common R&D policy elements or classes of R&D statements. These policy elements concern:

- (a) role of R&D in corporate development;
- (b) resource allocation;
- (c) area priorities;
- (d) relations to competitors and customers;
- (e) acquisition and utilization of technology;
- (f) organization of R&D;

- (g) R&D management philosophy;
- (h) meta-policies.

Naturally, all policy elements are not found in all corporations but rather than describing each corporation in this respect, each policy element will be described:

(a) *Role of R&D in corporate development.* Several natural roles may be discerned with respect to profitability, growth, diversification, internationalization and other features of corporate development, for example, good will. The roles also vary within the corporations with respect to different product areas. At SKF, for example, R&D has a defensive role as far as bearings are concerned ('the R&D goal is to protect us from surprises'), while it has an offensive role along some lines of diversification.

(b) *Resource allocation.* This is a natural and explicit element in policies concerning R&D. Budget proportions and profiles with respect to total R&D resources and different kinds of R&D resources are used with different degrees of rigidity among the corporations. Astra, for instance, has rigidly adhered to allocating a certain percentage of the turnover to R&D, while others dismiss such a policy as unsuitable. (Note that pharmaceuticals are not sensitive to business cycles.) KemaNobel, Alfa-Laval and SKF stress some ratios between development of old and new products respectively. Similarly, policy statements may concern other subdivisions of R&D work and resources (for instance, product versus process development or research versus product development). Astra allocates a certain percentage to what is called explorative research, while within KemaNobel 'no basic research or R&D with the sole objective of making discoveries should be done'.

(c) *Area priorities.* Areas or fields of science, technology and application are distinguished, and levels of ambition or priorities are formulated. Sometimes this is done in a negative way, as for example, when a corporation declares that it should not develop in-house competence within biology or medicine or that it should not go into the packaging business. Such negative delimitations may be of much guidance to R&D and sometimes act as a deterrent on R&D ambitions or serve the purpose of slowly killing a project. Mostly, however, area policies are formulated in terms of existing areas to concentrate on and which areas to develop into. The latter areas are almost always adjacent, in some sense, to existing areas of competence. Since much R&D is connected to products ('Our R&D is mostly a consequence of our products'), R&D policies are often tied to product areas and differentiated with respect to the corresponding product and market features. The conceptualizations of areas differ, however, in specificity and focus, and it is not always clear what distinguishes, for example, a product area, an area of application, or a technological area (compare 'refrigerator area', 'food preservation area' and 'cooling technology').

(d) *Relations to competitors and customers.* Policies that focus on competitor and customer relations are mostly formulated on levels where groups of competitors and customers may be relatively well identified. Policies may thus concern

leadership or followership with respect to product quality and performance, product price and time of introduction. Policies may also be formulated in terms of unique or advanced competence in certain areas. Sometimes policies regarding leadership and advanced technology are formulated for public consumption, both internally and externally. Invention-based corporations such as Alfa-Laval and SKF have developed traditions and reputations of superior product performance, technological leadership, and universality of applications (a kind of 'first and best everywhere' policy). Standards of judgement have become ends in themselves and the relation has weakened between R&D operations on the one hand and corporate economy, customer economy and competitor capability on the other.

(e) *Procurement and exploitation of technology.* To an increasing extent R&D policies are connected with more general policies or strategies regarding the procurement and exploitation of technology. The following is an inventory of such policies/strategies.

Table 5.3 Inventory of policies/strategies for the procurement and exploitation of technology.

Technology procurement policies/strategies:	Technology exploitation policies/strategies:
Internal R&D	Internal exploitation for production and/or sales of products
Purchasing of licenses, patents, or know how (monetary or by barter)	Licensing out (monetary or by barter)
Acquisition of companies Acquisition of personnel	Offering R&D or Engineering services
Support of external R&D Joint ventures	Joint ventures Divestment
Absorption of externally disclosed information	
Collection of information from closed sources	

Naturally these policies may be used in combination. It is important to note the many policy options besides the traditional ones of internal R&D and internal exploitation by the production and marketing of hardware. The policies also have different impact on corporate development in terms of profitability, growth, diversification and internationalization. For example, licensing out may be more profitable than internal exploitation but may result in less growth.

(f) *Organization of R&D.* Often R&D policies focus on the organization and location of R&D operations, responsibilities and objectives of R&D units, R&D management positions, and procedures for co-ordination and communication etc.

(g) *R&D management philosophy.* Almost every manager has some idea about the nature of R&D and R&D personnel and how R&D should be managed. Managers with influence in these matters may give a policy standing to some of their management principles or philosophies. Examples range from what may be called proverbial management ('Never change a winning team', 'Necessity is the mother of invention', 'Control kills innovation') to more elaborate philosophies, attitudes and views. Resulting R&D policies may, for example, concern scale effects in R&D work, handling of ideas and innovative people, organizational climate, and degree of management control.

(h) *Policies about policy making.* Sometimes policy statements concern the form rather than the content of R&D policies (i.e., what kind of language to use, how specified policies should be, and what ideals to strive for in policy making). This may be the case, for instance, when corporate policies outline how policies should be made on lower levels. In a sub-study of Alfa-Laval about people's views on what an R&D policy should look like in general, 20 per cent of the key words used referred to spatial conceptualizations such as area, direction and position.

5.2.3 Policy making

As already mentioned, the policy situations in the corporations studied here are heterogeneous, especially with respect to R&D. Such activities have in some cases been initiated in connection with divisionalization, while in other cases they have been initiated after the reorganization into divisions, when decentralization has been considered too far-reaching or otherwise improper by top management. The development of corporate, strategic or long-range planning and policy making has been focused initially on financial and marketing planning, while the consideration of R&D aspects has been superficially done, postponed, or relegated to lower levels in the organization. The situation in 1975 with respect to strategic planning at the corporate and R&D level is summarized in Table 5.4

To introduce strategic planning at the corporate and/or divisional level is just one way of articulating goals, policies and strategies, and a study of policy making has to go deeper into the organization and its history to reveal features of the policy-making process. Thus the schemes, responsibilities and procedure for how strategic plans, policies and resource allocation are formally accomplished through breakdowns, 'rounds', planning cycles, etc. will not be presented here. Instead, three examples will be given in order to illustrate some approaches to policy making and determinants in the policy-making process.

Case 5.1 SKF

SKF is an example of an early internationalized corporation. World War II caused, among other things, a deterioration in co-ordination and central control, which became permanent in the 1950s. For several reasons, multinational co-ordination gained the attention of top management as a strategic issue of the 1960s, from which R&D co-ordination derived as a strategic R&D-issue. Heavy investment in a central R&D laboratory located in another country was made around 1970, partly as a means of achieving co-ordination of R&D operations in

Table 5.4 Status of strategic planning/policy making at corporate and R&D level 1975

KemaNobel	A new corporate managing director initiated strategic planning in the early 1970s. Emphasis on developing financial targets and general strategies at the corporate level. R&D planning mainly at the divisional level. Corporate R&D planning and policy making have been postponed. Work on product strategies influenced by product-cycle and learning-curve models.
Philips	Strategic planning on the corporate and divisional levels has been established with the main part being carried out by the product divisions. Heterogeneous state of R&D planning with respect to different divisions.
Alfa-Laval	Partial failure of too ambitious an effort to start strategic planning around 1970. A second effort with strong support from the corporate managing director has resulted in the initial establishment of strategic planning in all divisions around 1975. Corporate R&D planning and policy making have been initiated but have developed somewhat in the shadow of corporate planning.
SKF	Partial failure of too ambitious an effort to plan strategically around 1970. Strategic planning has later on been reintroduced. Corporate R&D planning has been established with a 'bottom-up' approach, and corporate R&D policies are underway. R&D policy making activities have so far been only weakly connected to corporate and market (business) planning.
Boliden	Corporate policy making has been established. Strategic and market-planning activities on the corporate level are being developed. Corporate R&D planning has been initiated.
Iggesund	Small efforts have been made to plan strategically and then with emphasis on market planning. No explicit corporate policy making in general or with respect to R&D.
Astra	Strategic planning on the corporate and divisional levels has been established, with initial emphasis on the corporate level on finance and budgeting. R&D planning and policy making have also been established but mainly on the divisional and subsidiary level.
Volvo	Strategic planning on the corporate and divisional level has been established. No substantial R&D planning and policy making on the corporate level but in some divisions and subsidiaries.

foreign subsidiaries. R&D policy making has been approached in a 'bottom-up' way so that R&D resources have been initially 'taken up' by suitable projects without any specific policies being defined for the portfolio. Earlier efforts had been made to formulate long-range plans and use management by objectives, but these efforts had largely failed, and in 1975 it was considered to be wrong to use R&D policies or objectives of the kind: 'By 1980 we shall have \$X million in R&D, of which Y per cent shall be put into research, and we shall put \$Z million into the area of powder metallurgy'. Successively, however, work on corporate policies, business plans and R&D policies is being carried out. So far at the time

of writing (1975), the coupling between R&D and corporate strategy and between R&D and marketing is weak. Many factors contribute to this situation, one of which is that top management more or less avoids making commitments through policy statements. The role of R&D in diversification, which is a clear element of current corporate strategy, has also been differently emphasized. The chairman of the board, who was the former corporate managing director, has a personal interest in product development and has been advocating a general policy in favour of in-house R&D. The central R&D laboratory and a small innovation company came into existence very much through his efforts. The present corporate managing director, on the other hand, favours acquisition of companies as a means of growth and diversification. ('It is probably not feasible to diversify through inventive work'.) Around 1975 there was a wait-and-see situation among subordinates, a situation in which the pattern of influence generally worked in favor of the Corporate Managing Director in a somewhat concealed way. [End of Case 5.1]

Case 5.2 Astra

In the 1950s Astra debated how to grow profitably and how to weaken the dependence of the pharmaceutical industry upon Swedish markets and Swedish politics. Internationalization through in-house R&D within pharmaceuticals became a corporate policy, and by the end 1950s the new corporate managing director began to implement these policies. There were two main ideas (or supplementing policies) about R&D, namely that R&D should be located close to medical universities and research centres and that R&D should be managed through decentralized subsidiaries. Astra-Hässle developed accordingly and established some research areas in the early 1960s, partly through external co-operation. The areas of research could just as well have been other ones within pharmaceutical research if the pattern of initial contacts and advice had been different. Concerning the content of the research, corporate policies were more or less unspecified, although reorientation from chemistry to biology, pharmacology, and pharmacy was encouraged by top management. During the 1960s, conflicts arose with respect to the relation between Astra-Hässle and central R&D authorities. R&D policy discussions became heated. There were several sources of conflict, but on the whole the conflicts pertained to corporate controls versus ambitions and need for autonomy within Astra-Hässle, chemical orientation versus biological and medical orientation in pharmaceutical research, and research standards versus commercial values. A power struggle took place, which in the early 1970s resulted in R&D policies emphasizing high standards of quality in research and marketing, based on a biological orientation, and medical ethics and values have been reconciled with commercial values. Leadership and contributions to pharmaco-therapy have been preferred instead of some kind of followership. (One admits though that the advances often are marginal). Market aspects are considered on a macro level of broad disease areas, but on a micro level R&D is mainly managed according to pharmacological mechanisms rather than according to immediate identifications of markets.

This period of policy conflicts at Astra, mainly during the late 1960s resulted in

shifts of power among key individuals in which the corporate managing director was acting behind the scenes. Also, shifts in the balance of power among various professional groups took place but these occurred during the whole decade. The corporate-subsidary relation with respect to control was in 1975 still a controversial issue with latent conflicts. Astra-Hässle wanted to develop a third generation of products in one of the established research areas (beta blockers), but the central R&D authorities (which now included a former professor of medicine) were pressing in other directions.
[End of Case 5.2]

Naturally, there are more nuances of the policy-making process at Astra than can be accounted for here. An important circumstance is that Astra and Astra-Hässle have been successful. This has created possibilities for reconciliation. Successful policies and behaviour have been internally strengthened and have also influenced policy making in other corporations. It may be added that the policy of diversifying outside pharmaceuticals has partially failed. Some efforts to diversify into chemical products have been successful as business ventures but in relation to sales of pharmaceutical products they have not led to an increased degree of diversification. On the whole, internal R&D rather than acquisitions has been a preferred means of diversification.

Case 5.3 Volvo

A policy or a business idea that has been practised right from the original foundation of Volvo is the performing of internal design and assembly functions in car production and utilizing external production and R&D capabilities of a system of suppliers. Over the years, production and R&D operations concerning vital components, such as engines, have been internalized and R&D, including design, has become an integrated element of work.

Volvo has successfully grown and has internationalized since the 1950s, much on the basis of product quality. In the early 1970s a new corporate managing director carried through a second step of divisionalization, in which technological competence and power and R&D resources were dispersed to some extent. Questions then arose as to whether R&D was properly organized and managed, and a large management conference was held in 1973 on Bermuda with invited experts of world-wide reputation within science and technology and management. After this conference a corporate R&D policy was made, which largely confirmed the present organizational situation and did not signal any significant policy changes. The corporate R&D policy also outlined how different units were to formulate plans and policies—for example, how they should identify different levels of ambition with respect to different areas. This policy has not been applied throughout the corporation, and perhaps the most significant result of the conference was that yearly internal R&D management conferences on the corporate level were initiated. These conferences have mostly been informative and have had a marginal influence on R&D and policy making.

The outcome of the conference in Bermuda with respect to R&D policy making has been interpreted in different ways. Top management has felt that the

existing way of organizing and managing R&D was justified. Others have interpreted the outcome as meagre and have requested further policy making efforts.
[End of Case 5.3]

These cases point to some common features of policy making processes with respect to R&D, such as:

- policy evasive behaviour on the part of top management;
- policy seeking behaviour in the organization;
- evolutionary formation of policies with periods of confirmation of past behaviour and periods of transition;
- policy conflicts.

The role and behaviour of top managers in policy making is important but not necessarily in the sense that the group of top managers coincides with the group of individuals exercising key influences in each policy matter. A common situation is that people in the organization want guidance through policies, while top managers are evasive, especially with respect to R&D policies. Various reasons for this evasive behaviour are indicated in the interviews.

One reason is the attitude towards specificity of control through policies. Some top managers simply look upon R&D as something which should not be very much guided from the top or at least should not be guided through specified policies. 'The policy is to have no policy' was an aphoristic utterance by a top manager in a subsidiary of Iggesund, in which R&D related to new products had just been initiated. The attitude towards specificity varies among top managers with respect to different policy matters and different kinds of R&D. A top manager may, for instance, strongly advocate a form of organization for R&D or an R&D management philosophy, while he does not take any specific stand with respect to areas or technological content of R&D.

Another reason for the evasive behaviour in policy making of top managers is the stage of maturation in a policy matter. There are periods in which processes of intellectual and emotional maturation with respect to a policy matter occur in the organization. Leading actors 'go around thinking' and involve themselves selectively in policy discussions. Policies evolve in the heads of people, and 'some policies are in more heads and others are in fewer heads'. Different actors apply different amounts of pressure in different directions. ('There is never just one man who applies pressure in policy matters in a large corporation'.) A dominant policy may be crystallized and then adopted. (The adoption of a policy has similarities with the process of adoption of new products by customers with some leaders and some laggards and a majority in-between.) Sometimes, then, top managers are not prepared to adopt a policy, or they do not feel that the time is ripe for implementation. Both cases seem to evoke evasive behaviour.

A third reason is the attitude that is taken towards risks, especially political risks. In conflicting policy matters top managers may act politically 'safe' and try to avoid any commitments through policy statements. The uncertainty in R&D and technological change, together with a varying understanding of R&D may cause top managers to refrain from being active in policy making. It may be a question of being cautious without appearing to be an indecisive manager or of

delaying a matter and 'letting time work' or of handling radical policy proposals without disavowing sub-ordinates or of not creating or engaging in a power struggle. Some top managers also view policy conflicts among R&D people as desirable to some extent and the resolution of policy conflicts through direct involvement from the top as improper. ('Sooner or later the unsuitable people will disappear from the scene, if necessary, with top management acting behind the scenes'.)

A fourth reason for evasive behaviour is selective and sequential management attention. Different issues attract the selective attention of top managers in different periods. Issues relating to R&D, 'technological gaps', etc. are given attention intermittently. Shake ups and re-orientations occur, R&D policy concern decreases and primary attention is given to something else. Suppression and ignorance are extreme behaviours in this respect. R&D and technology are primarily portrayed by top managers as important to the corporation and something they are interested in. Such statements may serve the purpose of creating motivation and good will, but at the same time an evasiveness in more specific policy matters tends to prevail during periods when R&D policies are not of primary concern.

These are some general reasons that have appeared relevant to the evasive policy making behaviour on the part of top managers with respect to R&D. But if such behaviour is common, how then do R&D policies evolve? A very accurate answer cannot be given, but some patterns in the evolution of a policy were found over time and in the organization. With respect to evolution over time, R&D policies tend to evolve continuously rather than being the direct result of strategic decisions, at least this is true for the technological content. (Indirectly, however, a strategic decision—for example, to invest in a new production facility or to acquire a company—may activate discussion about R&D policy changes.) Periods of intensified effort regarding evaluation and policy making do occur, but generally do not result in revolutionary changes. This process of policy evolution over time may, to varying degrees, adapt to environmental changes and put pressure in new directions, or simply confirm the past behaviour of the corporation.

With respect to evolution in the organization, R&D policies tend to evolve loosely coupled to corporate policy making processes. The stockholders, the board of directors and the employees exercise marginal influences on R&D policies in general. Top managers, on the other hand, may be very influential depending on their experience, preferences and power. In case of top management evasiveness in policy making, sub-ordinates in and around R&D naturally become influential. In some cases, sub-ordinates were 'upwardly' active and, for instance, watched the behaviour of the corporate managing director and tried to recognize policies implicit in his behaviour.

The submission of proposals could be helpful in this learning process. In other cases, subordinates were more passive in policy matters and at most complained of the inability of top management to formulate policies. In still other cases, subordinates were actively making policies in their part of the organization but more or less isolated from other parts of the organization. Many variants of such

policy making behaviour could be found, but most of them seem to have in common a preservative effect upon policies and behaviour in the corporation.

5.3 DISCUSSION

5.3.1 Empirical summary

Policies and policy making concerning R&D in a number of corporations have been presented from a descriptive rather than normative point of view. Differences in emphasis on profit, growth, diversification, internationalization and R&D in corporate policies were found between corporations and over time with respect to, especially, diversification and R&D. To some extent, a strong emphasis on diversification as well as a weak emphasis on R&D was associated with vertical integration and a raw materials basis. On a more detailed level, there was a complex inter-relatedness between matters and people in policy making. There were no simple hierarchies of means and ends; nor did a deep, wide, or stable consensus about a specific means/end-structure exist.

R&D policies were, in general, vague and loosely connected to corporate policies. Eight classes of R&D policy statements were discerned. These classes concerned the role of R&D in corporate development, resource allocations, area priorities, relations to competitors and customers, procurement and exploitation of technology, organization of R&D, R&D management philosophy and policies about policy making.

With respect to policy making, the corporations differed substantially. A common feature was, however, an evasiveness in R&D policy making on the part of top management, and some reasons for this behaviour were identified. Also, some differences were found in connection with policy evolution over time and in the organization.

5.3.2 Corporate goals and policies

Goals, objectives, strategies, policies and similar purpose-oriented concepts essentially aim at focusing attitudes and behaviour. It is tempting to formulate a set of fundamental goals, a basic mission, or similar as a common point of departure in policy making. Several corporations do this, emphasizing such factors as survival, profitability and satisfaction of customer needs. As a complement to such traditional goals, quantified or not, there are sometimes conceptualizations of a basic business idea or a *raison d'être*. In this vein of thought Levitt (1960), in a well-known article, argues the need to define what kind of business a corporation is in, citing the standard example of the American railroad industry, which failed to consider itself as being in the transportation business. In doing so, Levitt claims, management of the railroad industry was not intellectually prepared to take advantage of opportunities in the development of alternate means of transportation, and through a narrowly defined scope of business, management became defensive and threat oriented. Levitt then pointed out that the oil in-

dustry would end up in a similar situation unless this industry defined itself as being in the energy business.

Levitt's ideas became influential and also created misinterpretations and abuse such as superficial phrases, too wide and too demanding definitions, or nominal rather than real policy declarations. Thus, one finds examples among the corporations studied of attempts to define themselves as being in the business of 'friction elimination', 'preventing exhaustion', or 'medical care systems'. Such conceptual exercises may challenge traditional implicit policies as being in the mining industry and 'stop' at the refined metal. The importance of Levitt's ideas is, however, that they focus on two common phenomena. One is technological substitution and the other is 'innovation by invasion'; for instance, the source of radical technological substitution in an industry is more likely found outside the industry than inside. The weakness of Levitt's idea is that it invites us to think in terms of the unique existence of a proper conceptualization, which is fundamental and static in character. As such, the conceptualization chosen may be too narrow, which could develop defensive attitudes and cause too many changes in technologies and markets to be identified as threats rather than opportunities, or it may be too wide, which would scatter attention and resources if implemented, or it may simply misdirect attention by its singularity. Should a manufacturer of pneumatic machinery consider himself as being in the business of pressure energy and consequently engage in hydraulics, or, if he already has done that, should he consider pressure energy to be the most important common denominator in his operations? Similarly, a manufacturer of sports cars may ask whether he is in automotive transportation, private transportation, surface transportation, or just transportation, or if he is in leisure vehicles or leisure articles. Obviously, functional relations between technologies and markets are not easily conceptualized and are more complex than hierarchic.

Viewed in a dynamic perspective, the weaknesses of singular conceptualizations are even more obvious. Consider, for instance, the process of evolutionary entry into new businesses, as described in Chapter 3. In such a branching into new technologies and businesses, which is mainly internally generated, a conceptualization in Levitt's terms would have to be wide or else it would act more or less as a policy straitjacket, unless reconceptualizations were continually made. For example, Alfa-Laval—in efforts to preserve milk—developed a competence in heating and cooling and later on in microwaves. Heat exchangers as well as separators, the latter originally used for the separation of milk, have found applications in several industries over the years. The application of microwaves in the preservation of different foods required, on the other hand, the development of a new packaging material. In this case, what would a conceptualization of the business of Alfa-Laval have looked like, how would it have influenced corporate development, and how would it have been influenced by corporate development? What boundaries of the corporation should from a normative point of view have been established in terms of milk separation, general separation, centrifugal separation, food handling, etc.?

Consider the process that complements an internally generated entry into new businesses, that is engagement in new businesses initiated mainly from the outside of the corporation. This process is often less evolutionary, as for example,

when an offer to make an acquisition suddenly arises. Sudden discoveries or ideas in internal R&D leading directly to revolutionary changes are conceivable but rare. In this case a rigid conceptualization may lead to a premature decision to turn down the offer. Also a search for new ideas in the corporate environment may be hampered by a rigidly or narrowly conceptualized policy.

Thus, there are several weaknesses inherent in formulations of basic business ideas. From the point of view of implementation, simplicity in formulation and stability over time are normally perceived as desirable features of a policy. Weak and singular conceptualizations are tempting and frequently occur but tend not to consider the dynamic complexity in technological substitution and the sources of innovation.

5.3.3 Policy making

There is a rationalistic normative vein of literature on the making of goals, policies, strategies, etc., as well as one with opposing views, centred around concepts such as 'muddling' and incrementalism. When it comes to policy making with respect to R&D and innovation, similar veins may be found in the literature, but on the whole R&D and innovation are mostly superficially dealt with in literature about policy making at the corporate level. This is also paralleled by the loose coupling between R&D policies and corporate policies, as described in Section 5.2. There are different notions about how to make such a coupling more effective. The view adopted here is that it is through the process of policy making, rather than through requirements on the outcome of this process, that a coupling may be achieved. Such a normative view must take into account the descriptive findings in this and other studies. We will focus on the role of top management below.

The situation in which people in the organization want guidance through policies while top management is evasive in policy matters has been observed by others, notably Wrapp (1967) and Quinn (1977):

But as the organization clamors for statements of objectives, these are samples of what they get back from him (the manager): 'Our company aims to be number one in its industry', 'Our objective is growth with profit'. . . . (Wrapp, 1967, p. 94)

Now the combination of policy-seeking behaviour in the organization and policy-evasive behaviour of top management may lead to a kind of stalemate, which makes it important to understand both kinds of behaviour.

That some R&D people and R&D managers want guidance by clearer goals, policies, etc. may seem surprising and that they want this guidance from the top even more so. Similarly, policy-evasive behaviour at the top may appear to be surprising. Simplified, this is a situation with the demand for guidance exceeding the supply of it. Conventional wisdom about R&D management suggests that it is rather problems with the opposite situation that require attention.

There are naturally many specific aspects of a situation where R&D policies are lacking, and some different patterns of behaviour were described in Section 5.2. Generally speaking, a policy reduces uncertainty but also involves a risk,

and there has to be a distribution of personal risks in policy making. Policy-seeking behaviour among R&D people is not a search for control but rather an effort to reduce uncertainty and anxiety by their knowing what is expected of them, how they will be evaluated, how they may argue about resources, about concentration, about co-operation, about room for action on an operational level, etc. They may feel that there is enough uncertainty in R&D work anyway and that being creative requires an amount of certainty about organizational matters. Besides, common organizational behaviour such as hierarchical thinking, pressing for articulated support of one's own preferred work, fear of failure, and striving for 'law and order' applies to a certain degree to all members of an organization, inclusive of R&D people and managers.

Similarly, policy-evasive behaviour among top managers may have different causes. In Section 5.2 four reasons were identified as having to do with the attitude towards specificity of control through policies, the stage of maturation in a policy matter, attitude towards political risks, and selective and sequential management attention. Wrapp and Quinn point at similar factors in top management behaviour in policy making. Concerning specificity, Wrapp speaks about 'the art of imprecision' and how a successful manager satisfies the organization with a sense of direction without actually getting himself committed publicly to a specific set of objectives.

Concerning the stage of maturation, Wrapp discusses the value of sense of timing in policy making, and Quinn describes the managing of the stages in the incremental process of policy making. Risk taking in a political context is an important factor in policy making. Quinn outlines different reasons why top managers do not announce goals, one reason being security. External security reasons for the corporation may make top management reluctant to announce goals, but internal security reasons seem just as powerful. An important factor to consider is how successful the corporation presently is, that is to say that there is an influence of business cycles. When growth and profitability are good, it may be easier to stick to the conventional ideas of strategic planning, while in recessions the political game becomes intensified. In the former case secrecy reasons may not be of primary concern, while in the latter case internal secrecy may be a prime factor behind the reluctance of a corporate managing director to formulate goals and plans, which, for example, would reveal how cuts are to be made in the organization.

Concerning the fourth factor, finally, selective and sequential management attention, Quinn writes:

At any given moment, an executive can push only a few specific new goals, giving them the attention and force they need to take hold. . . . In fact, the essence of strategy is to identify this small number of truly essential thrusts or concepts and to consciously marshal the organization's resources and capabilities toward them. Then—to capture the organization's attention—the executive must consistently reinforce these strategic goals through his statements, his decision patterns, and his personnel assignments. (Quinn, 1977, p. 28.)

In looking at corporate histories one finds that there is also a very limited number of strategic achievements which can be attributed to a corporate manag-

ing director (see also Section 7.2). Naturally, the question may be raised about how a top manager should behave in relation to strategic or policy issues he does not get involved in himself. According to Wrapp, a good manager makes sure he is well-informed on these issues, but he 'trains his subordinates not to bring the matters to him for a decision'.

This points to the need for an adaptive role differentiation between parties in policy making and mutual understanding of policy-seeking versus policy-evasive behaviour as a managerial implication. Often R&D and innovation are not included in the small set of policy issues of real top management concern. There are many complementary roles of R&D management and top management can play in the making of R&D policies and corporate policies. The role of R&D differs with respect to different corporate strategies such as growth, diversification, internationalization and profitability and the type and degree of coupling between R&D and corporate strategies is different in different technologies and markets.

Much specialized, as well as generalized, knowledge has to be combined in policy making. In order to reinforce a process coupling of R&D to corporate strategies, top management may choose to:

- initiate policy-making processes involving internal as well as external competencies;
- supply new angles of analysis, for example, reviewing the product portfolios with respect to technological substitution;
- dive into the specifics of some policy issue;
- require reconceptualizations;
- create parallel policy study groups;
- provide both broad policies such as pre-eminence of decentralization, which may promote cohesion and motivation, and specific policies such as 20 per cent growth rate and X per cent of turnover to R&D, which may challenge and promote focus;
- build up dialectic rhetoric to support transitions;
- promote action-oriented rather than planning-oriented uncertainty resolution;
- have concentrated policy reviews after a period of consistent action;
- promote policy changes by moving people and committing resources rather than through policy decisions;
- train subordinates to develop policy alternatives.

There is hardly any way to make such a process coupling orderly or to eliminate the political game features of policy making. However, paying attention to the need for a coupling between R&D and corporate strategy may reduce the stagnation effects on R&D from policy seeking at the R&D level, combined with policy evasion at the top management level.

5.4 CONCLUSIONS

Differences in emphasis in corporate policies on profit, growth, diversification, internationalization and R&D were found, especially with respect to diversifica-

tion and R&D. To some extent, a strong emphasis on diversification as well as a weak emphasis on R&D was associated with vertical integration and a raw material basis. A complex inter-relatedness between matters and people in policy making was found which is far from the picture of a stable consensus about a specific hierarchical means/end-structure. A tendency to conceptualize a fundamental objective or a basic business idea could be observed. Evolutionary expansion of corporate technologies into adjacent areas, considered as 'naturally' connected to existing ones, was commonly emphasized.

R&D policies were generally vague and loosely connected to corporate policies, as were considerations of patterns of technological development and sources of innovation in corporate policy making. Common reasons for this situation were limitations of rationalistic procedures and conceptualizations, inexperience in policy making, and limitations due to behaviours in policy making. To varying extents, policies confirmed historical corporate development, and to varying extents they resulted from action and reaction at different levels in the corporations. A combination of policy-evasive behaviour at the top management level and policy-seeking behaviour at lower organizational levels was found in several cases regarding R&D and innovation. Four reasons for policy-evasive behaviour were indicated, namely attitude towards specificity of control through policies, stage of maturation in a policy matter, attitude towards especially political risks, and selective and sequential management attention. Strong support, on similar grounds, for a policy-evasive behaviour in general management was found by Wrapp (1967) and Quinn (1977). As a general conclusion, a need was found for a closer coupling between corporate and R&D policies through interaction in the policy-making process.