# A Resource-based View of the Firm

BIRGER WERNERFELT
*Graduate School of Business Administration, The University of Michigan, Ann Arbor, Michigan, U.S.A.*

**Summary**
*The paper explores the usefulness of analysing firms from the resource side rather than from the product side. In analogy to entry barriers and growth-share matrices, the concepts of resource position barrier and resource-product matrices are suggested. These tools are then used to highlight the new strategic options which naturally emerge from the resource perspective.*

## INTRODUCTION

For the firm, resources and products are two sides of the same coin. Most products require the services of several resources and most resources can be used in several products. By specifying the size of the firm's activity in different product markets, it is possible to infer the minimum necessary resource commitments. Conversely, by specifying a resource profile for a firm, it is possible to find the optimal product-market activities.

Both perspectives on the firm are reflected in the literature on strategic management. The traditional concept of strategy (Andrews, 1971) is phrased in terms of the resource position (strengths and weaknesses) of the firm, whereas most of our formal economic tools operate on the product-market side. While these two perspectives should ultimately yield the same insights, one might expect these insights to come with differing ease, depending on the perspective taken.

The purpose of this paper is to develop some simple economic tools for analysing a firm's resource position and to look at some strategic options suggested by this analysis. This will apply, in particular, to the relationship between profitability and resources, as well as ways to manage the firm's resource position over time.

Looking at economic units in terms of their resource endowments has a long tradition in economics. The analysis is typically confined, however, to categories such as labour, capital, and perhaps land. The idea of looking at firms as a broader set of resources goes back to the seminal work of Penrose (1959), but, apart from Rubin (1973), has received relatively little formal attention. The reason, no doubt, is the unpleasant properties (for modelling purposes) of some key examples of resources, such as technological skills. The mathematics used by economists typically require that resources exhibit declining returns to scale, as in the traditional theory of factor demand. By virtue of analysing this type of resource, the economic theory of factor demand becomes a special case of the theory put forward in this paper. By dealing with the financial resources of the firm, the product portfolio theories in a sense become another special case of the theory discussed below.

Also, the idea that multiproduct firms benefit from non-financial linkages such as joint costs, is an old but largely neglected part of economics. Recently it has, however, received renewed attention, mainly through the formalization of the economies of scope concept (see e.g. Panzar and Willig, 1981).

It turns out that the resource perspective provides a basis for addressing some key issues in the formulation of strategy for diversified firms, such as:

(a)   On which of the firm's current resources should diversification be based?
(b)   Which resources should be developed through diversification?
(c)   In what sequence and into what markets should diversification take place?
(d)   What types of firms will it be desirable for this particular firm to acquire?

Specifically, the following propositions will be argued:

1.   Looking at firms in terms of their resources leads to different immediate insights than the traditional product perspective. In particular, diversified firms are seen in a new light.
2.   One can identify types of resources which can lead to high profits. In analogy to entry barriers, these are associated with what we will call resource position barriers.
3.   Strategy for a bigger firm involves striking a balance between the exploitation of existing resources and the development of new ones. In analogy to the growth-share matrix, this can be visualized in what we will call a resource-product matrix.
4.   An acquisition can be seen as a purchase of a bundle of resources in a highly imperfect market. By basing the purcase on a rare resource, one can *ceteris paribus* maximize this imperfection and one's chances of buying cheap and getting good returns.

In the next section the simple economics of different types of resources will be examined and the results will be applied to the characteristics of attractive, high profit yielding, resources. Then the analysis is confined to a particular type of resource and some strategies for managing a firm's resource position over time will be looked at.

## RESOURCES AND PROFITABILITY

By a resource is meant anything which could be thought of as a strength or weakness of a given firm. More formally, a firm's resources at a given time could be defined as those (tangible and intangible) assets which are tied semipermanently to the firm (see Caves, 1980). Examples of resources are: brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient procedures, capital, etc. In this section, we will ask the question: 'Under what circumstances will a resource lead to high returns over longer periods of time?'

For purposes of analysis, Porter's five competitive forces (Porter, 1980) will be used, although these were originally intended as tools for analysis of products only.

### General effects
This heading will cover the bargaining power of suppliers and buyers as well as the threat posed by substitute resources.

If the *production of a resource itself or of one of its critical inputs* is controlled by a monopolistic group, it will, *ceteris paribus*, diminish the returns available to the users of the resource. A patent holder, for example, appropriates part of the profits of his licence holders. On a smaller scale, a good advertising agency will be able to take a share of the image builders' (customers') profit.

An equally bad situation can occur on the output side if the *products resulting from use of the resource can be sold only in monopsonistic markets*. If a subcontractor develops a machine which is fully idiosyncratic to one customer, he will stand to gain less than if the machine has more buyers.

Finally, the *availability of substitute resources* will tend to depress returns to the holders of a given resource. A recent example is provided by the way electronic and hydraulic skills have eroded the payoffs to electrical and mechanical skills.

**First mover advantages—resource position barriers**
In some cases, a holder of a resource is *able to maintain a relative position* vis-à-vis *other holders and third persons, as long as these act rationally*. That is, the fact that someone already has the resource affects the costs and/or revenues of later acquirers adversely. In these situations the holder can be said to enjoy the protection of a resource position barrier. Defined in this way, resource position barriers are thus only partially analogous to entry barriers, since they also contain the mechanisms which make an advantage over another resource holder defensible. (Entry barriers in the traditional market context deal only with the situation between incumbents and potential entrants, not with the situation among the incumbents.) Just like entry barriers, resource position barriers do, however, indicate a potential for high returns, since one competitor will have an advantage.

Note that this (resource-based) concept in some sense supersedes the traditional (product-based) entry barrier concept, but in another sense does not:

(a)  If a firm has entry barriers towards newcomers in market A, which shares the use of a resource with market B, then another firm which is strong in B might have a cost advantage there and enter A in that way.

(b)  If the firm has a resource position barrier in resource α, which is used in market A, it might still survive the collapse of A if it could use α somewhere else.

On the other hand, for a resource position barrier to be valuable, it should translate into an entry barrier in at least one market.

So, an *entry barrier without a resource position barrier leaves the firm vulnerable to diversifying entrants, whereas a resource position barrier without an entry barrier leaves the firm unable to exploit the barrier*. There is thus a nice duality between the two concepts, corresponding to the duality between products and resources.

**Attractive resources**
It is possible to identify classes of resources for which resource position barriers can be built up. By their nature, these barriers are often self-reproducing; that is a firm which at a given time, finds itself in some sense ahead of others may use these barriers to cement that lead. It is the properties of the resources and their mode of acquisition which allow this to be done. *What a firm wants is to create a situation where its own resource position directly or indirectly makes it more difficult for others to catch up*. To analyse a resource for a general

potential for high returns, one has to look at the ways in which a firm with a strong position can influence the acquisition costs or the user revenues of a firm with a weaker position.

Let us apply this to a few examples.

*Machine capacity*

It is well known that production processes with decreasing returns to scale cannot yield high returns if they can be bought in open markets. On the other hand, economies of scale in the use of resources are the prime example of product entry barriers (Spence, 1979). From the resource perspective, the product entry barrier translates into a resource position barrier, since it will be irrational for entrants to buy the resource necessary to compete in a market where excess capacity would lead to cut-throat competition and low returns. So, in this case, the resource position barrier operates through lower expected revenues for prospective acquirers.

*Customer loyalty*

In this case the nature of the market for the resource generates the resource position barrier. It is much easier to pioneer a position than to replace someone else who already has it (see Ries and Trout, 1981). Here, later buyers will have to pay higher prices than earlier buyers. Related examples are the first mover advantages in government contacts, access to raw materials, etc.

*Production experience*

As is well known, if the leader executes the experience curve strategy correctly, then later resource producers have to get their experience in an uphill battle with earlier producers who have lower costs. Ideally, later acquirers should pay more for the experience and expect lower returns from it (Boston Consulting Group, 1972). On the other hand, if experience leaks from the early movers to later movers, the effect is to reduce the costs of the latter, so that we might approach the case of an unpatented idea for which no sustainable first mover advantage exists. This is the case, for example, with many production systems and procedures.

*Technological leads*

Here again, two counteracting effects are at work. On the one hand, a technological lead will allow the firm higher returns, and thus enable it to keep better people in a more stimulating setting so that the organization can develop and calibrate more advanced ideas than followers. The followers, on the other hand, will often find the reinvention of your ideas easier than you found the original invention. So you need to keep growing your technological capability in order to protect your position. This should, however, be feasible if you use your high current returns to feed R & D. A good analogy is a high tree in a low forest; since it will get more sun, it will grow faster and stay taller.

In general, one should keep in mind that most resources can be used in several products. As a result, a given resource position barrier will often have consequences for several products, each yielding part of the resulting return. A resource such as managerial skills, which could be analysed much like technological leads above, is a good example of this.

The general attractiveness of a resource, understood as its capacity to support a resource position barrier, is only a necessary, not a sufficient, condition for a given firm to be interested in it. If everyone goes for the potentially attractive resources and only a few can

'win' in each, firms will lose unless they pick their fights well. So firms need to find those resources which can sustain a resource position barrier, but in which no one currently has one, and where they have a good chance of being among the few who succeed in building one. They have to look at resources which combine well with what they already have and in which they are likely to face only a few competitive acquirers.

**Mergers and acquisitions**

Mergers and acquisitions provide an opportunity to trade otherwise non-marketable resources and to buy or sell resources in bundles. Through this vehicle one can, for example, sell an image or buy a combination of technological capabilities and contacts in a given set of markets. As is well known, this is a very imperfect market with few buyers and targets, and yet with a low degree of transparency owing to the heterogeneity of both buyers and targets. A key implication of the latter is that a given target will have different values for different buyers, with particularly big variance among those who can obtain some sort of fit (synergy) between their resources and those of the target.

Because of the extreme difficulties of investigating (often discreetly):

(a)   what resources a given target has
(b)   which of those the firm can effectively take advantage of
(c)   what the cost of doing so will be
(d)   what the firm could pay for them

prospective buyers often limit their search to targets which satisfy certain simple criteria. A resource-based set of acquisition strategies (Salter and Weinhold, 1980) is:

(i)    related supplementary (get more of those resources you already have)
(ii)   related complementary (get resources which combine effectively with those you already have).

Other acquisition strategies are more product-oriented and tend to focus on the firm's ability to enter (and dominate) attractive markets.

Let us here focus on the purchase of resource bundles, taking as given the profitability of using different combinations. In this perspective, one's chance of maximizing market imperfection and perhaps getting a cheap buy would be greatest if one tried to build on one's most unusual resource or resource position. Doing so should make it possible to get into buying situations with relatively little competition, but also with relatively few targets. Although, in theory, it would be best to be the sole suitable buyer of a lot of identical targets, even a bilateral monopoly situation would be better than a game with several identical buyers and sellers. Especially since the latter situation will most likely lead one into heavier competition in the race to build resource position barriers after the acquisitions have taken place.

## DYNAMIC RESOURCE MANAGEMENT: AN EXAMPLE

In the previous section, several situations in which firms could get high returns from individual resources were examined. In general, a first mover advantage in an attractive resource should yield high returns in the markets where the resource in question is

| Market \ Resource | I | II | III | IV | V |
|---|---|---|---|---|---|
| A | X | | | | X |
| B | X | X | | | |
| C | | X | | X | |
| D | | | X | | X |

Figure 1. Resource-product matrix

dominating. This theory will now be applied to a particular type of resource, the experience type, produced jointly with products. Finally, some ways in which a firm can grow its pool of such resources, will be investigated.

**The resource-product matrix**

The analysis will be conducted through what could be called a resource-product matrix, in which the checked entries indicate the importance of a resource in a product and vice versa (see Figure 1).

This matrix, which is a close cousin of the growth-share matrix, could be made more informative by replacing the checks with one (or two) numbers, indicating the relative importance of resources in products or (and) vice versa. As will be seen, even the simple form above is, however, a very powerful tool. Below it will be used to illustrate several different patterns of resource development.

**Sequential entry**

The use of a single resource in several businesses is the diversification pattern most often considered in business policy (Andrews, 1971). A typical example is provided by BIC's (BIC, 1974) use of their mass marketing skills, which proved critical in pens, lighters and razors, but insufficient in pantihose. Attempts to base firms on a single strong technology also fall into this category. Several consulting firms market concepts which exploit this growth pattern (e.g. the 'shared experience' of the Boston Consulting Group and the 'activity analysis' of Braxton Associates).

Although the general idea is to expand your position in a single resource, it is not always optimal to go full force in several markets simultaneously even with experience curve effects. Quite often, it is better to develop the resource in one market and then to enter other markets from a position of strength. An example is BIC, which entered the markets for pens, lighters and razors sequentially. This *sequential entry* strategy (an idea going back to John Stuart Mill, and his writings on infant industry protection), is also often followed by firms when they go international, as illustrated in Figure 2, where the firm develops production skills before going international.

To demonstrate the feasibility of this, we can look at a simple mathematical model. (A

| Resource / Market | Production Skills | International Contacts | III | IV | Domestic Contacts |
|---|---|---|---|---|---|
| Domestic | X | | | | X |
| International | X | X | | | |
| C | | X | | X | |
| D | | | X | | X |

Figure 2. Sequential entry

more elaborate formalization can be found in Bardhan, 1971.) A firm can operate in two markets, A and B, which are such that it takes $a_I$ hours to process I to produce a unit of product A, whereas it takes $b_I$ and $b_{II}$ hours of processes I and II, respectively, to produce a unit of product B. Assume process II skills to be available in a perfect market, whereas process I skills can be developed via experience curve effects. So, skills in process I are the attractive resource. Finally, look at the firm as having a two-period time horizon and consider the wisdom of developing process I skills in market A before market B is entered.

In the following, all parameters are assumed positive and subscripts A, B, I, II, 1, 2, refer to the markets, processes, and periods so named.

The demand curves are assumed to be constant over the two periods and linear so that the quantity sold is a linear function of the price charged. This can be written as:

$$A_i = \theta_A - P_A \phi_A, \quad i = 1, 2$$
$$B_i = \theta_B - P_B \phi_B, \quad i = 1, 2$$

where $\theta_A$ and $\theta_B$ are the volumes 'sold' at zero price and $\varphi_A$ and $\varphi_B$ the decline in volume per unit price increase.

Variable costs are assumed to be zero and fixed costs, $C$, of selling above zero outputs are in period 1 composed of a constant cost of operating each process. In period 2, process I costs are, however, lowered by $\eta_A$ and $\eta_B$ for each hour the process was used in period 1. So we get:

$$C_{A1} = \gamma_{AI}, \qquad \text{if } A_1 > 0$$
$$C_{A2} = \gamma_{AI} - \eta_{AI}(a_I A_1 + b_I B_1), \qquad \text{if } A_2 > 0$$
$$C_{B1} = \gamma_{BI} + \gamma_{BII}, \qquad \text{if } B_1 > 0$$
$$C_{B2} = \gamma_{BI} - \eta_{BI}(a_I A_1 + b_I B_1) + \gamma_{BII}, \quad \text{if } B_2 > 0$$

The simple linear version of the experience curve is chosen for analytical convenience and is in no way crucial to the qualitative results below.

If the firm tries to maximize the total profit over the two periods, the objective is to maximize:

$$(P_{A1} A_1 - C_{A1}) + (P_{A2} A_2 - C_{A2}) + (P_{B1} B_1 - C_{B1}) + (P_{B2} B_2 - C_{B2})$$

By inserting the above equations, differentiating with respect to $P_{A1}$, $P_{A2}$, $P_{B1}$, $P_{B2}$, and using the first order conditions, we find that, if all outputs are positive, the optimal levels are

$$A_1^*(P_{A1}^*) = \tfrac{1}{2}[\theta_A + \phi_A a_1(\eta_{AI} + \eta_{BI})], \quad \text{where } \eta_{BI} = 0 \text{ if } B_2 = 0$$
$$A_2^*(P_{A2}^*) = \tfrac{1}{2}\theta_A$$
$$B_1^*(P_{B1}^*) = \tfrac{1}{2}[\theta_B + \phi_B b_1(\eta_{AI} + \eta_{BI})]$$
$$B_2^*(P_{B2}^*) = \tfrac{1}{2}\theta_B.$$

By inserting $(A_1^*, \ A_2^*, \ B_1^*, \ B_2^*)$, $(A_1^*, \ A_2^*, \ 0 \ B_2^*)$ and $(A_1^*, \ A_2^*, \ 0, \ 0)$ in the maximant, one can find the conditions under which it is optimal to enter market B only in the second period. These conditions are:

$$\theta_B b_1(\eta_{AI} + \eta_{BI}) + \tfrac{1}{4}[\theta_B \phi_B^{-1} - b_1(\eta_{AI} + \eta_{BI})]^2 \phi_B < \gamma_{BI} + \gamma_{BII}$$
$$< \tfrac{1}{4}\theta_B^2 \phi_B^{-1} + \tfrac{1}{2}\theta_A \eta_{BI} a_1 + \tfrac{1}{2}\phi_A a_1^2 \eta_{BI}(\eta_{AI} + \tfrac{1}{2}\eta_{BI}).$$

So sequential entry tends to be better when

(a)   market A is big relative to market B ($\theta_A$ is large, $\theta_B$ is small)
(b)   product B only uses a little of I ($b_I$ is small)
(c)   product A uses a lot of I ($a_I$ is large).

Although the effect here is generated through an experience curve type of argument, a little reflection will reveal that other instances of resources produced jointly with products can also have the same effect. An example of this is brand loyalty in connection with economies of scale in process I, which will mean that a big $A_1$ guarantees sales and thus low costs of process I in period 2.

### Exploit and develop

If you push the example from Figure 2 a little further, you could look at the fifth resource, 'domestic contacts', as supporting the buildup of the first, 'production skills' through joint cost effects. This could in turn be used to support the acquisition of "international contacts" etc. (see Figure 3).

The close analogy to the product portfolio theory (Henderson, 1979), where strong products in a firm's growth-share matrix supply weak ones with cash, again underscores the duality between the product and the resource perspectives on the firm. Since one often would expect businesses to be related in more ways than financially, the joint cost subsidy from resource relation may be a more potent tool than product to product cash subsidy. Looking at diversified firms as portfolios of resources rather than portfolios of products gives a different and perhaps richer perspective on their growth prospects. Again, optimal management of a resource portfolio is in theory the same as optimal management of a product portfolio, but the two frameworks may highlight different growth avenues.

In the framework above, the optimal growth of the firm involves a balance between exploitation of existing resources and development of new ones (Penrose, 1959; Rubin, 1973; Wernerfelt, 1977). Even in an uncertain setting, this does not necessarily make versatile (multibusiness) resources more attractive than more specialized resources. The reason for this is that although versatile resources give more options, one would expect more and bigger competition in them.

| Resource / Market | Production Skills | International Contacts | III | Project Management | Domestic Contacts |
|---|---|---|---|---|---|
| Domestic | X◄ | | | | ►X |
| International | X──► | X | | | |
| Turn Key | | X──► | | ►X | |
| D | | | X | | X |

Figure 3. Exploit and develop

## Stepping stones

In the management of a resource portfolio, candidates for product or resource diversification must be evaluated in terms of their short-term balance effects (as in the product portfolio) and also in terms of their long-term capacity to function as *stepping stones* to further expansion. This ingenious strategy was attributed to the Japanese by *Business Week* (1981). Briefly, the idea is, that to enter the computer industry, it is necessary to first develop related skills in chips, an industry into which the Japanese could enter more easily, since they already possessed some of the required skills. Figure 4 illustrates this pattern.

## CONCLUSION

This paper has attempted to look at firms in terms of their resources rather than in terms of their products. It was conjectured that this perspective would throw a different light on strategic options, especially those open to diversified firms.

Resource position barriers were defined as partially analogous to entry barriers. On the basis of this definition, one can sketch a picture of firms as trying to develop such barriers,

| Resource / Market | Mass Assembly | Consumer Marketing | III | IV | Electronics Technology |
|---|---|---|---|---|---|
| Chips | X | | | | X |
| Stereosets | X | X | | | |
| C | | X | | X | |
| Computers | | | X | | X |

Figure 4. Stepping stone

perhaps through products in which already strong resources support less strong ones. This mechanism is again exploited in the resource-product matrix, which is somewhat analogous to the growth-share matrix and allows us to consider different growth paths. It should be kept in mind that the theory in the last section considered only resources of the type which are produced jointly with products. Growth strategies for other types of resources have yet to be developed. The only general statement made about growth strategy is that in some sense it involves striking a balance between the exploitation of existing resources and the development of new ones.

The paper is meant only as a first cut at a huge can of worms. Apart from the obvious need to look at growth strategies for other types of resources, much more research needs to be done on the implementability of the strategies suggested. Nothing is known, for example, about the practical difficulties involved in identifying resources (products are easy to identify), nor about to what extent one in practice can combine capabilities across operating divisions, or about how one can set up a structure and systems which can help a firm execute these strategies.

The new focus on technology in strategy, the increasing tendency for firms to 'define themselves in terms of technologies, and the setting up of cross-divisional strategic organizations (Texas Instruments, 1971), technology groups, and arenas (General Electric,' 1981) seem to indicate that objectives like the above are strived for, although perhaps implicitly, in several firms.

## ACKNOWLEDGEMENTS

## REFERENCES

Andrews, K. *The Concept of Corporate Strategy*, Dow Jones-Irwin, Homewood, Ill., 1971.
Bardhan, P. K. 'On optimum subsidy to a learning industry: an aspect of the theory of infant-industry protection', *International Economic Review*, **12**, 1971, pp. 54–70.
BIC Pen Corporation (A). *Intercollegiate Case Clearing House*, 1-374-305, 1974.
Boston Consulting Group. *Perspectives on Experience*, Boston Consulting Group, Boston, 1972.
*Business Week*, 14 December 1981.
Caves, R. E. 'Industrial organization, corporate strategy and structure', *Journal of Economic Literature*, **58**, 1980, pp. 64–92.
*General Electric—Strategic Position*. Intercollegiate Case Clearing House, 1-381-174, 1981.
Henderson, B. D. *Henderson on Corporate Strategy*, Abt Books, Cambridge, Mass., 1979.
Panzar, J. C. and R. D. Willig. 'Economies of scope', *American Economic Review*, **71** (2), 1981, pp. 268–272.
Penrose, E. G. *The Theory of the Growth of the Firm*, Wiley, New York, 1959.
Porter, M. E. *Competitive Strategy*, Free Press, New York, 1980.
Ries, A. and J. Trout. *Positioning: The Battle for Your Mind*, McGraw-Hill, New York, 1981.
Rubin, P. H. 'The expansion of firms', *Journal of Political Economy*, **81**, 1973, pp. 936–949.
Salter, M. and W. Weinhold. *Diversification by Acquisition*, Free Press, New York, 1980.
Spence, A. M. 'Investment strategy and growth in a new market', *Bell Journal of Economics*, **10**, 1979, pp. 1–19.
Texas Instruments—Management Systems. *Intercollegiate Case Clearing House*, 9-172-054, 1971.
Wernerfelt, B. 'An information based theory of microeconomics and its consequences for corporate strategy', *Unpublished Dissertation*, Harvard University, Graduate School of Business Administration, 1977.