INVISIBLE RESOURCES AND THEIR ACCUMULATION FOR CORPORATE GROWTH†

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I. *Introduction*

All around us and all the time, we see and hear about growth and decline of the firms. Some firms are "high-growth firms" and others are "low-growth firms." Managers want to know how to grow and make their firms grow faster than their competitors or the national economy. Many of them look as if they are preoccupied with growth, or perhaps with growth for growth's sake.

Corporate growth, as a phenomenon, is thus very familiar and omnipresent. But as a subject of theoretical inquity, it is not so. Certainly, there has been much research effort relating to growth such as competitive strategy of the firm, diversification and acquisition strategy of the firm, the development of managerial systems of the firm as the firm grows through several stages. There has not been, however, much research on how the firm grows and why the firm can grow. In fact, we perhaps have to go back to Penrose's seminal work, *The Theory of the Growth of the Firm* (Penrose [1959]) for the last in-depth theoretical inquiry.

The basic question behind this paper is a deceptively simple question for this theoretical inquiry: why can some firms continue to grow and some others cannot, even under very similar environments? What is the essential driving force behind successful corporate growth? My basic thesis is: it is accumulation of "invisible resources." It distinguishes successful corporate growth from failure.

Simply stated, a firm grows because it can attract more demand for its products. How can it do this? Either because it finds itself in a growing industry, especially in its early stage, or it can garner a greater market share, or both. Then, the next question is why some firms seem to be able to spot and enter into a growing industry or segments (as early entrants) while others cannot. Or, why are some firms supreme competitors in a variety of markets and over a long time while there are other firms which are mediocre most of the time?

Certainly, (coincidental) environmental conditions or luck may be a most important

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reason for explaining a single success of a firm in a particular market for a short period of time. But, long-term growth of a firm is accompanied most often with long-term and repeated success in a variety of market segments.[1] If we want to explain this type of success and corporate growth, the basic reasons have to be more intrinsic or internal to the firm, rather than just environmental conditions, or sheer luck. We have to take a serious look at the firm's "ability to grow" and how the firm can create, maintain and increase it to keep competing and growing.

This leads us rather naturally to an old concept of "distinctive competence" of the firm. Distinctive competence is a notion which appears very often in business policy literature. It is defined by Andrews [1971], as "the organization's demonstrated and potential ability to accomplish, against the opposition of circumstance or competition, whatever it sets out to do." Although this very broad concept of distinctive competence seems to need some reformulation and more structure to gain more insight into the process of corporate growth, there would be no denying that corporate growth is accompanied by (or a result of) intertemporal accumulation of "distinctive competence" by the firm. In an analogy with a national economy, distinctive competence is like technology whose progress (and accumulation) has been the major source of economic growth of many nations.

If accumulation of distinctive competence is a major source of corporate growth, it becomes imperative then to have a better understanding of this very broad concept and try to conceptualize the process of its dynamic change, especially in relation to the firm's strategy. But at the same time, there would be other resources of the firm whose accumulation is essential for its sustained growth, like money. This is just like capital accumulation is essential for national economic growth.

Thus, in this paper, I will try to do the following:

1) To identify two kinds of strategic resources, resources whose accumulation is of strategic importance to corporate growth, especially emphasizing the importance of "invisible resources" among them (Section II);
2) To present a framework to conceptualize invisible resources (which are basically the same as "distinctive competence") in a more detailed and structured manner, based on the concept of information flow and their channel (Section III);
3) To describe an accumulation process of invisible resources in connection with the firm's strategy[2] (Section VI, Section V).

II. *Two Kinds of Strategic Resources*[3]

What resources are the real driving force behind corporate growth? What are the really limiting resources that constrain corporate growth in an essential sense? If I term them "strategic resources," what are they?

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[1] For a very interesting account and analysis of strategies of American tobacco firms, see Miles [1982].

[2] I use the term 'corporate strategy' here as a generic term for the firms' strategy in general. Thus, I do not restrict its usage here to mean only "firm-wide total strategy of a multi-business firm," as some writers prefer to do in some instances.

[3] My discussion in Section II and III relies heavily on our joint work, Yoshihara et al. [1981], chapter 1, in which we first developed a framework to be presented in Section III. My analysis here extends oir previous work into the area of corporate growth more explicitly.

There are many kinds of resources the firm has to have in order to carry out its oerpations, let alone to grow.

A most common classification scheme of the firm's resources would depend on physical characteristics of resources and classify them into human resources, physical resources and monetary resources.

Human resources would include workers, technicians, scientists, salesmen, and managers, etc. It is clear that without their labor service the firm would not be able to operate even a single day. Physical resources are things like plants, equipment, warehouses, computers, parts, and raw materials. Indispensability of these resources is also apparent. The same is true for money. Whether long-term funds for capital investment or short-term working capital, money is a life-blood of any business avticity.

These resources I mentioned are all, in a sense, "visible" resources, and therefore very easy for us to comprehend and image. But there are many "invisible" resources of the firm that many people claim as important as visible resources mentioned above. Although I am not aware of any systematic framework or classification scheme to discuss this class of resources, typical examples many people point out would include: technological capability, production know-how, marketing savvy, brand name, good credit standing, management skill, organizational culture, and so on. These are the things one cannot physically identify and put fingers on, but still their importance seems to be beyond doubt. For example, one of the popular explanations for Philip Morris' phenomenal success in Miller beer is the marketing savvy they developed in the tobacco business and transferred to the beer business.

Notice that some of these invisible resources are intrinsically connected with people working in the firm. For example, technological capability at least partly resides in the knowledge of the firm's scientists. Marketing savvy largely comes from the expertise accumulated in marketing personnel of the firm. Thus, invisible resources may seem inseparable from human resources in many instances. People are often carriers of invisible resources and are important for this very reason.

For the sake of conceptual discussion in this paper, I think it is much better to try to separate human resources and invisible resources conceptually. Thus, I treat human resources in this paper as a resource which supplies general and usual manual, technical and managerial service, very similar to a textbook concept of labor input to the firm, which a firm can buy in the marketplace. Any firm specific or special expertise and knowledge accumulated in the firm's personnel will be treated as a part of invisible resources. The reason for this separate treatment of human resources and invisible resources will become clearer when I discuss a conceptual framework of invisible resources in the next section. Basically, personnel-related invisible resources are only a part (though substantial) of the entire invisible resources, but the entire invisible resources can be conceptualized nicely by a single framework.

In order to identify "strategic resources" for the growth of the firm from this wide array of various resources, we need some criteria of "strategic importance for the growth of the firm." To determine these criteria, we need to take a look at the firm's environment and what the firm does in that environment.

First, the firm in this paper operates in a market economy, obviously. That implies that the firm can and does obtain certain resources as input from the outside markets, e.g.,

labor market, raw materials market, equipment market, financial market, etc., if these resources are available in the marketplace and they have the means to obtain them. Second, as a corollary of market economy as the firm's environment, the firm operates in a competitive market for this output, not in a vacuum. In this circumstance, competitive advantages, or favorable "difference" with one's competitiors, become imperative.

Third, the firm's environment changes over time, sometimes quite rapidly, and these changes are often uncertain and unforeseeable. Changes in technology, demography, energy, people's taste, government regulations are just a few examples that readily come to one's mind. Coping with these environmental changes is another imperative for sustained corporate growth.

Fourth, there is an internal dynamics of the process of corporate growth under these environmental circumstances. An essential part of any growth phenomenon is, it seems to me, a process of reproduction, or internal dynamics of the reproduction cycle. For example, in growth of human population (and mankind), it is a reproduction of the human race by the human race. For national economic growth, a large part of attention has been focused on the process of reproduction of capital by capital, whether neoclassical economics or Marxian economics. Although reproduction itself may not be the ultimate goal of growth, it seems to be the essential driving force underlying any growth phenomenon. It is strategically important to understand this internal dynamics of reproduction if one wants to understand "growth." The same would be true for corporate growth.

Reproduction means that a resource is at the same time an input of the process and an output thereof. In a national economy, capital is one of the inputs to productive activities of the economy which in turn produces capital as one of the outputs (for future use as an input). For a growth of the firm, there must be such internal dynamics.

Given these considerations, criteria for "strategic resource" seem to be the following four:

(i) resources that are means for market exchange,
(ii) resources that have limited, if any, availability in the market,
(iii) resources that are both input and output of the firm's activity and reproducible by the firm at great effort and time.
(iv) resources that are flexible in their uses.

Market economy dictates the first criterion. It is obviously money (and most likely only money) that satisfies this criterion. Market economy and competition will require the second criterion. Those resources readily available in the market will not be ultimately important for creating competitive advantages for the firm as long as money is available (both to the firm and their competitors). For such recources, money becomes the really crucial factor. Reproduction consideration and a competitive market argue for the third criterion above. Even if some resource is both input and output and reproducible, it will not have strategic importance if it is very easily reproducible because by definition that resource cannot be a source of competitive advantage which makes a difference. Competitors should be able to imitate it very easily. The fourth criterion is important because of the uncertain and dynamic nature of environmental changes. An obvious way to cope with these changes is to maintain flexibility of the firm's resources as much as situation permits.

Note that physical indispensability for the firm's operation is not included in the above four criteria. Because of a market economy, a resource may be physically indispensable

for the firm's operation but may not have strategic importance for its growth as long as they are available from the outside market.

Having developed a list of four criteria, what are the resources that will satisfy most (if not all) of these criteria? Depending on a particular circumstance of the firm, different kinds of resources may make the cut. But, what would be the resources that will be most likely judged strategic?

Money is certainly one of them. It is a means in market exchange. It is flexible in its uses in the sense that money can be converted into any resource as long as there is a market. It is also reproducible and both input and output of the firm's activity. The firm uses money to buy equipment, materials and labor and so forth, and gets money for selling its outputs. The residual, profit, is what the firm ultimately produces in this process.

Human resources, as I define here, and physical resources do not often satisfy these criteria. They are not certainly means for market exchange and usually they are available in the market. Moreover, they are not generally reproducible by the firm's activity. Humans are certainly not, but most of the physical resources are not either. Steel mills buy their furnaces from furnace companies and meat packers ask construction firms to build their plants. Although machine tool builders may manufacture some of their own equipment, they are exceptions rather than a rule. The same kind of physical resources would not be both input to and output of the firm's productive and business activities. As for flexibility, they vary. But, they are certainly not as flexible as money and quite often task-specific. A steel furnace cannot be used as a copper furnace, a lathe is not a substitute for a die, a computer programmer is not easily converted to a chemical engineer, and so on.

Invisible resources, whose examples I described above, do not qualify as a means for market exchange, but generally do well for the remaining three criteria. First, most of them are not readily available from the market. Even if they are available in the market, they are in very limited supply. For example, patent will preclude wide availability of important technology except under licensing agreements. One cannot buy production know-how in the market, except by hiring key personnel, which will be in very short supply, if any. Many of these know-how are very firm-specific and depend on the organizational character of the firm that they are not easily transferrable to other organizations even if the key personnel are movable across firms.

The same is true for marketing savvy, brand name, good credit standing. They are all very firm-specific and idiosyncratic that they are not well-suited for market transaction piece by piece,[4] except for market transactions of the firms as a whole. This is all the more clear for organizational culture. How can one obtain them in the market? The only way to obtain them seems through careful organizational development within the firm.

These invisible resources also satisfy the third criterion. Certainly they are important inputs to successful competitive actions by the firm, but at the same time they are created by the very same actions. Technological capability and production know-hows advance as the firm spends more R&D money and gets more experience in a given technology (a well-known experience curve phenomenon is an example), a successful product will established a brand for the firm, organizational culture will develop that suits the kind of competitive behaviors required in the firm's chosen field.

[4] For market failures for firm-specific and idiosyncratic goods, see Williamson [1975].

Invisible resources are thus reproducible by the firm, but it is not that easy. Numerous firms have failed to develop right technology, establish their brands, build marketing savvy and transform organizational culture, as the competitive environments have changed and the firm has ventured into various fields.

Although invisible resources are not easy to create or transform, many of them can often be quite flexible in the sense that the same resource can be put into multiple uses simultaneously in a variety of fields. Philip Morris exploited its marketing skill and know-how in both tobaccos and beers at the same time. Honda could succeed in automobiles through skillful uses of their brand image and technology in motorcycles. Simultaneous multiple use is a property most other resources do not share. A machine cannot produce two different products exactly at the same time. Money poured into one business is not simultaneously usable for other businesses. As will be presented in the next section, essence of invisible resources is information. Information has a well-known property of simultaneous multiple use by many people.

Thus, invisible resources satisfy the three criteria rather well and should be regarded as another strategic resource besides money. In fact, I think they are a major source of competitive advantage for the very reasons I have explained for their strategic importance. As such, it is a very similar concept to distinctive competence mentioned in the previouse section. But, in emphasizing the importance of invisible resources, one should not conclud that a mere presence of most of the invisible resources will guarantee successful corporate growth. They are just potentials. The firm has to exploit them well. For that purpose, entrepreneurship, management skill and decision-making ability are really crucial. This is perhaps the most important invisible resource of all.

Money and invisible resources are thus identified as two most common strategic resources of the firm. Analysis of their internal dynamics and accumulation process will therefore be of paramount importance in understanding and explaining corporate growth.[5] Indeed, invisible resources could be the more important of the two because money can sometimes be obtained from the outside market either in the form of equity or debt. Modern capitalism in a sense freed many entrepreneurs and firms with the right invisible resources from the constraint of money. It is apparent in the American venture capital market, for example, that good invisible resources can attract money, but not necessarily vice versa.

Indeed, Penrose [1959] first noted that managerial services are the real limiting factor of corporate growth and discussed the process of their accumulation and its effect on the rate of corporate growth. My concept of invisible resources includes an essential part of her managerial services but is a much broader concept. In fact, since it looks so broad, some may wonder whether it is of any further help in analyzing corporate growth other than emphasizing its importance. To be of any further analytical help, we need a more precise conceptual framework to think about invisible resources. It has been perhaps due to a lack of this kind of framework that there has not been very much theoretical duiscssion

[5] Some may wonder why accumulation of physical resources (capital) is relegated to a position of only secondary importance in my framework here, whereas it is usually "the" topic of growth theories of a national economy. The basic reason is that for the firm, capital assets are resources obtained from the outside market, although we do not usually assume their outside availability in economic growth of a national economy. A national economy is often treated in these theories as a closed system, but a firm is essentially an open system within a market economy. As long as money is accumulated, we can subsume capital accumulation in it for corporate growth, whereas it misses an essential point for a national economy.

of invisible resources or distinctive competence. It is this task that I now turn to in the next section.

III. *Information Flow Framework of Invisible Resources*

Not only the concept of invisible resources may seem too broad, but the examples of invisible resources that I gave may look to have no commonality at all except that they are "invisible" or intangible. But there is an essential common property to all theses. They are all related to *information flow and accumulation* surrounding or within the firm. Before explaining what I mean by this more precisely, it seems better to spell out a concept of the firm underlying my conceptualization of invisible resources, i.e., what the firm is and what it really does. I consider three views of the firm are essential in understanding its behavior and achievement.

First, a firm is a physical transformation and market exchange agent which takes certain inputs from outside (environment) and produces certain outputs which are then sold to the outside parties in the market. Let us call this entire process an operating process and many activities the firm's personnel perform in this process operating activities. This view of the firm is taken (to the extreme) in the theory of the firm in economics.

Second, a firm engages in information exchange activities and information processing activities. This is often the other side of the same coin, operating activities. Operating activities are not only physical transformation processes but also inevitably information exchange with the environment and information processing within the firm. Producing a particular kind of automobile and selling it to the market at a certain price will, for example, teach the firm more about its production technology and the nature of demand and will tell the market what kind of a firm it is (brand image). Doing something always accompanies some learning to the doer and some signalling to the others. Sometimes, the firm engages in an information exchange and processing activity quite idependently of the ongoing usual operating activities. Eor example, research and development activity has some element of this.

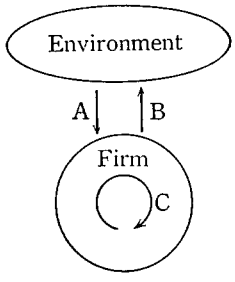
Obviously, information exchanged and processed will accumulate over time, not merely exchanged and processed. From this view, a firm may be regarded as an information exchange and processing entity as well as an information accumulating entity.

Third, a firm is a human organization composed of people with various traits, tastes and abilities. Furthermore, these people are organized in an authority and reporting hierarchy. Within this organization, information is exchanged among the personnel and processed by each individual in order to carry out operating activities.

If one takes the first view as the main or only concept of the firm, a growth theory emphasizing money and physical capital will emerge quite naturally. If one thinks, as I do, the second and the third views are equally, if not more, important, it seems natural that invisible resources will also receive major attention. Ideally, all three views should be incorporated in the theories of corporate behavior, including corporate growth.

From the second and the third views of the firm, we can visualize three kinds of information flows related to the firm, as in Figure 1. The circle represents a firm outside which lies its environment.

FIGURE 1



Information flows A and B are concerned with information exchange between the firm and the environment. Arrow A has its origin in the environment and flows into the firm. This arrow is meant to represent information flowing into the firm. Arrow B is just the opposite. It indicates information concerning the firm which flows into and is received by someone in the environment: customers, competitors, suppliers, etc. The origin of an arrow indicates the object of information and the head indicates where it is going, or a possessor of that information.

Arrows A and B are information directly connected with the second view of the firm above. As the firm performs its operating activities or its special directly informational activity, the firm actually can gather information about the environment (Arrow A) or sends signal about itself to the outside parties (Arrow B). For example, R&D would essentially be an information gathering activity about nature, certainly a part of the firm's environment. This suggests information flow like Arrow A. If the firm finds more about customers' needs through their sales experience, it is another example of Arrow A.

When the firm establishes a brand name either through advertising or through word of mouth by simply selling a quality product, this is because a good information about the firm or its product has flown into and is received firmly by the consumer out in the environment. Clearly, a key lies in information flow like Arrow B. Good credit standing in the financial market also involves a similar information flow. This time, the object of information is profitability and financial health of the firm and this information has to flow into the investors and bankers in the environment.

Information is exchanged not only between the firm and the environment but within the firm among the members of the organization, as the third view of the firm above suggests. Organizational information exchange and processing is a backbone and shadow of the organizational decision making process. Arrow C in Figure 1 shows this type of information flow. Both senders and receivers of this information are within the firm.

For example, when one says a firm has a good market-oriented organizational culture, it can be interpreted in this framework that the intraorganizational flow of market-relayed information is very active and appropriate. Other firms without such a culture will perhaps receive (or have a very good chance of receiving, if they are sensitive) similar flows of information from the environment at the firm's interface point with the environment, but this information will not be processed and transferred properly within the organization. As another example of Arrow C, a highly skillful managerial service involves intraorgnaiza-

tional information flows: selective and timely information processing, for example.

Then, how can we conceptualize invisible resources using the information flow framework in Figure 1? I think most, if not all, of the invisible resources can be rather neatly interpreted as either *stock* of information or capacity of information *channel* associated with three information flows in Figure 1.

Information received by the environment or the firm or the members of the organization will accumulate over time (at least some part of it will) due to these information flows, and some part of it will decay. Stock of information is a current net accumulation of information. For Arrow A, it is stock of information on the environment accumulated in the firm. For B it is stock of information on the firm accumulated in someone in the environment. For Arrow C, it is stock of information on the organization or other members of organization held by the members of the organization.

Information flows vary in their content, speed, noise, etc., depending on the channel through which information flows. Therefore, the capacity of information channel becomes very important for information exchange, processing and accumulation processes of the firm.

Following the order that I mentioned various examples of invisible resources in the previous section (page 22), let me interpret these examples using the information flow framework. First, technological capability and production know-hows of the firm most likely refer to a stock of information about technology (which is a part of nature as the firm's environment) within the firm accumulated either through R&D activity or learning by doing. When license agreements about technology with some outside parties are important to the firm's technological potential, it can be interpreted as important information channel for technological information. Both are related to Arrow A in the technology area. The more stock or the better channel the firm has, the more invisible resource the firm has, we would say.

Marketing savvy comes from knowing the market well and knowing how to attack the market very well. This consists of in our terminology here, well-accumulated stock of market information in the firm and a good informtaion channel for market information to flow into the firm. This is another example of stock and channel capacity of Arrow A information flow, this time about the market as a part of the firm's environment.

Marketing savvy also involves quite often the ability to communicate the firm's intention, its product information, etc., to the market effectively. Advertising is a clear example. In this case, the flow of information is the reverse of the previous case. It now flows from the firm to the market. Thus, this communication ability is an example of the channel capacity of Arrow B information.

An example of stock of Arrow B type information flow out to the market is brand name. Brand name is essentially a stock of good information (reputation) held by the consumers (a party in the environment) about the firm or its products which have been accumulated through many information flows of Arrow B type over time.

Good credit standing is also similar to brand name. This time the object of information is the firm's financial conditions and the possessors of information are the participants in the financial market. But, it is the same as brand name in the sense that an essence lies in stock of good information about the firm in the environment, Arrow B information flow.

It should now be obvious that management skills and organizational culture are related

to Arrow C information flow. Management skills are channel capacity of internal information processing as well as repositories of intraorganizational knowledge about the members of the firm and stocks and channels of information about the environment that the firm possess somewhere in the organization. Organizational culture can be interpreted as the characteristics (unique to a particular firm) of the channel of internal information processing and perhaps the characteristics of stock of information thereof. A technology-oriented firm often tends to process more technology-related information faster within the firm than a firm with marketing-oriented culture. Such a firm may even preselect the kinds of information they process on the basis of their culture, thus often ignoring imoprtant market information. They are all related to the characteristics (capacity) of internal information channels.

At this point, a more concrete discussion of real-life examples would help us understand this framework and its validity. There are many such examples in popular business publications, if one reads it that way. Take, just for an example, a case of American Airlines' SABRE (American's computerized reservation system offered to travel agents) in *Business Week*, August 23, 1982.

This system offers reservation service not only to American's flights, but all the other carriers as well. United Airlines offers a similar service. On this system, *Business Week* writes:

> An airline's seats are generally thought to be its merchandise, but the product really is its flight schedule. The computerized reservation systems that travel agents and corporate travel departments buy or lease from the airlines are the principal distribution network for that product. With 82% of the nation's 20,000 travel agents, who account for more than 60% of airline ticket sales, expected to be computerized by yearend, the system an agent uses is critical.
>
> Agents see flight schedules in their computers six or eight lines at a time. Because more than 75% of all flight bookings are made off the first batch of listings displayed, the system supplier, or "host" tries to influence the agent by putting its own services high on the flight lists. "That's the nature of the competitive arena," says Thomas G. Plaskett, senior vice-president for marketing at American Airlines Inc. "There's no reason why we shouldn't consider Sabre [American's computerized system] part of our arsenal."

American, as one of the two major "hosts," clearly sees its value as an invisible resource, even though on the surface this sytem may look like just a computer system intended to automate a tedious and labor-intensive operating activity called reservation. One of the major benefits of this system comes from the fact that through this system American can influence an information flow (its channel) to the customers (travel agents) greatly in their favor so that American has a better chance of being noticed and booked. Compared with other competitors, American has, in a sense, a better channel to the customers.

The benefit of the system does not stop there. Passenger information stored in SABRE's reservation records is a potent stock of customer information that American has for its marketing activities. This is an example of Arrow A-type information stock. This was, for example, at the base of American's successful targeted marketing approach to frequent and often expense-account travelers. To build a brand loyalty among such travelers, Amer-

ican was the first to start a program to give a free upgrading to first-class service and free trips after travelers fly a certain number of miles on American. Clerical cost of this program was smaller because of the stock of information that SABRE maintains on customers' flying records. SABRE's customer information stock and computer capability can also be a source of advantage in providing computer-related communication services to the consumers, a direction American is reported to be thinking of as a strong possibility for new business.[6]

As I mentioned previously, one of the characteristics of invisible resources is their possibility for simultaneous multiple uses. This is clear in the American example. The same stock of customer information can be used in a variety of business and marketing programs. These uses, I might add, are contemplated on top of "the" ostensibly major and original purpose of using them for resrvation services. This is another property of information flow-related resources. They are often created as the inseparable flip-side of the coin called operating activity, in this case reservation service. Operating activities always accompany some information flow. The important point is, how the firm can capitalize on this resource of very low marginal cost in a creative way.

The next example of Timken, a roller bearing giant, will illustrate these points, too. One of Timken's competitive advantages, according to *Business Week*, May 17, 1982, is very strong customer service and technological support performed by an army of well-trained sales engineers. *Business Week* quotes the following comments by three Timken's customers:

> "When a part fails, a customer does not have to return it. Instead, Timken engineers inspect the problem onsite to determine its precise nature and help the customer get his equipment functioning."
> "A Timken sales engineer helps us to design the bearings in our gearbox."
> "Timken engineers check the assembly process every two weeks. They are scrambling in our behalf."

Why is this very pervasive presence by Timken's engineers on the customet's plants? Certainly, providing better service will give Timken a competitive edge. This is a part of operating activities of Timken. Timken engineers are there to outperform the competitors in service. But, there are also informational reasons, I suspect. These service activities help Timken accumulate all of the three types of invisible resources in Figure 1, A, B and C.

First, heavily involved in the customers' operations, Timken is in a position to collect a huge amount of information about the details of the customers' needs (and perhaps future trends in their changing needs) and the performance of their bearings, e.g., what went wrong? Both in terms of stock and channel of information flows on the customers' needs (Arrow A), Timken's direct service system is beneficial. Second, by frequent contact with the engineers of the customers' plants, Timken can supply information about their products to the customers inexpensively so as to influence the customers' purchase decisions in Timlen's favor. This is quite analogous to SABRE's merit to American Airlines and is concerned with Arrow B type information flow. Third, constant and direct contacts with the customers' requests, complaints and pressure by Timken's personnel will be helpful to maintain a customer-

[6] SABRE also uillstrates other important characteristics of an invisible resources. It is not available in the market and it is not so easy to create it within the firm.

oriented organizational culture at Timken. This is an effect on information flows of Arrow C.

Obviously, we should not overemphasize these informational benefits of Timken's thoroughgoing service system. Even if there are these potentials their magnitude may not be that great. And it is costly to build up and maintain such a system and thus may not pay at all for smaller firms. Moreover these benefits I mentioned above may not materialize at all if the service function is not managed properly. But the point is that operating activities by the firm, like Americans' SABRE and Timken's service system, have potential (side-) benefits in terms of invisible resources and they can be understood well through our framework.

As the last example of analysis using our framework in Figure 1, let us discuss the benefits of a large market share, which are commonly believed to be very substantial, from invisible resources perspective.

First, a large market share means there are a large percentage of customers who know the firm's products first-hand. This by itself is a stock of information about the firm in the environment, which often means great customers' recognition. This sometimes translates into an image of reliability and high quality on the part of the customers. This is clearly an example of Arrow A type information stock.

Second, a higher market share means, especially if maintained over time, greater cumulative volume of production of the same or similar products. A well-known experience curve effect on product cost will tell us that the firm's unit cost will go down. Behind this experience curve effect lies an accumulation of Type B information on technology and production know-how. Greater volume of cumulative production means a greater amount of information flows and thus a accumulation of invisible resources.

Third, being in a high market share position, the firm often has contacts with a great number of customers. Through this contact, the firm has a potential to be able to obtain greater information about the customers' needs at a little extra cost. The firm has to contact the customers anyway to sell and to provide service to them regardless of whether the firm uses that opportunity for information gathering activities or not. Market share can translate into a better information channel on customers' needs. As a Japanese executive once remarked, the market leader often can see potential demands in advance. The reason is that the top firm has the greatest chance of being consulted by the customers on their problems, which then give a clue to future demands.

Market share will undoubtedly have other kinds of benefits which may not necessarily be better understood through the information flow framework. Monopolistic power of price manipulation and threats would be such an example. But it should be clear now after discussing American Airlines, Timken and market share, some of the major benefits in these examples which are often discussed in ad hoc ways, are not so ad hoc as it may seem. Instead, the information flow framework provides an alternative and hopefully more systematic way of explanation.

IV. *Accumulation of Invisible Resources*

Using the terminology developed in the previous section, I define accumulation of

invisible resources as (1) an increase of stock of information and/or (2) an increase of channel capacity, associated with information flows A, B and C.[7] The question is how this accumulation process works and what kind of insights the information flow framework can give us about this process.

Basically, there are two routes for this accumulation:

(1) Active and directly informational activity with accumulation as the explicit and primary objective

(2) Inseparable information flows accompanying daily operating activities with accumulation of invisible recourses as an implicit or secondary objective.

Examples of the first route (or explicit route) are: TV commercials to increase brand image, basic R&D activities for new technology development, organizational development and training programs designed to enhance employee's sensitivity to markets. The second route (or operations route) has been well documented by my discussion in the previous section like Timken. As another example of this second route, take a case of Matsushita Electric's overseas expansion pattern.

Arataro Takahashi, often called an alter ego of Matsushita's legendary founder Kohnosuke Matsushita, says that when Matsushita have started production operations in developing countries, the product they have explicitly chosen has quite often been a battery (Takahashi [1979]). After that comes, depending on the country's demand situations for electric appliances, such products as radios, electric fans and TV. This sequential step of development is explicitly recognized and often becomes a pattern for their development. Takahashi cites the reasons for this pattern:

> "Batteries are necessities in most countries in the world and universally in demand. Furthermore, if we bring automated equipments from Japan for only a few number of processes which are critical for the battery's final quality, we can be sure of certain quality level even if we have to use local labor which may not have appropriate skills. An additional merit we are cognizant of is that through battery operations employee training can be done in a relatively short time.
>
> As the employee's skill level advances, we can expand our operations into such products as radios and TVs which require a much higher level of technical competence."
>
> (translation by the author)

It is quite clear from his remarks that accumulation of production know-how in foreign subsidiaries is intended through battery operations. This is a good example of the second route (operations route). It would be quite different from, for example, going into TV right away and training local unskilled labor in special training programs (an example of the first route).

[7] The definition should not be interpreted narrowly. A narrowest interpretation would be to fix the variety of information flows associated with the firm (like market-information flow on beers, technical information flow on cigarettes, . . .) and then measure increases of stocks and channel capacities (however one operationally measures them) of these information flows. I want to interpret this definition to include, for example, changes in the variety of the kinds of information flows associated with the firm, like when the firm goes into a new product market and thus establishes a new information flow associated with that market. This *change* of invisible resources is also an accumulation under this definition. I also envision a *negative* accumulation as a special but important case of accumulation here which is a very broadly conceibed notion. I may use decay instead of negative accumulation for such cases.

Although the line of demarcation between the two routes is not as clear in reality as one may wish, explicit recognition of two kinds of routes seems to be desirable for several reasons. For example, the fact that the second route is very important implies that there is a possibility of accumulating or decaying invisible resources bit by bit through daily operations of the firm *without* people explicitly realizing it. This is a rather sombering fact and could actually have grave consequences. A firm whose performance has been on a long and slow downhill for no apparent reason or a firm which cannot somehow capitalize on the great market potential, these are often victims of slow decay of invisible resources through the second route. It is like a series of body blows in boxing which, taken one at a time, may not have any visible significant impact but will take its toll slowly and quite effectively over a longer time span.

In fact, the speed of accumulation through the second route seems often slower compared with the first route, but its resulting accumulation is often more solid and less fragile than the first route. A good case in point is the difference between a brand image created by TV commercials (the first route) and one created by words-of-mouth reputation of actual superior product quality (the second route).

Perhaps it is almost always the case that both of these two routes would be available and actually used for accumulating a single invisible resource. It is the mixture of the two routes which is a really important decision variable for the firm. Whatever mixture is used, an essence of this accumulation decision rests on one thing: how the firm *controls* the information flow in question in a cost-effective way. Though very simple, the information flow network suggests this is the essence.

But, this is perhaps still too vague. Let us further break down this essential question into more operational subquestions. Suppose we are dealing with accumulation of a single invisible resource, like knowledge about customers' needs. There are two basic questions the firm has to answer in order to decide on how the firm controls the information flow related to this invisible resource. First, which activities (operating activities or directly informational activities) would carry information flows with the best quality information at the fastest speed? Second, after identifying these critical activities, how does the firm control these activities in a cost-effective way? Let me explain the two questions in a more detail.

The first question recognizes that there are many alternative activities which may carry information flows related to an invisible resource at different speed and different quality. For example, in accumulating knowledge of customers' needs in consumers' goods, consider three alternatives: (1) to do a questionnaire consumer survey from time to time, (2) to sell directly to the retailers (skipping distributors) and get frequent contact with them to gather consumer-related information, and (3) to set up the firm's network of after-service and consumers' claims processing. The first activity is directly informational and the other two are operating activities with informational implication. Obviously these are not mutually exclusive, but at the same time each is not the absolute necessity for the firm. The firm can choose not to do consumer survey as such. The firm can use the distributors for their distribution. The firm can ask the relailers or wholesalers to take care of after-service and claims processing. These three alternatives are just examples.

Depending on the nature of the products and distribution systems, either one of the three could be the best way to gather information on *real* customers' needs. The essence

of the first alternative is in contact with the customers through questionnaires. The essential information flow in the second alternative is in observing customers' buying behaviors on the spot. The retailer conveys this information to the firm. The essence of the third alternative is in observing the customers' first-hand reaction in using or consuming the firms' product. These are, in a sense, three different ways for the firm to contact the customers: the first alternative is ex ante contact (ex ante of buying), the second alternative is on the spot contact and the third alternative is ex post contact (ex post of buying).

A well-known common pitfall of the first alternative is that the quality of information could be low (consumers' may not be able to articulate their potential needs in a survey). For a second alternative, the retailers may garble whatever they know in communicating it to the firm. They may do this either strategically to enhance their bargaining power or unintentionally due to their perception and communication bias. The third alternative presents a problem of sorting out the information on the customers' needs from the ways they respond to the present product and service and the ways they protest against specific features of the product. But, if the firm is successful in sorting out, this could be the highest quality information source.

It should be clear, though, that each alternative presents a different arrangement for information about the customers' needs to flow to the firm with varying quality and speed. A mixture of these, including a decision to take or not to take each alternative, presents a wide range of possible information flows. Identification of critical activities with the best information flows is not an easy task.

Once the firm determines these critical activities, the second question is how the firm controls the identified information flows. Behind this question lie two related decisions. One is the decision on who should perform these critical activities. The firm themselves? If the firm decides to let the others do the critical activities (like letting others observe the customers' buying behavior), who should it be and how should the information be relayed to the firm (e.g., through the distributors or the firms' own sales people)? The other decision is on the mechanism the firm should set up either internally within the firm or through some arrangements with external parties to ensure that information actually flows as intended both in quality and speed.

The first decision determines who has the initial proprietary access to information in question. Internalizing the critical activity in question within the firm would normally be the best way to assure the firm the initial proprietary access to information. One of the reasons, for example, why some firms prefer direct distribution system (skipping as many stages of wholesalers and retailers as possible) is exactly this. It will enable the firm to know consumers' needs more quickly without too much noise. Timken's example in the previous section is very much like this. Taking another example, many firms manufacture key components for their final product internally like IBM produces its own memory chips. They do this partly because (1) the firms cannot afford to allow the others the initial proprietary access to sensitive information on key components and (2) accumulation of technological know-how from internal production of these components will often determine the firms' ultinate ability to develop competitive final products.

Obviously, internalization, though perhaps most desirable from an information control point of view, is not always the best decision. Some activities may require too much fixed investment to internalize and may be too risky. In such a case, it becomes imperative to

arrange a mechanism to allow the firm a reasonable degree of control of information flows in question, such as partial internalization (i.e. making x% of the components on their own).

So far I have been taking examples mainly from information flows like Arrow A in Figure 1 (environmental information flowing into the firm) so as not to confound my arguments. But it should be clear that for other information flows like Arrow B and Arrow C, the essence of the above argument apply equally well. It is the control of information flows that is most important. To do this, the firm has to (1) identify the critical activities and (2) devise a mechanism to control these activities in a cost-effective way.

Underlying this essence is the importance of operating activities for accumulation of invisible resources. What the firm does for operations determines in a large measure what and how much invisible resources the firm can accumulate (and therefore how the firm can grow). Operations are often considered to be of only tactical importance like, for example, cost differentials due to different modes of operations. But viewed from the information flow framework, operations do seem to have much more strategic importance for the long-term growth potential of the firm as carriers of many important information flows. This long-range importance of operations will become more succinct when I discuss below an interactive accumulation process of various invisible resources, interaction among the invisible resources with operating activities as one of the important interactive agents.

V. *Interaction in Accumulation*

Interaction among invisible resources in their accumulation process means that accumulation of a single invisible resource cannot be discussed independently with accumulation of certain other invisible resources. There may be either positive or negative interdependencies. For example, accumulation of a large stock of technological information in the firm may tend to foster internal information channels mainly appropriate for that type of information, sometimes even at the expense of weakening other types of internal information channels appropriate for market, e.g., market information. This is a story we sometimes hear in high technology firms concerning their technology oriented organizational culture.[8] In our terminology here, this is a example of positive interdependence between Arrow A type invisible resources (e.g. technological capabilities) and Arrow C type invisible resources (e.g. technology-oriented organizational culture).

At this stage of analysis, not too much is known about this interaction. Here in this paper, let me just introduce two-way classification of invisible resources and discuss very broadly interaction in terms of these two categories. I will also speculate on the forces behind these interactions.

Among the three information flows in Figure 1, Arrow A and B have one thing in common: both of them are information flows with the environment. These two flows, therefore, will be carried by the firm's activities with the environment. Arrow C is different and by itself completely internal to the firm. I will call invisible resources connected with information flows of Arrow A and B as informational resources (denoted by I) and invisible resources

[8] See, for example, stories on Texas Instruments about their marketing-related troubles. "When Marketing Failed at Texas Instruments," *Business Week*, June 22, 1981. "An About-face in TI's culture," *Business Week*, July 5, 1982.

connected with Arrow C as organizational resources (denoted by O).[9] As has been obvious from my discussions so far, informational and organizational resources are different not only in terms of external or internal nature of the information flows, but also in terms of means to affect accumulation of these resources. For example, most of the means to affect O would have management control and organizational behavior orientation. In affecting I, many means to be employed seem to be more functionally oriented, like marketing and manufacturing.

Using this simple dichotomy of invisible resources into informational resources (I) and organizational resources (O), it is possible to discuss three kinds of accumulation interaction among invisible resources: (1) between I and O, (2) among I themselves and (3) among O themselves.

An example of interaction between I and O has been just mentioned above. Accumulated I is a strong force to nurture O suitable for the particular kind of I that has been accumulated. It is not only that. Since an organization seems to be able to tolerate only a limited variety of major internal information channels[10] (e.g., a strong technical organization culture often does not coexist well with a strong market-oriented organizational culture), major characteristics of accumulated I will partly determine what kind of internal information channels become dominant in the firm. These dominant internal information channels then mold the behaviors of the members of the organization who in turn tend to accumulate more of the similar I. O will start affecting I through organizationally-colored decision making processes. Left to themselves, this chain of actions and reactions will lead to a positive interdependence cycle between I and O. (I—O—I—O— . . . .) Unless checked by the market forces or some top management explicit intervention, this cycle will lead to greater specialization of the firm's invisible resources and quite possibly some kind of rigidity of the organization.[11]

On the other hand, interactions among I themselves are not necessarily a positive interdependence only in the sense that similar I to tend to be accumulated leading to greater specislization. Aside from the effect of I on I itself through O (the process mentioned above), there certainly could be a positive self-accelerating interaction in I in the sense that within certain ranges greater I leads to smaller extra cost of accumulating more of similar I due to informational economies of scale. But, at the same time, there seem to be several mechanisms to produce negative feedback as well within I after initial scale economy is over.

For example, scientific knowledge in a particular area may become harder and harder to accumulate once one approaches the forefront of the basic sciences or brand image becomes harder to increase after the firm establishes itself among an overwhelming portion of the particular market. That is, this kind of argument would say that a growth curve of I resembles a usual production function: after the initial range of increasing marginal rate of accumulation, a decreasing rate of accumulation will set in.

Furthermore, there would be another mechanism which will make the variety of I in-

[9] This usage of the term organization resources does not imply that they are in any sense less related to "information" flows. They truly are, as is obvious from Figure 1. But I think this term may be more in line with other related terms describing similar things to Arrow C information flows.

[10] For an interesting way of describing this phenomenon through the concept of "specialized coding system for communication" each organization tends to develop, see Arrow [1974].

[11] A good example would be Ford's experiences with the Model T. See Abernathy and Wayne [1974].

crease (not specialize). It is in the very activities of accumulating a particular I. Whether accumulation of a particular I is done through directly informational activities or through operating activities, these activities often tend to have some other by-product information flows. R&D in a particular area leading to an unexpected discovery in a different area, or marketing activities for a particular product leading to better contacts or customer information usable in different areas. These are only examples of many by-product information produced by the firm's activities. Utilized effectively, they would certainly enlarge the variety of I the firm can capitalize on.[12]

An example of interaction among O themselves was already mentioned above: a specialized coding system for internal communication. This is in effect a process of one or a few number of dominant internal information channels refining themselves and sometimes driving other types of internal informational flows less operative within the organization. This process will continue, perhaps at a decreasing rate, as long as the firm operates in the same business areas. To get out of this cycle and ease the potential risk of too much dominance by a single type of internal information channel, the firm may have to venture into new business in which the market pressure forces other types of information channels to develop within the firm.

Penrose's argument is another example of interactive effects within O. Penrose [1959] argues that the limit on managerial services is the key constraint for corporate growth and further maintains that effective accumulation of new managerial services takes time (thus cannot be too flexible) because new managers have to work with existing managers as a team to familiarize themselves with the way the firm functions. To accumulate new managerial services the firm needs the services from existing managers which are in only limited supply. Interpreting managerial services as the capacity of internal information channels, this is an example of the rate of expansion of O being affected by the current status of O, i.e., interaction within O.

The interactions among invisible resources I discussed above are just examples. Obviously they are not exhaustive. The main point of these examples would be that it is important to recognize the existence of interaction. Through clever uses of these dynamic interactive effects, the firm would be able to cope with the accumulation of invisible resources better. But why are there such interactions in the first place? What are the underlying causes for interaction to occur? This understanding would enable the firm even better accumulation decisions.

Basically, there seems to be two reasons why interaction among invisible resources occurs. First, a single activity (either directly informational activity or operating activity) often brings with it multiple information flows. That single activity will contribute to accumulation of several O and I even if the major purpose of doing that activity is to accumulate one particular invisible resource or just to do operations. Some means taken to accumulate I often affects O, too, and vice versa. Thus, interaction materializes.

Second, suppose some invisible resource is either accumulated more than necessary at that particular time or is simply usable for other uses. Both cases are quite possible given the joint production nature of invisible resource accumulation just mentioned above and the possibility of simultaneous multiple uses of many invisible resources mentioned in the

[12] A negative influence for this effective utilization through O has been mentioned above as an influence of O on I.

previous section. Then, as long as there is some pressure for effective utilization of resources in an organization, pressure to use these "idle" invisible resources will often be induced for the decision makers in the organization. This would lead in many cases to various undertakings by the firm which in turn will affect accumulation of other invisible resources.[13] One of the results that ultimately emerge is interaction among the invisible resources.

Thus, I have identified two forces, multiple information flows and pressure within the organization, as the likely sources of interaction in invisible resources accumulation. By judicious utilization of two forces to create active interaction, invisible resources accumulation can be speeded up and made more cost-effective. It can create something like a chain reaction.

Perhaps a summary of my arguments in this and pervious sections is in order. The rate of accumulation of invisible resources depends not only on (1) the amount of effort and visible resources spent on the first route of accumulation (directly informational activities) but also on (2) the kinds and intensity of operating activities and (3) the current variety and level of accumulated invisible resources. To emphasize (2), I discussed the second route of accumulation (operations route) and my discussion on the interaction is essentially the argument on (3).

No knowledge of the functional form of this rate of accumulation function

$$(I_t, O_t)=f(m_t, x_t, I_t, O_t)$$

is claimed, where m_t corresponds to (1) above and x_t to operations. It would be interesting to see, for example, what kind of function f is compatible with a geometric learning curve. The learning curve is a special case of the theory presented in this paper. It mainly focuses on the effect of x_t.

Basically, the fact the (I_t,O_t) depends on (I_t,O_t) means that we have some kind of reproduction relationship here.

VI. *Conclusion*

In trying to identify a basic framework and the essential variables of corporate growth, I have concentrated my efforts on one of the two (what I think) strategic resources for growth, invisible resources. In so doing, I have clearly (and purposefully) lost my balance. I have neglected money, the other strategic resource, almost completely. This imbalance should be only a temporary phenomenon. We do need to incorporate accumulation of monetary resource quite explicitly into a model of corporate growth: for example, balancing cash flow over time by adroit management of the firm's product-market portfolio.

In fact, this cash flow balancing is at the heart of product portfolio management techniques which have become quite popular recently. Partly because this aspect of growth is now well-known, I have been purposefully unbalanced in emphasizing only the invisible resources side of corporate growth. Two imbalances would hopefully make a good balance, although there is certainly a need for union of the two.

I envision a model of corporate growth with three essential constraining factors: money (M), informational resources (I) and organizational resources (O). Each has its own char-

[13] Hirschman [1957] cites a similar kind of pressure and inducement mechanisms as a basis of "induced" investment and dynamic interaction in capital accumulation paths in developing economies.

acter and growth dynamics. And there would be interaction dynamics among the three, too. Of course, the firn's strategy will be the underlying variable in these dynamics. What these dynamics would look like and how the strategy is related to these dynamics are the questions I am only beginning to understand.

But I suspect that a theory of corporate growth would be a theory of predominantly unbalanced growth processes, a chain of disequilibria. It was A.O. Hirschman that first advocated a theory of unbalanced nrowth for economic development of underdeveloped countries (Hirschman [1957]). Although a theory of corporate growth has some essential differences from a theory of economic growth of nations as I explained in Section 2, the fact that certain kinds of unbalanced growth paths are quite often optimal over time seems to be common to two growth theories.

A challenge is to find out what are the optimal kinds and sequences of unbalanced growth and what is the logic behind this seemingly counterintuitive statement. My next paper will begin to address this question.

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