

CONCEPTUAL MODEL OF RESEARCH AND DEVELOPMENT AND COMMERCIALIZATION BASED ON ORGANIZATIONAL LEARNING

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Abstract

Investigation shows the model's major research and development based on the two forms have been established. The first mathematical model of the method to econometrics amount cost impact conducted during the process or the structures of research and development at the level of the Board. II. Conceptual models to experimental models of geometric mathematics of lower quantity. These models, which organize the resources and structure of the design is the subject of the role of research and development as well as on determinants of strategy and organization of that term to steer research and development strategies are famous suppliers. The second part of the models in this study has been examined. But this research is a form of research and development with an emphasis on organizational learning is taken into consideration. In this model, research and development through a process of organizational learning, can be learned.

Keywords: *organizational learning, research and development, commercialization, research and development model*

Introduction

Evolutionary approaches to research and development since 1940, which derived from the definitions of each time, we can conclude that the current research and development continues and the effectiveness is more day by day centers Advanced industrial countries today, that research and development to increase productivity, improve product quality and reduce the cost of manufacturing methods and ultimately, reducing waste, and improving the competitive power, expanding the business to define tasks, cross production and technology transfer, improving customer satisfaction and the production of wealth and prosperity led to the basic research and applied far more contribution and in many of these countries, more than 65 percent of the cost of the national research development research Assign. Over the past years in spite of the existence in our fields of research activity is very weak and the problems resulting from inadequate research funding and researcher, research and development units of the chain of production units, was formed more than 1000 currently; so the unit, only the Ministry of industries and mines has formal research and development units

[1] are Tasks of the research and development units, a range of activities that include the type of technology, product type and the appropriate operational structure depends. On one side of the spectrum, micro activities include work and studies in the field of operational process, and on the other hand it strategic studies related to marketing research and macro-policies related to the development of technology transfer Projects Company (select, transmission and absorption).

Research and development of industrial enterprises units in accordance with the terms of its original form (the motivation and attitude of the management and allocation of resources and facilities) in a different position in the organizational structure of the Board have the jurisdiction described in a variety of them determine.

Research and Development

Numerous studies on the factors affecting the effectiveness of the activities of research and development have taken place. Research and development activities of the organizations in the model on the effect of three levels have been about [2]

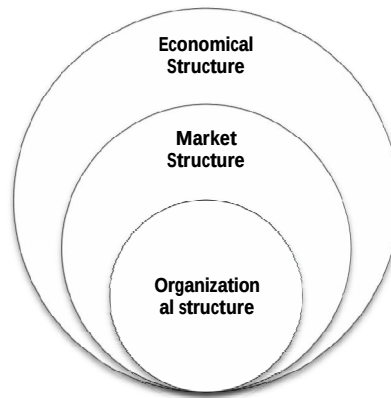


*Fig 1- Impact levels Of Research and development
(Miller & Morris, 1999).*

Economical Structure:

in this location are influenced by the activities of the general atmosphere of the economy and that of the industry in the communities and agency is it, for example, the Redwood trees of knowledge-based industry to the axis of the space of macro level or the level of the economy.

Market Structure:

In this position, this is known as the structure of the industry, the competitive status of the industry, the structure of supply and demand, competitors, customers, and the desirability of market developments level.

Organizational Structure:

organizational factors such as focus within Europe communication and organization structure of the ruling organization in these conditions within a total surface of how to have a research and development organizations in effect when he prays and uses of this is that the capacity of the organization structure and operation and use of the research and development activities to be part of the effect turns out. Also in the same model of factors affecting research and

development factors into two categories within the Organization and outside the Organization to have been classified:

a) Organizational Factors

Research facilities and equipment, management, information technology, resources, organizational culture and investment.

b) Organizational Factors such as Outsourcing

Global factors, regional and international relations, government policies at the national level and at the level of the industry, competitive position, industry, non-notable control

Generally, the position of the Organization in front of the organization within the factors, organizational factors out of CRP in front. Essentially, organizational change management, outsourcing agents and difficult for the organization by recruiting them it is necessary to adopt suitable strategies. Due to the fact that organizational factors outside the direct control of the non-directly under the control of the organization within the factors put more control over those factors [3]. Studies and evaluation of shows that the lack of effectiveness of research activities research and development units in the country, caused by bottlenecks and to remove some of them be pointed as follows [1]:

- *Lack of appropriate executive structure*
- *Poor management and lack of will of the parties on the use and application of research and development*
- *Major industries being imported and the lack of serious competition between these industries with domestic and foreign industry.*
- *Higher management attention than to fix the technical problems of the moment (operation), legal, financial,*
- *Administrative and etc, Towards expansion activities*
- *Lack of proper organization*
- *Lack of proper recognition, trust and confidence towards the research and development departments*
- *Heavy metals research expenses*
- *Weakness in the research and development required in the languages collection*
- *Lack of attention to the market and customer needs.*
- *Lack of facilities and equipment needed for the research in some units.*
- *Lack of communication and coordination between the departments of research and development for the use of researchers and research experiences and existing research facilities and equipment.*
- *Do not use the device in other times of non-research departments and investment again to order the same devices*

Research and Development Performance Measurement Indicators

Despite the problems, and the problems mentioned in the previous section, the researchers sought to overcome these challenges, different models for evaluation and performance measurement research and development units have been specified. Studies on the development and its evaluation of how to package the Organization and structural and industrial activity and with what level of activity and what are its duties, different indicators.

The Organization for cooperation and economic development, about 50 years ago for collecting information about the resources assigned to the scientific research and experimental work with specialists instructions member countries.

Another important advantage of assessing research and development is the use of information obtained by comparing the data within is easily possible. In other words, the human and financial resources that can be corporations, universities, industries and countries

are allocated to research and development; difficult to compare directly with each other. Another advantage of assessing research and development ease to collect information at the level of regular and consecutive part and is a country [4] Also, Pappas and Remer (1985) in qualitative and quantitative research methods of performance measurement will correspond to the types of research investigations, which have put the mentioned in the chart shown below, much of the fundamental research to the development of research, moving from a more quantitative performance measurement systems will use [4]:

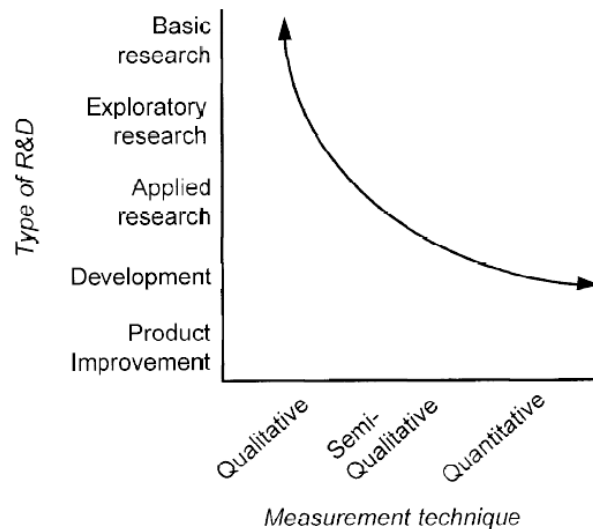


Fig2- The relationship between the different performance measurement research techniques (Pappas and Remer, 1985)

Research literature

In a review of the theoretical literature and for performance of the described models in relation to research and development, there are two categories of models: mathematical models that are experimental and the econometrics method through the amount of cost impact conducted during the process or the structures of research and development at the level of the Board. These models are the amount of opportunity cost and the relationship between these types of costs with the overall efficiency. II. Conceptual models of experimental models of geometric mathematics than that of quantity are lower and it is the subject of research and development for the whole is divided into two regions:

- 1) the model from the viewpoint of organization) resources and design the structure of the subject of the role of research and development.
- 2) model on determinants of strategy and organization at the so-called research and development; strategies to advance the winners are known.

Research and Development, Innovation and Growth and Productivity (Bogliacino & Pianta, 2012)

In a model provided by Bogliacino and Pianta (2012) and from the new innovation model Schumpeter and the concept of reading and the development of it, the existence of a relationship between circular and increasing the activities of research and development, innovation and growth and interest and efficiency.

Research and Development as a Process System

(Brown and Svenson, 1988 Quoted from Ojanen & Vuola, 2003)

The purpose of this model is offered by these two authors to determine the efficiency of research and development is the subsystem of the system to the categories processing system, the system receives the output gains, the implications, the scale of measuring scales within the processes, outputs and measuring scale implications can be classified [7].

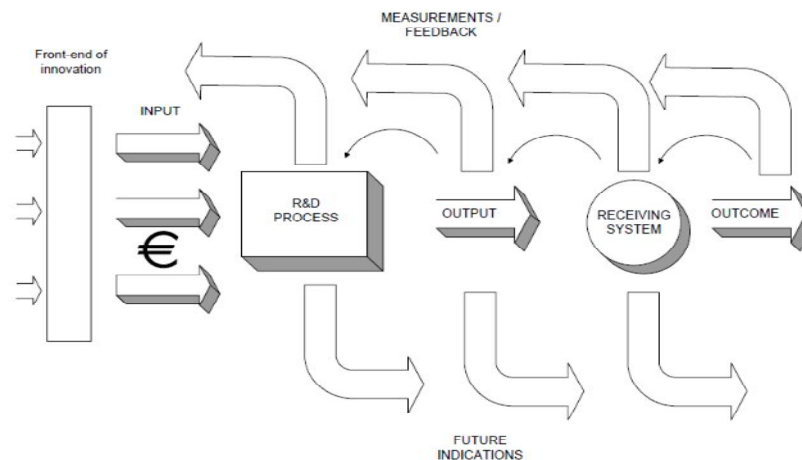


Fig 3- Research and development as a process system
(Brown and Svenson, 1988 Quoted from Ojanen & Vuola, 2003)

In the same or within the Department and input to the research and development system can be of the manpower, equipment, knowledge, ideas, and resources needed for the activity. Typical processing system as well as research and development laboratories that research and development input by and report the results to the output

Convert. The output is the same as research and development; it also includes the production, products and processes, know-how and inventions. The recipient of the systems research and development as well as production, marketing, engineering and other units. is the same as the main achievements of the results include lower costs, improve sales, improve product and abstain from is a valuable asset to the Organization, and which are measured [8].

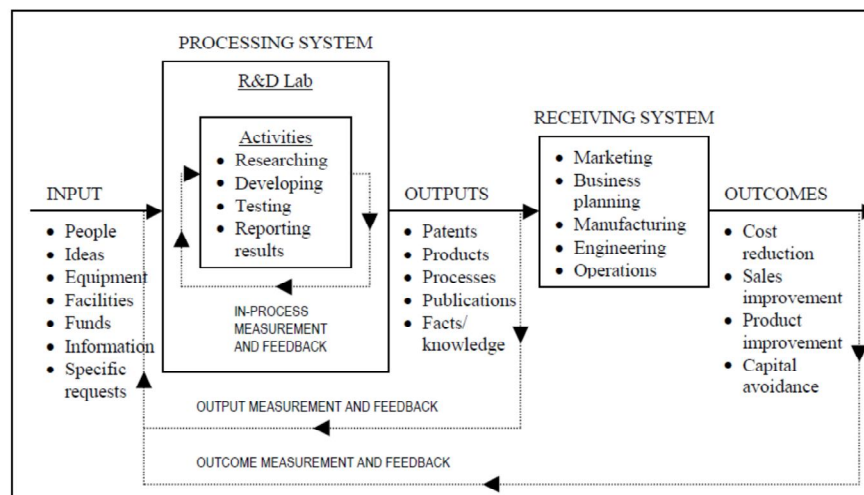


Fig 4- (Brown and Svenson, Quoted Ramli from 1988, 2004)

Integrating Marketing and Research and Development (Gupta et al. 1986)

As part of the relationship between marketing and research and development; d to develop the sales and market share was noted and thus increasing the profits of the most major reasons is marketing a company. According to the Mission of these two units is identical in principle [9] As well as the root of the relationship between the two units can be found in the second generation of studies on the generation of research and development as well as follow [10] A theoretical framework for the study of the integration between research and development and marketing in the scientific literature by Gupta and colleagues (1986). Within this framework, it is assumed that the strategy, organizational and environmental factors, individual factors are determining the levels of integration between research and development and marketing and as a result of the success of the new product development will help [11].

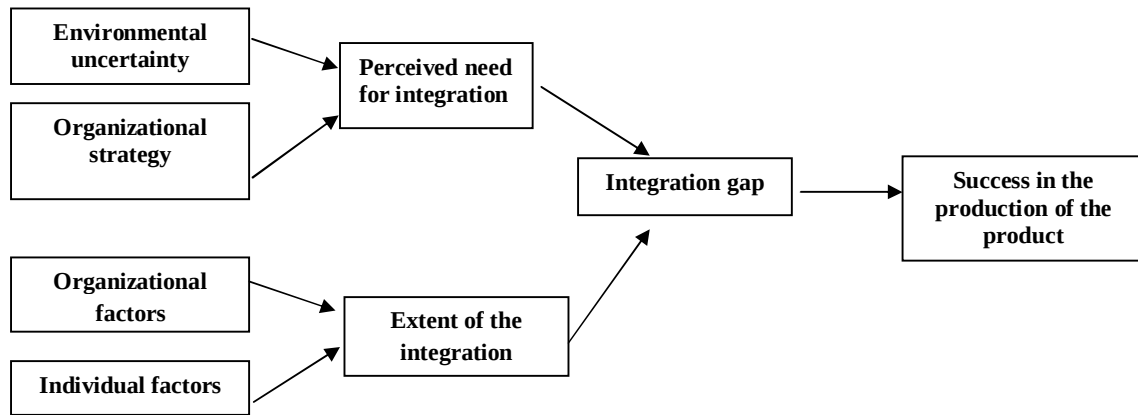


Fig 5- (Fain et al, 2011)

Theoretical Framework of the Relationship between Research and Development and Marketing (Gupta et al, 1986)

The logical basis of this model is based on three main concept is one is that the degree of integration of the marketing and research and development requirements depends on the company's new product strategy and understand its environmental uncertainty.

And the other being the ability of the company for success in integrating research and development and marketing of an impressionable two:

- (1) Organizational factors such as the structure of the remuneration system
- (2) Social and cultural differences among managers of research and development, marketing managers. As shown in the model, the gap caused by differences in understanding the need for integration, and new product development are expected to reach integration [11].

Pioneer research and development (Richtnér, a. and j. Rognes, 2008)

In this model, which is based on interviews with a number of international entrepreneurs has been formulated, based on follow up a question has been raised [12]: the activities of

multinationals research and development how to organize production and markets in multiple sites.

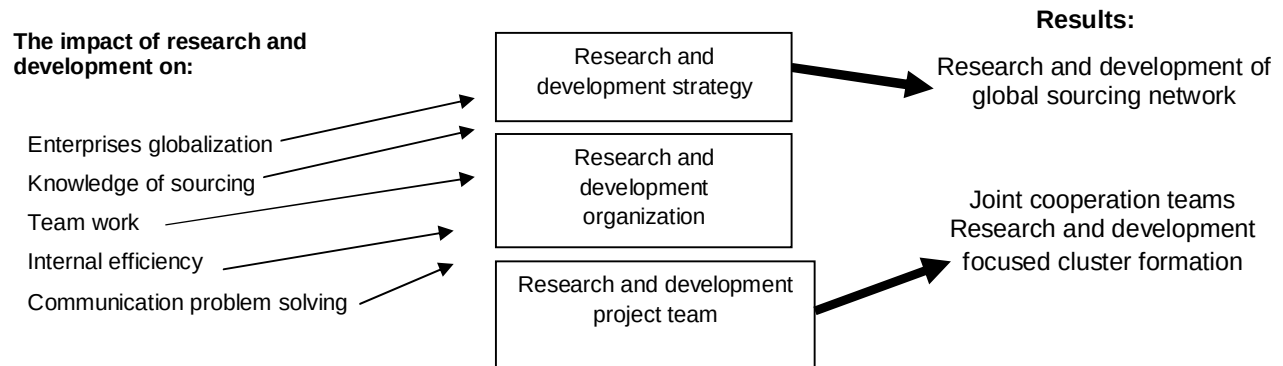


Fig 6- (Richtnér, a. and j. Rognes, 2008)

The main determinants and Trends in International Research and Development (Von Zedtwitz & Gassman, 2002)

This model is often an article related to the subject of research and development drivers was used due to States that increase the cost of research and development in the great attention the country Manager of the company, can be internal to the research and development of research and the development of international guidelines [13].

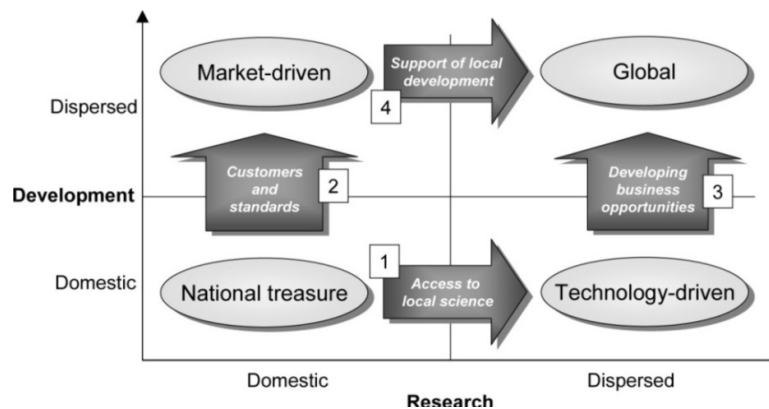


Fig 7- Determinants and trends in international research and development (Von Zedtwitz and Gassman, 2002)

The other main determinant factors of affecting the location of research and development ; d activities, expressed by the two scientists to pay attention to the level of market access and the need for access to the international science and technology reference. On this basis, the four organizational evolutions process that the original pattern of the four international research and development; d lead, be obtained include:

- 1-direct research and development that having both those within the company (focused).
- 2-the market-driven research and development focused on it to be dispersed.
- 3-axis technology research and development that is focused on a decentralized basis.

4-global research and development research and development that it is completely decentralized.

International Research and Development (2001Chiesa,)

Discussion on the model of the thread causing a kind of focus and lack of focus on research and development has been interpreted about the investigation of external and internal sources of knowledge can be explained and claims that the dominant approach in research and development towards becoming an international issue. The interpretation of this general trend of the international points of R&D here. On this basis, the two major factors that factor and appears on the selection of an effective international structure is as follows [10]:

1. Need access to external sources of knowledge related to the innovation process and shortens the time-related needs in obtaining optimal use of native building, and this knowledge in the way of innovation.
2. Get international R&D there are a number of processes often result in out-of-company in both local and global level, i.e. in other words, the degree and extent of dispersion of the company R&D resources, the key factor is another structure affect the output.

External Sources of Knowledge

Need to access multiple resources for the operation and use of knowledge for innovation, the main conduit for international R&D interpretation. Innovation process technology-related knowledge, related to both technology-driven and market-driven. While, as mentioned access to resources it traditionally as a major reason for the lack of concentration is R&D, but this article also should be noticed that the process of innovation is needed to interact with a number of resources that are not merely technical [10]

In the category of development activities from day to day is important in order to be able to have access to key sources of knowledge in our market (users of the template and guide to key customers), which makes the win and advance innovation dynamic new product ideas, and solve technical problems that are often the source of innovation processes,.

Access to the knowledge resources (both market and technology) as a way to reduce the time and based on access to the market in the short term, competition has been that the process of accumulation of knowledge over the long term will also quickly. Therefore, the external sources of knowledge on the distribution of the international structure of the R&D in any investigative activity twofold and influence development activities.

In organizing a company, in this model are to form structures that ensure access to external resources related to knowledge as well as possible. For example, scattering more external sources of knowledge, the more scattering of R&D structure. The analysis of the data shows that the rate of dispersion of external sources of knowledge is influenced by two factors that technological knowledge resources in order of scattering and dispersion of knowledge resources will affect market [10]:

1. The nature of the innovation process: need access to multiple resources have increased technical knowledge to work involved in technological innovation incremented. If certain innovation relies on the ability to integrate different technologies, the possibility of their existing technology within the company that are not available, that is, the availability of external resources.
2. The degree of diversity: the need for increased access to foreign sources of knowledge of the market with the approach of the distinction between national and regional markets.

It should be noted that although both of these factors are unique to the industry, the impact they have on the international structure of R&D is also dependent on the specific variables to the company. Need to access external resources, a function of internal knowledge resources accessible and available. For example, if a company has the knowledge resources of the art in a particular field and the Interior is available, require the use of external resources will not be out of the country.

Also, as mentioned above, the extent of the impact that the international structure of market differentiation R&D, depends on the company strategy this strategy is based on the civil responsibility, or relies on the global approach.

R&D internal resources:

Companies from wherever is inclined to use internal resources to innovation and have it R&D process cycle which can lead to a world-class innovation. To use a slight superiority this could be developed outside the company to exploit the global level need there. International R&D structure design means to identify the units and leveraging it capabilities at the international level and defining and attributing responsibilities at the global level.

The second critical variable influencing the structure of R&D (both in the research and development activities) seems to be that the degree of dispersion of the company's key resource and technical. Internal R&D dispersion-dispersion structure between the more R & D makes. Whether and to what extent a company their R&D spread resources, appears to be strongly dependent on two basic factors [10]:

1. R&D is a division of Labor: in fact, possible to create a part in the structure to the intrinsic nature of the R&D name to the severity of the impact of technology. For example, if the telecommunications and electronics industry with the petrochemical and chemical industries, the comparison is determined that in the first case, models and products can also be divided into independent potential systems that fit a predefined data type), and then connect to each other. This makes the Division of labor between the different units and the units specialized in various fields. But the chemical industry, the nature of the products and the production process often creates the possibility of dividing the work reduces to R&D so that it is necessary to the process of innovation technology in a physical location. This would affect the designed structure and prevents the implementation of R&D structures, for example in the chemical companies, because it is in the research and development activity should be split between different units. This would explain why the behaviors of the company of an industry to another industry help.
2. The management company culture: another factor that affects the dispersion of a company affects R&D, its management culture. This variable is set, the amount of the company's desire to concentrate their activity or lack of concentration and dispersion rate also reflects the company's resources are affected, as a result of the process of creating a starting point of the international structure and, ultimately, affect the structure on the result. Since this is a specific agent, helps show how a company may conduct moss grows in the same industry are also different. Today, companies with a strong tendency to focus the force to create a tool for the integration of units between expansive and complex structures resulting from the choice of different units in a co-ordinate way. On the other hand companies with a strong focus on culture tend to enforce the structures.

An example of the coexistence of different structures in the same sector, a development of the activities of the State in the electronics industry. Companies with the tradition and culture of the (such as Japanese competitors) out there that only recently began to operate outside of the

country with R&D (for external knowledge resources with dispersion), and a simple structure such as specialized support units have been implemented. European companies in the same industry (mainly focus on a strong tool for culture) to the severity of his R&D in the past two decades have expanded.

They are going to set up a laboratory set up integrated structures. The framework presented in the figure below the factors affecting the structure of R&D shows:

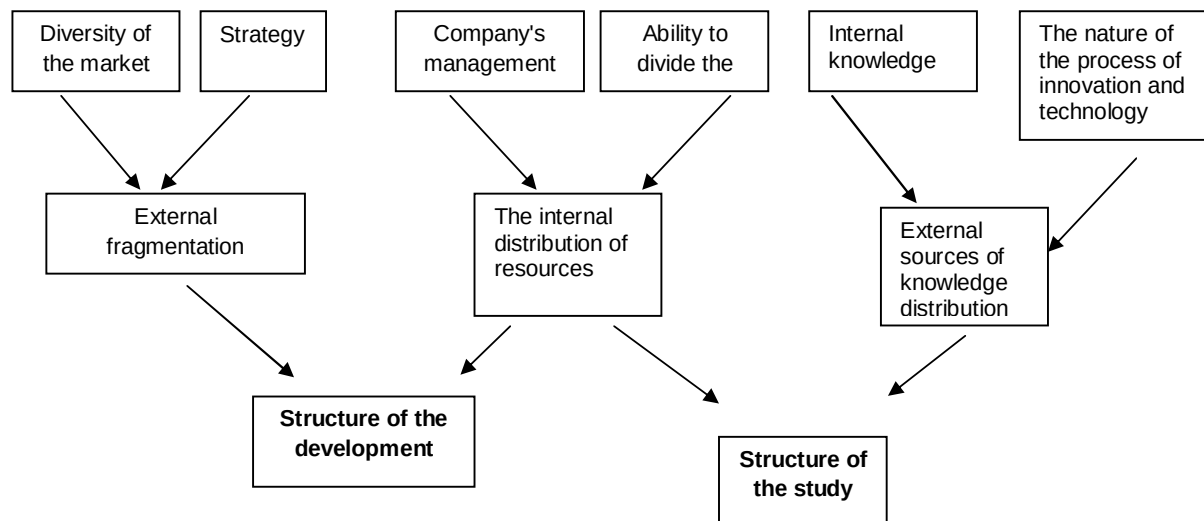


Fig 8- Factors affecting the selection of international structure (Chiesa, 2001)

Based on this model, the framework shown in figure shows the factors that affect the structure of R&D. Companies tend to make certain structures in the long R&D that strengthens them in the short term and of its support to the competition. The following two forms a brief relationship between the kinds of device structure with the two changes described above (the amount of dispersion and degree of dispersion of the company resources external resources). Matrix for both research and development activities have been made. Of course, the proposed framework should be used with caution. Virtually every area of the four matrixes with each other have overlap in a way that is not clearly the boundary between them.

Presented in the form of framework proposes that the incentive to go out on the research and development of different (scatter market knowledge resources in front of technological knowledge resources dispersion). In addition to the history of the company (R&D resource distribution inside) may be used for research and development have differences with each other.

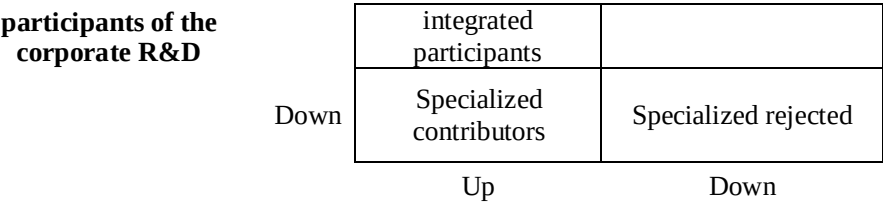
This framework shows that the two factors are related to the company (such as strategy, management culture, the level of knowledge of internal available) and related industry (such as the diversity of the market, the Division of labor, the nature of the nature of the technological innovation process) on the two external sources of knowledge and dispersion-dispersion affect internal resources that are also effective on the final structure of the R&D in turn. Factors related to the company because of the differences described in part help while factors related to the industry, can be the cause of differences between part explains.

Selection of international structures in development activities (Chiesa, 2001)

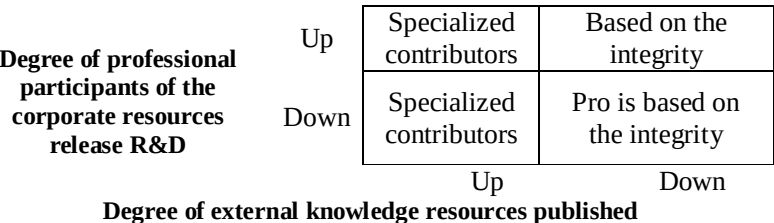
degree of dispersion of resources, professional

Up

Specialized laboratory	Specialized laboratory integrated participants
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Select research activities in international structures (Chiesa, 2001)



Research and development model based on organizational learning

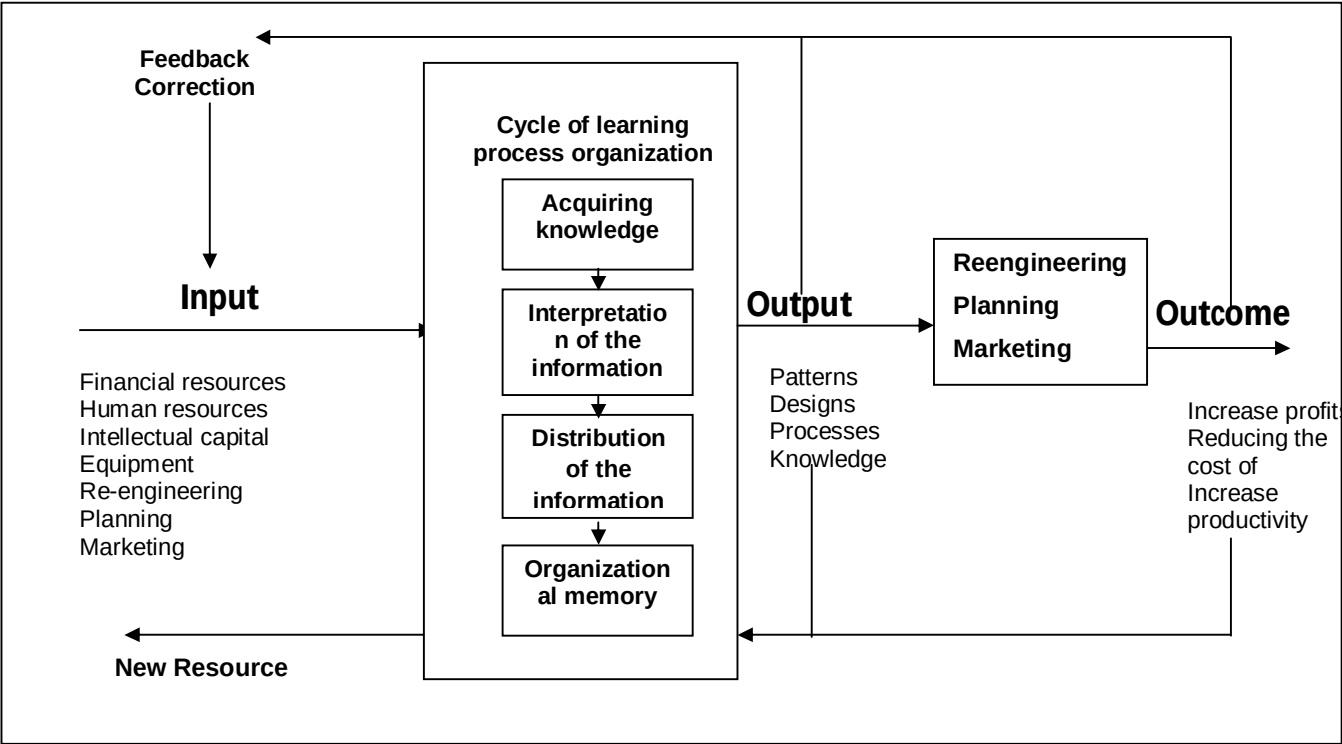


Fig 9- Research and development Model Based on the organizational Learning

In this model the entries include hard and soft factors in the Organization are considered. Software agents include human and intellectual capital in the process of learning and a stage in the lifecycle and the memory organization. In this case, is considered as a knowledge organization. The process of knowledge to help Ned that exits in the first stage to be spiral or reenter new resources in the design, engineering and research and development planning. At this stage the Organization has learned and can be the final output, such as increased profits, productivity and cost reduction along with.

Resources

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