

**R&D Structure:
Centralization vs. Decentralization**

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1.Introduction

As the privatization has grown in the world, small businesses started to option more market share and compete with each other.

“Whatever customer wants” defined as quality and they try to become more and more customer oriented.

Customers want innovative products and this need forces the companies to research and development. Slightly, research and development (R&D) becomes as an important division within the most of successful companies.

Necessity of organization leads to define divisions, roles, functions and their relationship clearly within an organization. So R&D as a uterus of technology needs to organize at one’s best.

Small businesses become big and their organizational chart becomes more complex, sometimes. In this circumstance, management knowledge should helps to solve the organizational problems.

Centralization or decentralization in R&D is one important issue related to organization. In this paper has been tried to analyze and evaluate some pros and cons of centralized and decentralized R&D department. Also its relation to globalization, multinational company and culture discussed.

2. Definitions

When centralized vs. decentralized and centralization vs. decentralization evaluated, pros and cons of each one should be discussed for companies with different circumstances.

When we talk about centralization we mean the authority to make important decisions is retained by managers who are in top of the hierarchy

in an organization. In the other hand, centralized organization retains their power, authority and key decisions at highest level.

When an organization is decentralized authority to make a decision delegates to managers at all levels. In these organizations empowerment of employees will occur and decisions are made closer to the immediate area affected. Organizational resources allocated by manager at all level and new projects will initiate by lower level managers.

Decentralized companies have ability to react to changes quicker and so they are usually more succeed in crisis management.

3. R&D structure

All departments in an organization need to a proper structure. If their structure design strong and fit enough, effectiveness will improve. So, R&D managers should know the properties of the people and tasks in R&D and then try to determine work flow, structure and model of organization in R&D.

Specialists are unmanageable, usually. Also creativity and innovation needs to more freedom and it means less direct control. Besides, R&D Activities need to easy communication and collaboration decisions. As a result, flat structure with the least hierarchical level will better fits to R&D department, because tall hierarchical model slows speed of communication. Also more level of organizational chart means more distortion because of the number of people who cite the subject.

Another point is more advantage of team working that could be useful in R&D's structure. A team has a leader who selects through team members

by themselves. So they obey him/her easier than other shapes and it will increase the effectiveness.

Finally, informal relationship helps to have a better and proper communication, out of the organizational relations and should be considered by managers.

Anyway, assume that we have a few teams. They will be able to communicate with each other easily, because of the small size of department. That group can manage by one guy at the top. So this model is centralized.

Now if our company becomes multinational, globalization occurred or size of R&D becomes huge, which structure will be fit to R&D department better?

One response may be decentralized model, but it should be assess and analyze exactly.

Therefore we start assessment of centralization and decentralization advantages and disadvantages hence.

4. Centralization evaluation

As mentioned if more key decisions are made by top managers of an organization, structure is more centralized. This shape of management has some advantages and also several disadvantages.

If we consider R&D as an organization we can allocate all features of centralized organization to R&D.

Control is more over centralization because sub-division is closer to top managers. Therewith coordination will facilitate because of the same reason.

One or some constant people make decisions, so consistency of decisions will see there.

When all departments managed centrally, Changes will made easier and faster. For this claim first reason is reducing bureaucracy. The next reason is self-idea exert reduction, and the last reason is resistance of powered guys (managers) against the new decisions that will be decreased by centralization.

By this model of organization fixed-cost will reduced because of duplication avoidance. So when fixed-cost in an organization is high, they can focus on centralized model of organization.

Meanwhile for taking advantage of "economy of scale" centralization offered, similarly because of duplication avoidance.

When bureaucracy reduces, communication costs will be dropped. Further, allows people to share information easily.

Documentation as an important key factor should be near the heart of technology (R&D). In order to keep documentation specialists closed integrated with R&D department, centralization is preferred.

Obviously by this model, activity time and as a result cost will be decreased. Also common management style and systems, and then shared culture is well-known by centralized management.

Having equal culture is a benefit for every organization, because of the easier decision making. In such an organization, assessment could be done

by minimum sample of population. Also existence of a shared culture in an organization can made cooperation easier.

These are some reasons for the companies that prefer centralization in R&D even in huge size. Microsoft Company was one of the five industrial R&D inventors in 1999 that has been managing centralized.

5. Decentralization evaluation

There are a lot of activities in the world that moving toward decentralization.

For example in computer and especially networking or in electronics particularly control branch, decentralization obtains a big share of that knowledge and the specialists tend to design and implement a lot of project decentralized.

In other sciences, such as management this issue is fresh, nowadays and we will explain why it happens.

Usually, decentralization comes with multinational or international companies. Statistical evidence suggests that most activities of R&D in these companies still remains at corporate headquarter. For this first reason is to keep secret information to the competitors. The second reason may be proximity to a single best site for doing research in that industry.

One exist instance for this claim is the U.S automobile industry Detroit. They take advantage of nearness to the customers and suppliers. Similarly chip design might best be done in Silicon Valley, because of the technical skills and information that is available there.

Anyway, like any other idea there are some reasons that support decentralization.

Decentralization means fragmentation and it means more flexibility. Also in this model decisions will be made closer to the information sources.

What we can find out in some centralized organization is tallness and as a result lower level of control. By decentralization this problem will be solved because of proximity of manager and smaller size of sub-divisions.

Creating motivation for employees is important and sometimes difficult, particularly for specialists in R&D department. By reducing number of hierarchical levels that occurred by decentralization sometime, nearness of managers to the employees happens. As a consequence more motivation beside more accountability will be seen.

Decentralized R&D is more flexible because of its size. Smaller size organizations are able to respond to the environmental changes better and faster. Also they meet customer needs more effectively.

Some lateral benefits such as better TQM implementation comes with decentralizations.

For international or multinational companies decentralization in R&D is seen as a way for being closer to the customers. By this strategy, R&D unit will be able to absorb know-how from the local market.

Decentralization enables innovation, because of more authority. As referred innovative activities need to more freedom that could be found by decentralization.

Another motive is adapting advanced technology in host country. Sometimes growing share of knowledge-workers in host country leads to decentralization.

Increasing synergies between parent and subsidiaries is a good motive for this model.

Cross-cultural communication of local market and mother country will dissolve by decentralization and nearness to customer.

It seems that globalization of the world's economy may change the pattern of R&D structure to become more decentralized.

There are many reasons and thinking for making decision about being decentralized or centralized and it is a complex decision and it may be a long-term process to determining structure of R&D in an organization.

6. Some related points

R&D activities can be divided to three types of incremental, applicable and radical. Research and development acts as one of these models.

In radical R&D that allocates 10% to 15% of research budget usually done by creative people at the university and its outcome is theories.

Applicable researches done by innovators and allocates 25% of industrial research budget, that academic and industrial researchers do these activities together. Outcome is a new product in this type of activity.

The last type of R&D activities is incremental or developing research. Producers use this type of R&D activities and about 60% of their research budget have allocated to that. Increasing market share and effectiveness of

that organization are resulting of this activity that usually done by entrepreneurs.

There are a beautiful relationship between centralization, decentralization and types of R&D activities. Table 6.1 shows this relation.

	Category of R&D Activity	Nature of R&D
Decentralized	Incremental	Engineering-based application focus
Centralized	Radical	Deep or science-based R&D

Table 1

Another point is management style in relation to foreign R&D activities that can use by multinational companies divided to four models:

1. Absolute centralization
2. Participative centralization
3. Supervised freedom
4. Total freedom or absolute decentralization

Most of the firms exhibited the second and third management style. Firms with a home market orientation tended to be more centralized than world market or host market. High-tech industries such as electronics and chemicals tended to use participative centralization management style.

7. Conclusion

Managerial experiences show that switching between centralization and decentralization is too difficult and needs to long time. Also selecting one of them in order to use in R&D structure is critical task that should be done carefully.

Managers know that decentralized R&D management is more difficult and more complex and obviously needs to more expertise. So we strongly suggest to the managers that act with open eyes in this area, otherwise they will make a risky decision and may constrain to pay heavy costs.

8. References

1. Joseph L.C Cheng , Douglas S.Bolon - The Management of Multinational R&D - The Ohio State University.
2. Robert R. Wiggins - Strategy Implementation: Organizing for Action
3. Identification And Analysis Of Public Policy Issues
4. The Strategy and Organization of International Business
Technology Review 122 - 2002
- 5.Erik Frinking, Mari Hjelt, Irma Essers, Pivi Luoma, Sami Mahroum - Benchmarking innovation systems: Government funding for R&D - Rand Europe - Helsinki 2002
- 6.Peter Dobers - Gothenburg Research Institute - 1997 - Sweden - Strategies For Environmental Control
- 7.Japanese Strategies For Gaining And Sustaining Competitive Advantage Through Software
8. Jens Froslev Christensen - 2002 - Corporate Strategy and The Management of innovation and technology
- 9.Myong Hun Chang - Joseph E. Harrington, Jr.- 1998 - Organizational Structure and Firm Innovation in a Retail Chain - Kluwer Academic Publishers
- 10.Gerald A. McDermott - March 2000 - Reinventing Federalism: Governing Decentralized Institutional Experiments in Latin America - The Wharton School University of Pennsylvania
- 11.Nienkem N.Beintema , Luis J.Romano , Philip G Pardey – July 2000 - Agricultural R&D in Colombia

12. Suzanne Harrison , Patrik H.Sullivan Sr –2000 - Profiting from Intellectual capital Learning from leading companies – California USA
- 13.Miriam Heller, Ph.D. - Life-Cycle Infrastructure Risk Management : R&D Needs – 2002 - Palisades, New York
- 14.Mette Praest Knudsen - Knowledge flows and echnology transfer – 2002
- 15.Jorge Niosi - The Internationalization of Industrial R&D From Technology transfer to the learning organization – 1999 - University of Quebeq
16. Prof. Dr. Michael Dowling - Strategy Formulation and Implementation in a Global Environment - April 29, 2002
- 17.Bartlett and Ghoshal -The Organization of Multinational Corporations (MNCs) – 1989
- 18.Micael Gleonnec - The Collective Structuring of innovation
- 19.Developing New Products for Global Markets Standardization versus Adaptation
20. Matching Structure & Control To Strategy
21. Bernard Franck , Robert F. Owen - Fundamental R&D Spillovers and the Internationalization of a Firm’s Research Activities - February 2003 – compuserve
22. Patrick Waelbroeck - Innovations, Production Complexity and the Optimality of R&D - August 2002 - Free University Brussels
23. Nicolas Carboni , Roger Miller – Managin Innovation In The New Economy A Collaborative International Program In The Management Of Innovation

24. Paul N. Doremus - The R&E Tax Credit: Rationale, Structure, and Performance – 1998 - National Institute of Standards and Technology
25. Francesca Sanna-Randaccio , Reinhilde Veugelers - Multinational Knowledge Spillovers with Centralized versus Decentralized R&D: a game theoretic approach - December 2001 -University of Rome “La Sapienza”
26. Steve C. Rogers, Director, Worldwide Purchases Mastery - Designing a Supply Organization to Leverage Internal and External Opportunities - Procter and Gamble Company
27. Ming Fan - Decentralized Mechanism Design for Supply Chain Organizations Using an Auction Market - 2001 - Department of Management Science Business School University of Washington
28. Massimo Paoli , Simone Guercini - R&D Internationalisation in the Strategic Behaviour of the Firm - January 1997 - Science Policy Research Unit Mantell Building University of Sussex
29. Groove Brief - Decentralization: Architecture Matters - 2002 - Groove Networks,Inc.
30. Jianmin Tang and Someshwar Rao - R&D Propensity And Productivity Performance Of Foreign - Controlled Firms - In Canada - March 2001 - Aussi disponible en français