

RESEARCH AND DEVELOPMENT BARRIERS IN MANAGEMENT AND BUSINESS AREA: STRATEGIC MANAGEMENT OVERVIEW

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Abstract: Research and Development has become a reality of needs that must be met by business organizations and non-profit organizations. Business actors as organizations and as part of the industrial community in achieving *sustainability* are faced with how to transform in the digital transformation era and the era of the covid-19 pandemic in the form of real efforts through holistic strategic changes and new and contemporary ways of thinking. With the shift in business assumptions from conventional business to digital business so that the innovation paradigm is open, with the support of Research and Development assuming that knowledge that is efficient, high quality and widely distributed to form a digital ecosystem to become a " *digital highway* " with a collaborative spirit to build is strategic management quick reaction to answer the company's organizational problems.

Keywords: *Research, development, strategic management, information technology*

1. Introduction

The prolonged Covid-19 pandemic has created an era of rapid change and forced all sides of the economy and business to deal with it. Business organizations in carrying out business activities and their management are not only limited by the scope of environmental changes and dynamics that will directly or indirectly affect the management and life of business organizations so that the leaders of business organizations or companies must be able to respond to it by making policy adjustments as a form of implementing strategic management for his company.

Companies in carrying out strategic management require a process, namely the Research and Development (R and D) process to ensure objectives, accuracy, value of possible testing, replication, generalization, objectivity, savings, and accuracy and trust building (Ates & Bititci, 2017). R and D companies in the field of management and behavior, are not always able and possible to carry out investigations or research that is 100% scientific, in the sense that unlike physics or mathematics, the results obtained are guaranteed to be exact and error-free. This is especially the case in some areas of R and D companies that are faced with realities in the field because of the difficulties that may be encountered in measuring and collecting data in the subjective areas of feelings, emotions, attitudes, and perceptions.

These problems occur whenever R and D companies try to measure human behavior. Difficulties may also be encountered in obtaining a representative sample, limiting the generalizability of the findings. Thus, it is not always possible to fulfill all the scientific

advantages fully realized by the company's R and D as part of a strategic management policy (Dziyaba, 2016) . Comparability, consistency, and broad generalizability are often difficult to obtain in corporate R and D research. However, to the extent that the company's R and D research is designed to ensure the maximum possible purpose, thoroughness, and possibility of testing, replication, generalization, objectivity, savings, and accuracy and trust-building, it will become part of strategic management policy to address the company's organizational problems by solutions and alternatives can be found, namely by the deduction process or the induction process, or by a combination of both (Adriana, 2011) .

Deduction is the process by which a company's R and D research arrives at a reasoned conclusion by making logical generalizations from known facts. As a concrete example, for example, R and D company conducts research on a high level of performance in a marketing department because all members of the marketing force are high-performing, very proficient in their work, then it is a process in which R and D Companies observe certain phenomena and on the basis of this comes to the conclusion, in other words, in the induction of R and D the company logically establishes general propositions based on the observed facts (Winarno, 2018) .

Another concrete example for example, we see that the production process is the main feature of a factory or manufacturing process, therefore it can be concluded that the factory exists for production purposes. Both deductive and inductive processes are applied in scientific investigation. Theories based on deduction and induction help researchers or R and D companies to understand, explain, and/or predict business phenomena.

Starting from the fact that when research is designed to test certain hypothetical results, such as, for example, R and D Companies conduct research on whether controlling conflicts and disputes in the workforce is part of strategic management to improve individual performance?, then in solving the puzzle In this research, the R and D researcher begins with the framework of conflict theory, formulates hypotheses, and concludes logically from the results of the research, as a hypothetical-deductive method in the building blocks of the R and D investigation.

The building blocks of scientific inquiry are described by Sekaran (2006) , which includes the initial process of observing phenomena, identifying problems, building theories about what might happen, developing hypotheses, determining aspects of research design, collecting data, analyzing data, and interpreting the results.

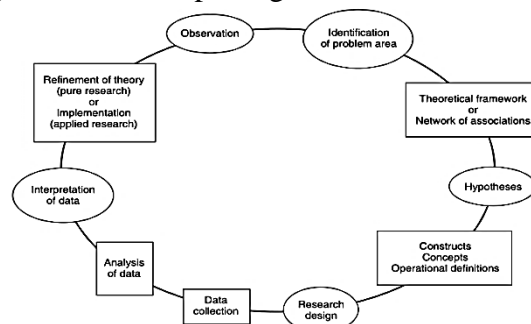


Figure 1. The building blocks of science (Sekaran, 2006)

2. Research methods

This research is a preliminary research collaboration between the Al-Abidin Research and Development Institute in Surakarta and research lecturers across the fields of economics,

applied mathematics, informatics engineering at Duta Bangsa University Surakarta, and STMIK Sinar Nusantara Surakarta. With the theme of developing a conceptual framework model of strategies to increase financial resilience in SME business organizations during the Covid-19 pandemic crisis through exploration of innovation capabilities, aspects of Collaborative Network, IT, and *Entrepreneurial Orientation* with an approach to the role of Research and Development in the strategic management area.

3. Strategic Management as a Research and Development Process

Strategic Management is part of the process of determining the goals of an organization, developing policies and plans to achieve these goals, and allocating resources to implement these plans. Strategic Management is the highest level in management activities, so strategic management is not a task, but a set of managerial abilities that are applied throughout the organization with various functions. Strategic management can be seen as a combination of strategy formulation and strategy implementation, but strategy must be closely related to its objectives. Strategy formulation involves analyzing the situation both internally and externally, micro and macro, namely setting goals, determining long-term vision and mission, overall corporate goals (both financial and strategic), tactical goals, and planning.

Implementation of strategic management involves the allocation of fairly diverse resources (financial, personnel, time, technological support), creating alternative courses of action or structures (eg multifunctional teams), assigning responsibilities to specific tasks or processing them for specific individuals or groups, organizing processes, supervising results, comparing with benchmarks, evaluating process efficacy and efficiency, controlling variations, and making process adjustments when deemed necessary.

Strategic Management is a process in which management takes initiatives with the permission of business owners to use resources and increase the productivity of their company. All actions must reflect the mission, vision, objectives and policies of the organization itself. This is done by designing and implementing programs that aim to achieve goals and the available resources must be used properly. Strategic Management is a managerial level action that prioritizes goals over strategy. Strategic management provides the direction the organization will take. However, this is not only limited to managers, but also directors and other shareholders in the internal management structure. Overall strategic management is an ongoing process that controls the organization and the industries that affect it.

Strategic management is centered on unifying management, marketing, finance/accounting, production/operations, research and development (R and D), as well as computer information systems to achieve organizational success, furthermore on the priority side of the Company's R and D researchers as part of Strategic Management are by compiling a theoretical framework, formulating hypotheses, and concluding logically from the research results in a hypothetical-deductive method that is strung on the building blocks of science.

There is a process of seven main steps in the Hypothetical-Deductive Method from the building blocks of science, namely Observation, Preliminary information gathering, Theory formulation, Formulate hypotheses, Further scientific data collection, Data analysis, Deduction (Sekaran, 2006).

1) Observation

Observation is the first stage, where Company R and D researchers as part of strategic management will feel that certain changes are taking place, or that some new behaviors, attitudes, and feelings are emerging in the corporate environment (workplace).

When an observed phenomenon is seen to have potentially important consequences, then the Enterprise R and D researcher will proceed to the next step.

How to observe environmental phenomena and changes? Managers as part of the Company's R and D personnel who are adaptively oriented and are always sensitive and aware of what is happening in and around the workplace. Changes in attitudes, behavior, communication patterns and styles, and other verbal and nonverbal cues can be easily observed, and analyzed so that a policy is taken by managers who are sensitive to various nuances, regardless of whether dealing with finance, accounting, management, marketing, or other matters. administration, and regardless of the sophistication of machines and the Internet, in the final analysis. When there is indeed a problem in the situation, the manager may not understand what is really going on, but can certainly sense that things are not as they should be. Likewise, if there is a record of declining sales, frequent production interruptions, or incorrect accounting results, low-yield investments, employee disinterest in their work, and the like, it can easily catch the attention of a manager affiliated with the spirit of R. and D Company, although to prove why it happened may still be an enigma.

2) *Preliminary information gathering*

R and D The company as part of strategic management conducts initial information gathering involving in-depth information seeking, from what is observed. This can be done by speaking informally to several people in the work environment or with the client, or to other relevant sources, thereby gathering information about what happened and why. Through this unstructured interview, a company R and D researcher gets an idea or "feel" about what is happening in the situation. After the Company's R and D researcher raises the level of awareness about what is happening, the Company's R and D researcher, can focus on the problem and related factors through further formal structured interviews with the relevant groups.

In addition, by conducting library research, or obtaining information through other sources, the researcher will identify how the problem has been handled in other situations. This information will provide additional insight into the possible factors that may operate in a given situation over and above factors that did not appear in previous interviews. Thus, a lot of information will be collected through interviews and library searches. The next step is to understand the factors that have been identified in the information gathering stage by bringing them together in some meaningful way.

3) *Theory formulation*

Formulation of theory, is the next step, in an effort to logically integrate all information, so that the factors causing the problem can be conceptualized and tested. The theoretical framework that is formulated is often guided by experience and intuition. In this step critical variables are examined for their contribution or influence in explaining why the problem occurs and how it can be solved. The identified network of associations among the variables will theoretically be woven together with justifications for why they might affect the problem.

Corporate R and D researchers are faced with several questions about why a theory should be formulated whenever a problem is investigated, and why an individual R and D researcher cannot act on the information contained in previously published research findings, while conducting a literature survey. There are several reasons for this. One is that different studies may have identified different variables, some of which may not be relevant to the situation at hand. Also, in previous studies, some hypotheses may have

been substantiated and some have not, presenting a confusing situation. Therefore, problem solving in any complex problem situation is facilitated by formulating and testing theories relevant to a particular situation.

4) Develop a hypothesis

Formulating a hypothesis is the next logical step after the formulation of a theory. From the theoretical network of associations among variables, certain testable hypotheses or educated conjectures can be generated. For example, at this point, a Corporate R and D researcher might hypothesize that if a sufficiently representative number of goods and brands were stocked on a supermarket shelf in a potential sales area, customer dissatisfaction would be greatly reduced. This is a hypothesis that can be tested to determine whether the statement will be supported and proven. then testing the hypothesis is called deductive research.

Sometimes, a hypothesis that was not originally formulated can be generated through the process of induction, that is, after the data is obtained, then some creative insight occurs, and based on that, a new hypothesis can be generated to be tested. Generally, in research, hypothesis testing through deductive research and hypothesis generation through induction are both common.

5) Further scientific data collection

After the development of the hypothesis, data with respect to each of the variables in the hypothesis need to be obtained. In other words, further scientific data collection is needed to test the hypotheses generated in the Company 's R and D research . For example, to test the hypothesis that stockpiling sufficient goods will reduce customer dissatisfaction, a Company R and D researcher would need to measure the current level of customer satisfaction and collect further data on customer satisfaction levels whenever sufficient quantities of goods are available and available. for customers. Data on each variable within the theoretical framework from which hypotheses are generated should also be collected. The data then becomes the basis for further data analysis.

6) Data analysis

In the data analysis step, the collected data is analyzed statistically or using a recommendation system algorithm analyzer to see whether the resulting hypothesis has been supported. For example, to see whether inventory levels affect customer satisfaction, it is possible for a R and D researcher to conduct a correlational analysis and determine the relationship between the two factors. Similarly, other hypotheses can be tested through statistical analysis or using an appropriate recommendation system algorithm analyzer.

Quantitative and qualitative data analysis can be performed to determine whether certain allegations can be substantiated. Qualitative data refers to information collected in narrative form through interviews and observations. For example, to test the theory that the budgeting process is an important and complex activity at the same time, because it has a functional or dysfunctional impact on the attitudes and behavior of organizational members. Budgets that are too pressing tend to lead to an aggressive attitude of workers (subordinates) towards management (superiors) and cause tensions that allow the budget to cause inefficiency. This can happen because the budget is prepared too rigidly or the targets set in the budget are too difficult to achieve. The budget that will be used properly will be a positive auxiliary tool in setting work performance standards, in encouraging the achievement of targets, in measuring results, and in directing attention to areas that

require investigation by the Company's R and D researchers in the field of *Budgetary Participation*.

Budgets prepared in a participatory manner reflect that important decisions in the budgeting process are made in groups rather than individually. Participatory budgets are more likely for managers (as subordinates) to negotiate with their superiors about possible achievable budget targets. According to (Brownell & McInnes, 1986), budgetary participation is the level of involvement and influence of individuals in the preparation of the budget while (Lau & Tan, 2003) states as a process subordinates / budget implementers are given the opportunity to be involved in and have influence in the budget preparation process.

7) *Deduction*

Deduction is the process of arriving at a conclusion by interpreting the meaning of the results of data analysis. For example, if it is found from data analysis that in a corporate organization where the budget is the most dominant factor in measuring the performance of subordinates, then this condition is called budget pressure or *budget emphasis*. When the budget is used as a measure of the performance of subordinates in an organization, the subordinates will try to improve their performance with two possibilities. First, improve *performance* so that the realization of the budget is higher than previously targeted. Second, loosen the budget at the time of preparing the budget. In addition, another reason lower-level managers try to make slack is to increase the opportunity to earn more if the awards given are characterized by budget achievements, then they will tend to build slack in their budgets through a participatory process (Waller, 1988).

Based on this deduction, the Company's R and D researchers will make recommendations on how the problem of "Budget Emphasis" as the only performance measurement for management uses the construction of performance measurement instrument indicators, the budget as a benchmark for performance, achieving targets, increasing the budget and achieving budget targets.

4. Business Information Needs in Strategic Management

Running a business requires data that is useful, timely, accurate, reliable and valid. When data in raw form is evaluated, analyzed, and synthesized, useful information becomes available to managers that helps them make sound business decisions. For example, figures for gross sales, profits, and the like, are descriptive data, which is certainly informative for managers (eg, the number of dollars received from selling products, and how much profit the company earned). However, they did not give any indication of the steps the company could take to drive its growth further. An informed decision (for example, which sales strategy the company should adopt) will be a function of analyzing this data and synthesizing it, in conjunction with other relevant information relating to different regions, regional sales statistics, competitors' sales and strategies, and Likes.

Information gathering, communication, and decision making go hand in hand. The information age has enabled managers to collect vast amounts of data in a short period of time and make informed decisions based on their analysis and interpretation. Almost every organization must engage in research at some level in order to remain competitive. Companies collect data on an ongoing basis, both from inside and outside the organization, regardless of whether they call research the activity or not.

For example, companies engage in the first step of the research process when they collect data from the external environment to assess market trends, competitive practices, and new products. It is also research when they review the effectiveness of internal policies and procedures, or assess the performance of their own products. Other internal information gathering areas typically used by businesses relate to accounting, administration, budgets, finance, sales, marketing, human resource accounting, employee surveys, and the like. Internal and external sources of information often overlap, as when external research on customer preferences, financial markets, and economic indicators determines internal decisions about product lines, marketing strategies, and distribution systems.

The methods used to collect, analyze and synthesize information from the external and internal environment are becoming increasingly sophisticated due to the scope of technology and internet network facilities, which enable timely and efficient research to be vital to the survival of the company.

There is a shift in business assumptions from conventional business to digital business so that the innovation paradigm is open, with the support of Research and Development assuming that knowledge that is efficient, high quality and widely distributed to form a digital ecosystem to become a " *digital highway* " with a collaborative spirit is a representation achieving *sustainability* and being part of strategic management in responding to the challenges of the company's organization, which include:

1) *Manager Information and Decision-Making Systems*

Digital technology has been useful for research, especially in collecting, storing, and analyzing information. This includes all electronic interactive media, information technology, Internet and Intranets, *search engines* , *cloud computing* , *databases* and *big data* (Brauers et al., 2008) . As organizations take on expanded functions and grow in size, it is important for them to be equipped with good information systems from which data can be accessed for analysis by executives and managers at different levels (Turban et al., 2006) .

Implementing an effective information system requires careful architectural planning. Computerized information systems enable efficient operation of different subsystems in the organization because information for each area such as finance, budget, plant maintenance, transportation, distribution, marketing, or human resources, can be easily retrieved by any department.

2) *Neural Network*

Neural Networks are designed to track patterns in a data set and generalize about them. This software enables sales forecasts, stock market predictions, weather pattern detection, and the like. Brainmaker California Scientific Software used to manage investments by recognizing patterns and trends that affect stock prices can be cited as specific examples (Engleberg & Wynn, 2017) .

3) *Enterprise Resource Planning*

Enterprise Resource Planning (ERP) packages from software companies that offer integrated all-in-one business applications are slowly replacing traditional manufacturing, finance, and order entry applications, which are usually "partially and fragmentedly designed" and do not allow integration easily (Zappia, 2011) . The trend is to integrate various ERP packages using " *best-of-breed* " criteria for specific applications for specific solutions and for industry specific requirements. For example, the needs of pharmaceutical companies are different from the needs of car

manufacturers, so they need to be calculated accurately and measurably (Brauers et al., 2008) .

The advantage of an ERP package is its ability to provide a comprehensive solution for all the needs of an organization in day-to-day work. This is because they provide complete support for executive support systems and Management Information Systems (MIS), and can work with all existing databases built on different platforms (Rosenfall et al., 2008) . Software developers use various tools to build and modify data tables and develop custom functionality. ERP solutions were initially targeted at large companies and organizations that had to reengineer to install ERP in their systems, with the aim of increasing return on investment, but over time there was a shift in business assumptions, namely from conventional business to digital business and open innovation paradigm, then ERP software products can now be easily implemented in business organizations on a medium scale, to a micro scale to face challenges in the digital transformation era and the era of the covid-19 pandemic.

4) *Data Analysis Software Program*

The existence of software programs available to obtain, store, and analyze raw data collected using intelligent system-based decision support systems and the like is very supportive and facilitates strategic management and Research and Development departments, so that a strong digital ecosystem is realized and becomes a " *digital highway* " in order to answer the company's organizational problems (Turban et al., 2006) .

5. Conclusion

It was understood that scientific research and the excellence of scientific inquiry within the framework of business research in the Company's Research and Development department is that it is possible to conduct correlational analysis and determine the relationship between the two factors.

The steps in the hypothetical-deductive method of studying problems in order to solve them require an awareness of the value of scientific inquiry, so as to understand and be ready to accept the need for "good" research, this will directly offer opportunities to effectively solve complex problems. encountered in the management and business areas. Research barriers in the Company's Research and Development department will increasingly be overcome in the management and business areas, namely by developing an understanding of information technology needs, understanding risks and controls in the information technology environment, and understanding big data analytics processes so that the guarantee of research success covers a wider scope. wide. and recommendations of strategic value.

From the strategic management review, a manager needs to also be aware that the research and development department of the company is not able to offer 100% accuracy in the results, choices and tradeoffs among various criteria of scientific investigation can be carried out to obtain valid results for good decision making. The use of information technology and the internet is part of the agility (agility and flexibility) of the Company 's Research and Development department in conducting research, especially when it comes to the Covid-19 pandemic (Albitar et al., 2020) .

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