

Introducing the application of simulation principles as a helping tool in the process of management decision-makings

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Received: March 9, 2014

Accepted: May 11, 2014

ABSTRACT

The purpose of this article is introducing the management simulation techniques and their application in the process of analysis, measurement and anticipating changes and their impacts on other existent variables like price, quality, and time and so on. Decision making for affective usage of labor, equipment, and other organizational resources for each manager is a necessary issue. Therefore, manager always intends attain the greatest productivity from possibilities and resources to attain pre-specified purposes. Applied simulation is a technical process that provides the possibility of representing the processes, resources, goods and services in the computer dynamic model, and in fact simulation is an imitation of operation or real system of with passage of time that in spite of doing it manually or by computer by creating the history of system and analyzing it to reach at the results about real application of the system. Technology and simulation software is one of the oldest methods and tools for managers, industrial engineers and system analysts and so on that empowers them before decision making about each production system or services that is manipulating or is working and the necessary statistics in the entire aspects for better decision making and with purpose of decreasing the costs and increasing the profit or process will be achieved. In this article at first we deal with the techniques of simulation and then the quality of using them in organization. Applying the introduced techniques in this article can decrease the costs and risk of incorrect decision makings in organization and processes and products will be improved.

KEYWORDS: simulation, management, principles

INTRODUCTION

Management Decision Making

Decision making is a central aspect of virtually every management and business activity; important decisions are not only made by managers and entrepreneurs, but also by the consumers of their goods and services, and by their business rivals, partners and employees. The ability to understand how decisions are made, and to predict, guide and improve those decisions, will be an invaluable part of every manager's toolbox. It is this ability that will be developed in this course.

Some decisions are impossible to make analytically, for lack of time, data, computational ability, or awareness. These are situations that could put decision makers at risk of falling into systematic biases and errors. Some decisions are made with and require extensive thought and analysis, as the stakes are high, there are multiple conflicting objectives to balance, and many sources of uncertainty about the future. To these decisions should to structure decision problems, identify relevant objectives and make trade-offs among them when objectives are in conflict with one another, as well as, represent and analyse the main uncertainties and risks involved in a decision.

A Systematic Approach to Decision Making

A logical and systematic decision-making process helps to address the critical elements that result in a good decision. By taking an organized approach, Organization is less likely to miss important factors, and can build on the approach to make decisions better and better.

There are six steps to making an effective decision:

1. Create a constructive environment.
2. Generate good alternatives.
3. Explore these alternatives.
4. Choose the best alternative.
5. Check decision.
6. Communicate decision, and take action.

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How effective decisions lead to organizational change management?

Management development training typically only covers half the battle that managers face today: people leadership training and management skills. But there is a lot more to this course: management training, leadership development, and handling the organizational change process.

Important decisions require leadership to use the appropriate processes and data tools to reach the best conclusion. Decision making criteria can help Organization to frame the problem, define alternatives, and incorporate appropriate data into solution identification.

Leadership skills and leadership communication are vital in not only reaching the right conclusion, but implementing it. After making the right decision, Organization has to impose change. Getting people to change behaviors may be the toughest and biggest challenge managers, effective leadership and executive leadership, and organizational leadership face today. Learn the six strategies that can overcome the resistance to change and how and when to use them.

Execute decision making and tree diagrams

- Define problems so alternative solutions become apparent
- Frame business problems using decision trees
- Understand and model uncertainty
- Perform sensitivity analysis: the “what if?” dilemma
- Analyze data

Execute organizational change management

- Understand the impact of change on employees of organization
- Analyze the positive and negative impacts of change
- Examine the Kurt Lewin change theory along with others
- Explore six change strategies that reduce resistance and enhance commitment to change initiatives

Simulation

Simulation is a technical process that helps organizations to predict, compare, and optimize the results of operation and process of decision making without tolerating the costs and risk of changing current processes and new applications.

Using simulation models as a supporting technique from management decisions decreases the risk of decision making process by evaluating and analyzing different designed strategies and improves the system that always has the increasing process. The widespread usage of commercial, economical, marketing, education, special sciences and many other sciences are covered (Robert Shaton).

Definition of simulation

According to the Shaton definition simulation is the process of designing a model of real system and doing experiments with this model that aims at finding the behavior of marketing system and different strategies for system operation.

The model of simulation is ability or capability of a designed method that provides a powerful statistical solution and ensures the manager from access to the purposes of organization (Ferrin, 2002).

A model is a short state of a complex real system with real concept. The value of one model is that its predictions provide appropriate answers for solving the specified problem.

A model of simulation shows a type of phenomenon or dynamic systems that are able monitor the current issues in organization more than changing to the problem.

The main purpose of simulation models is to provide a basis for predicting the behavior of the system. Generally simulation is used when because of complexity of the specified system using analytical methods is not practical. Therefore, the method of studying the system by simulation is posed.

Mostly the complexity in real systems is in the form of following patterns:

- The state of lack of trust in the system: simulation provides a mechanism that is logical and profitable to overcome lack of trust without limiting the system.
- Dynamic behavior: the system behavior during the time is not stable and current main variables like productivity and ...are changing during the time. To specify the cause of changings and controlling them the dynamic and appropriate model with changes should be used.
- Feedback mechanisms: the acted behaviors and decisions in a stage of the process influences on other parts of process directly or indirectly and introducing these effects and their reasons is very necessary.

To make a correct decision in every stage of system activities the following stated cases are very influential.

Using simulation we can test and predict the impacts of each factor. Simulation is testing a real system with model. Because testing on one real system has very problems. For example Shaton in his book entitled as “science and art of simulation of systems” quotes from Brish to solve these problems as follow:

1. Experiment on real system can corrupt the operation of organization.
2. If people are inseparable parts of the system they may change their behavior.
3. It is possible that equality of the action conditions for each period of repeating the experiment be so difficult.
4. Acquiring a similar sample needs a lot of time and expense.

According to the following cases we have to use the simulation method to predict the results of decisions and decreasing of the risk.

The process of simulation

Principally a project based on the model of simulation starts when there is problem in the system. In this time the first step is establishing the problem, because to find the answer of the problem we should know what is its original basis?

Therefore the first step in simulation test is specifying the purpose of experiment, because it is this purpose that specifies the method of experiment, details and final results.

The second step is definition of system. In this stage we should specify that which methods and techniques can be used to study the system. In fact definition of the system, specifying system components, elements and domestic and foreign factors of system environment, parameters and system variables are involved in the aspects of definition. After these relations and dominant rules among system features and its variables it is specified and formulized, then the quality of system behavior is considered and details of changing variables in the system are specified. The third step is answering to this question that whether in entire decision makings it is possible to use simulation model or not? If real conditions are not so complex and be able to use the methods of analysis for problem solving issues, then there is no need to use simulation model. But if according to the complex conditions and high risk just it is possible to use simulation the application of simulation method is necessary.

The fourth step is establishing the model. The art of modeling is ability of analyzing the problem, abstracting the features, selecting suppositions and then completion and developing the model until getting a suitable approximation of reality. To the extent that the model is completed it clears the complex situation.

Fifth step is preparation of data. Each study requires collecting data. In a model of simulation the input data should have a close relationship to system components and their connection. In this time the analyst should decide which data are needed and how to collect this information.

The sixth step will be removed by turning the model. In this step we should describe a model that is prepared for the system and simulation models are logically complex and have mutual interactions in most of the system elements.

In seventh step we specify the model credibility. This stage is the most important and difficult stage of simulation. Specifying credit means that whether the model precisely specify the real behavior of the system or not? Therefore what is important is credibility of the model not reality of its structure.

The eighth step is the strategic and tactic programming. Generally the strategic program means the experimental design that has suitable information and tactic programming means specifying this subject that each of the specified tests in experiment design how are used?

In the ninth step the experiment and interpretation is the result. In this stage mistakes and deficiencies of programing are clear and applied stages are reviewed. The tenth step is along with manipulation and documentation. Achievement of one project of simulation is only when accomplished that the accepted model is understood and used. Precise and complete documentation from quality of providing, development and pattern of model action can increase the suitable life and chance of successful manipulation. Good documentation simplifies the method of modification even at the time of lacking main creators' makes using them possible.

Simulation directly by predicting the impacts and results of applying changes on the process, quality, productivity and time cycling helps managers' decision-making. Also the existent issues in change management are solved and their purpose is applying the processes in quality operation that respecting price, method of classification and quality faces restriction (Kellner et al, 2000; Madachy, 1999).

In fact simulation is a determining tool it is the question that how these limitations should be. Through simulation we can specify the higher and lower level of independent variables to be able to apply the limitations of price, quality and basis of classification.

It can be said that technology is the production of product by the means of model in real condition, in fact by modeling, the reaction of real environment is already predicted on new technology.

The environment behavior could be modeled in face of real variables and could be disregard those variables are not reachable easily. In fact simulation is easier than a real environment to get the result.

Mostly, simulated models help to decide whether a process to halt or to be continued.

Simulating technics that applied for evaluating the systems offering the best means to improve the quality of scale, and the scales used in designing process, codification and testing the steps of organization that could be applied in real environment. So the possibility of having deficiency in products and services to customer decreased and needs and willing of customers are obviated and organization attains its mission.

On the other hand using the techniques of simulation we can anticipate the costs to specify the priorities, to classify the products and services, and to distinguish the required labor and in fact by using data gotten from applying simulated techniques the manager with more certificates decide about cost, budget, labor and planning.

By the way simulation is not always the solution and it is useful when the model and data represent the real conditions. The imagined power for simulation extensively depends on the rate of credit of the model. As simulation is simplifying the real world and its credit is approximated, so the rightful results are the product of simulated model that depends on the real value of parameters of the model.

In most of the samples of the real world these parameters or evaluating them has no precision. To overcome these problems we can attain the following strategies:

- The existent values are equal to the possible suitable variables.
- The values can be based on subjects, documents and other precise documents.
- Necessarily we can determine parameters using experiences of individuals that are involved in a job or existent theories.

CONCLUSION

In this article we tried to introduce the impact of simulation in analysis, evaluation, designing and predicting different influential parameters in process of organization directly or indirectly and its influence on the process of decision making.

Simulation can be used in anticipating different parameters in developing organization processes such as cost, credit, classification and existent deficiencies in development steps of organizational processes and it enables the managers and staff this ability that in the process of decision making the required materials should be measured to improve the current processes and to remove deficiencies to reach the organization to pre-specified purposes.

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