

Research Technique Implemented on Activities of The executives

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Abstract:

Behavioral operation stems from the fact that humans are not rational as typically assumed in the traditional operations management theories. Behavioral operation management is the emerging and promising field in the domain of operations management. Being an emergent stream the researchers have experimental focus while dealing with behavioral operation management. This paper is an attempt to consolidate the published work on behavioral operation management experimental research methodologies and explain various options available for researchers. Also this paper proposes guidelines for selecting the appropriate experimental research methodology. Various experimental studies falling under the umbrella of behavioral operation management are vignettes, process simulation, laboratory simulation, natural experiments and mixed experimental studies. The problem at hand determines the type of experimental study. Though there are several pros and cons of using a particular design, the mixed experimental studies have found to be more acceptable to the researcher compared to other studies

1. Introduction

Behavioral operation management (BOM) is defined by Bendoly and Eckerd(1) as “A multidisciplinary branch of operations management (OM) that explicitly considers the effects of human behavior on process and system dynamics, influenced by cognitive biases and limitations, social preferences and perceptions of cultural norms. Conversely this domain also concerns itself with the effect of process and system dynamics on human behavior, hence viewing human behavior as critical in not only its direct and moderating effects but also in its mediating role between operating policy change and connected outcomes.” BOM is a relatively new discipline in the operation management area. OM as a discipline has always assumed that human are rational and always works in self-interest (2). But the reality is different. Lot of OM theories have been challenged on their false assumption ground and the applicability in the real world where human is not behaving in a rational way. In order to test and refine the traditional OM theories and practice after considering the human as irrational entity, a new stream of research has developed which is known as BOM.

As evident from the literature, any developing stream heavily relied on the experimentation methodology. The BOM is no exception to this. There are two important aspects of the BOM, first one is the selection of the suitable research methodology and is related to the balance between the typical modelling studies vis-a-vis empirical studies. The second aspect is the multidisciplinary nature, encircling various disciplines such as decision science, psychology, OB and management.

This paper focuses on the types of experiment studies used in BOM, in order to trace the development of the stream and envisage the future direction. In particular the paper tries to answer the following questions

1. What is BOM and how it has evolved from operations management?

2. What are the various types of experiment techniques falling under the BOM research methodology? What are the pros and cons of the above techniques?
3. How to select the appropriate experiment technique?

The rest of the paper is divided into various sections. Section 2 deals with the evolution of OM to BOM. Section 3 describes in detail the experimental techniques in BOM along with pros and cons of each technique.

2. OM to BOM

As applicable to any other disciplines, the exact origin of the OM is very difficult to pinpoint. "It is difficult to pinpoint the origins of our field." But roughly the origin can be traced back to seminal work of Adam Smith dealing with the division of work and labor written in the book titled *The Wealth of Nation*. This work followed by Charles Babbage resulted into creation of sequence of general principles (3). Lot of OM dimensions for example inventory management, PPC, scheduling have deep roots in the Babbage's work. However, the application of the scientific approach to the OM came only from the F.W. Taylor work generally known as "Scientific management" (4). The 20th century had witnessed the Taylor and his followers say Gantt, Gilbreth, Frank etc. giving momentum to "fostered quantification of management" (5).

However, the scientific management has not enough thrust to take OM to the next higher level of evolution stage like causal model- based theories. As a result, the field of OM was perceived to be purely descriptive and was resembled with factory/industrial management (6). The various disciplines that were part of industrial management such as finance, HRM, marketing etc., gradually started differencing and establishing themselves as a separate independent discipline. So, what was remaining for OM discipline was "a nearly empty basket of techniques: time and motion study, plant layout, Gantt's production control boards, the simple EOQ model, and simplistic descriptions of how a production system worked".

Golden age for OR and OM was 1960-1970 where influential applications in OM were developed (7). Lot of progress in understanding the OM problems such as scheduling, queuing, PPC, inventory, transportation etc. has been made by various researchers. The most dominant approach to formulate the management problem as single objective function having few constraints was popularized in the same era. The high degree of dependency of OR and OM led to an "identity crisis" and the definition of the field was challenged. The pure quantitative approach to solve the problem make the practitioners difficult to interpret the results and complicating the decision-making process.

The recent modern industry-oriented advances stimulated OM to be application orientated and tried to enlighten why, how and when, diverse processes/practices are functioned. So, the emergence of operations strategy as a subfield of the OM came to light (8), and OM established its role in creation of corporate strategy. Another development after switching the focus from tactical to higher level problems was the emergence of the 'game-theoretic models' the sub-area focusing on coordination of supply chain via contractual settings aligning incentives of various upstream and downstream players of the SCM

To summarize with an analogy as quoted by Gary Becker the famous Nobel laureate about the weakness of the economics handling the people issues "Obviously, economics as a field has neglected psychology, and this needs to change. However, this does not mean throwing out of the window the premises of neoclassical economics; it provides a powerful paradigm of analysis which will be able to incorporate the additional considerations of the psychological system and provide stronger results." Ironically it is true in the OM field too.

3. Experiment Studies Variations in BOM

BOM has deep behavioral roots in three major streams namely sociology, cognitive psychology and social. So, the experimentation used in BOM is rich and deep, Figure 1 depicts the variations in the experiment studies in BOM.

The design of an experiment to test a particular theory often forces the experimenter to focus on specific aspects of the theory other than those that naturally come to the fore in the theoretical literature. The insights gained from designing an experiment are often of value even apart from the actual conduct of the experiment. Thus, there is

interplay, on many levels, between theory and experiment. So, the various options available in the BOM domain are as below.

3.1. Vignette Based Research

Vignette based research (VBR) is one of the classical ways to understand human behavior (9). Vignettes are valuable for accessing the anticipated reasoning, process of decision and/or understanding the intended behavior (10). Vignettes have been primarily used in context of policy making, hospitality and health care, marketing management and business ethics. Recently the VBR is strongly establishing itself in the realm of OM.

The VBR is termed differently in different disciplines for example conjoint-analysis, scenarios, stated choice methodology, and policy capturing (11). As per the definition the VBR has three main components, first the decision scenario, second the manipulated critical variables of interest and the last is response items.

As with other techniques of the BO research methodologies, the VBR too has some advantages and disadvantages. The predominant benefits of VBR vis-a-vis the survey or direct question method are 1) increased the level of realism 2) enhancement of internal validity owing to use of standardize stimulus 3) high measurement reliability 4) ease to replicate 5) VBR has high construct validity owing to focus on specific features 6) Cost effective 7) Requires less time to execute 8) low on social desirability bias

A very important pitfall of the VBR is unlike the empirical studies this methodology focuses on “facsimiles of real situations and the subjects’ responses to the scenario demonstrates intended reasoning, decisions or behavior”. Unlike the pilot survey in empirical studies vignettes should be pretested for the representativeness. Plus, there has to be post testing for assuring the respondents’ understandings of the vignettes.

3.2. Process Simulation

Process simulation (PS) is an alternative to classical VBR studies. PS may involve computerized or manual task, or it may be executed either as facsimiles of reality or it may be the real-life natural experiment (Toomay, 1995). The main difference between the VBR and PS is the ability of PS to test the multiple occurrences of stimulus and responses over a period of time (Kellner et al., 1999; Umber, et al., 2004). So, in PS there are more than one objective to be achieved using the variations involved in PS say change of tasks, time taken to compete the tasks, number of errors made (Jahangir Ian, 2010; Schultz et al. 1998).

3.2.1. Laboratory Simulation

‘Beer Game’ is one of the most popular examples of the laboratory simulation (LS). The natural experiments bring the elements of uncontrolled nature with them, so to avoid it LS are widely used in the BOM. LS are particularly helpful for various purposes of research including theory testing, examining anomalies and evaluation of new policies or processes (12). Each of these purposes needs a different kind of treatment when conducting the LS.

Despite the differences in the treatment, LS follows certain steps. These steps are as below

- 1) The experimental design
- 2) Subject pool selection
- 3) Implementation
- 4) Compensation

3.2.2. *Natural Experiments*

According to Benzoyl et al., Natural experiments are those in which real workers are observed doing real job at their respective location in real time. While the LS try its best to increase the internal validity the natural experiments (NE) try for achieving high external validity. The general motive of opting for NE is to test for new policies and processes in real time. So, the NE is superior from LS and VBR in terms of achieving high realism and multi period observations respectively. Another benefit of NE is that many times the subjects of the study are unaware of the fact that they are being observed or studies so they act in their natural way, so it reduces the sampling bias (13).

3.3. *Mixed Experimental Studies (MES)*

Having outlined the common approaches used in the BOM, it is worth noting that there are opportunities in the joint use of more than one approach. For example, vignettes have used in various studies as stand-alone methods; they have been used in mixed studies as backdrop to process simulation. The mixed experimental studies can provide deep insights into the higher-level operations management, project management, Board discussions etc.

4. **Selection of the Experiment Technique**

The selection of the experiment technique is a critical decision. All the technique describes above have their own merit and demerits. The selection of the experiment technique solely depends upon the nature and the complexity of the problem. It is the duty of the researcher to select the best experiment technique to give justice to the research problem.

I assume that social status and cultural capital have a significant impact on the language exam. Presumably, the proportion of those who are less well-off and those with less cultural capital is less successful in the language examinations. Consequently, I assume that there will be a higher proportion of those who have obtained their language exam with the help of a Degree Program.

Generally, there will be least one decision variable, but the exact quantity of the decision variables is not standardized. In doing the experiments it is generally a [2*2] or a [2*2*2] decision matrix. The physical proximity of the respondents is needed for some experimental designs while few experiments can be conducted remotely. For capturing the physical changes say eye movements, retina analysis, heart beat measurement, sweat etc. the physical presence of the respondents is must. Some kinds of experiments are better conducted using various technological. These tools will help to monitor and moderate the experiments in real time boosting the validity of the overall experiment. Last and very important parameter is the financial requirements. The researcher has to strike balance between the available resources and the study requirements. While doing the justice to the research problem the researcher must allocate all the possible resources available.

5. **Conclusion**

BOM has been acknowledged as one of the most fertile and emerging fields in OM. BOM works as a twofold strategy, one it studies how the human behavior affects the performance of operating systems, and second BOM gives ways to improve the performance. Being a developing stream in the domain of operations management BOM is heavily relied on the experimental studies. What was interesting at one point in time is far less interesting later on. This essentially follows from the definition of unexpected: once a new piece of knowledge is established, repeating it, or claiming something similar to it, is no longer as interesting. And just like mines eventually run out of ore, a topic can start to run out of interesting results. In that case we find ourselves in a situation where “everything has been said but not everyone has said it.”¹ When that happens, we need to look for different interesting findings. The only way to stay interesting is to change.

The BOM is very fertile and lucrative area of research. Lot of academicians and the practitioners are getting involved into the realm of the BOM. The discovery of the hidden and important intangible human behavior that is always neglected by the OM literature brings deep insights both into the academia as well as in the industry. And

for industry or practitioners BOM will help them to make better decision making, devising new strategies, better allocation of the resources, policy making and human resource management in an efficient and effective way.

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