

Chapter 4

The Use of Case-Studies and N-of-1 Protocols in Organisational Research

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The current pace in business and its environment has demanded that different methods of organisational research be used. This is to not only improve organisational performance and sustain operations but also develop new and superior processes. This chapter will consider how case-studies and 'N of 1' protocols have been used in organisational and managerial research. Insights about these two methods will be provided with their strength and weaknesses as methods of research in organisational and management research.

Case studies

Commonly used in life sciences and social sciences, case studies give an intensive analysis of a single organisational unit where several factors of development are stressed relative to the context under study. A selected even is generally examined over a long period of time without following a rigid protocol so that specific data is collected; analyzed and sharper understanding of the case is enabled (Yin, 2012). Since case studies might be both explanatory and descriptive, it is important that the object of research be identified to be able to illuminate what the researcher needs to know. The object lays down the analytical framework which is essential in study hence enabling analysis of relevant information and continuous reporting of results. Empirically, case studies seek to investigate a particular phenomenon in its real-life context hence it can be used as a research strategy. Organisational and management research consider that case study research should include quantitative research and should not only focus on a single case study but should be in a position to explicate multiple case studies to enrich the information reported (Swanborn, 2010).

Ideally, multiple sources of evidence should be consulted before the management can make any development of theoretical propositions in any situation that might affect the running or conclusions of an organisation. It is vital to understand that in using case studies for research, a variety of research methods can be used to enrich its information since it isolates events and focuses on illuminating it relative to other several qualitative and quantitative data. Researchers find it essential to incorporate information-oriented sampling in selecting key cases for case study. This entirely depends on the inherent interest of the researcher and the rich knowledge of setting circumstances to be able to successful research and come up with up-to-date information regarding the event. A project is only a case study when it is clear of what the study is a case of (Swanborn, 2010).

Organisational and management research considers research as a process that enriches and updates the existing information so that new frameworks, methodologies and their various applications can be used in the organisational settings. Management research pursues the understanding of how available knowledge is understood and used in various settings including the management practitioners. Case studies are considered a rich source of information on specific phenomena and management research incorporates this knowledge in various decision-making processes (John Gill, 2010).

Management researchers understand that it is vital to eliminate the confusion surrounding distinction between inductive logic, case study research and qualitative data. Case study for management research is done on both basis of deep single case studies and multiple case studies having in mind the comparative logic required (George & Bennett, 2004). Organisational research often requires a holistic, in-depth investigation and therefore case study is an ideal methodology. Illuminating the viewpoint of the participants by various multiple sources of data to investigate a particular course or event defines what a case study is in any research. Seeking to deepen understanding of various processes which already have been accepted in the discipline as significant is the purpose of the case studies (Yin, 2012). Researchers consider that case studies provide a contribution to existing wider debates and a rounded account of a particular discipline. Organisational and management researchers consider that case studies provide a thick description that is detailed and goal oriented hence its ability to use a single systematic technique. This interestingly breaks down case studies into representative, prototypical, deviant, crucial and archetypal case studies (a fuller description of these subtypes can be found in Dul & Hak, 2012).

Case study methodology has been subjected to scrutiny and criticisms since 1930. This is because it contributes less to building the theories than studies with more cases. However, it continues to be utilised due to its ability to permit intensive examination of cases even with limited resources. As a research tool, it has been used in various social sciences for research purposes because it is a reliable methodology when it is executed with due care (Dul & Hak, 2012).

Various guidelines for researchers in various fields have been produced to assist researchers. Apart from just describing, predicting and understanding, case studies have been useful in controlling events, individuals, processes and industrial culture due to the information gathered. Case studies can at times be complex, and despite some criticisms, researchers have used them to build theories.

Most organisations consider using research in explaining various situations that may affect efficiency of operations, advance processes and ensure that activities, processes and future projections of the organisations are accurate. Since case studies combine both elements of quantitative and qualitative, they have been highly accepted by organisations in their decision making process to enrich the conclusions (Denzin & Lincoln, 2011). Case studies however have been considered weak in conducting external validity due to poor generalizability (Buchanan, 2009; Hauswirth, 2006).

The Distinction between Case Studies and N-of-1 Protocols

While case studies look in depth at phenomena that are not well understood, and try to gather as much relevant information as possible to help understand the phenomena, they are generally exploratory and always descriptive. N-of-1 studies are quite distinct in that they are quasi-experimental interventions. All N-of-1 research ('N' referring to the number of cases in the study) focuses on variation over time and then attempt to understand this variation as a function of other variables (Hilliard, 1993). What constitutes a 'single case' may be an individual person, and organisational unit or a whole organisation. In any event, cases are in continual measurement of outcome, whilst undergoing different phase changes.

Several authors argue that N-of-1 methodology is under-utilised (Hersen & Barlow, 1984; Hilliard, 1993; Galassi & Gersh, 1993; Blampied, 1999, 2001). Hayes (1981) in particular suggested that N-of-1 methodology may help to close the gap between science and practice. Specifically, the use of N-of-1 methodology allows for the examination of relevant questions without the requirements of large amounts of funding, resources and participants. N-of-1 designs establish that the cause comes before the effect by manipulating the intervention variable before presenting the assessing the dependent/outcome measure (Mitchell & Jolley, 2001). The simple A-B-A design is the most common example of the N-of-1 research. The logic of this design is simple; before intervention the researcher collects baseline measures (A). Measurement continues when intervention is introduced, and the researcher observes whether change occurs (B). The intervention is then removed to see whether there is a return to baseline (A). If so, tentative causal inference can be made (Galassi & Gersh, 1993). Variations of this design are the most commonly used by N-of-1 researchers. In fact, it has been suggested that all N-of-1 research have a few core elements, which can then be creatively used (Mitchell & Jolley, 2001).

Several authors (Hayes, 1981; Hilliard, 1993; Galassi & Gersh, 1993; Long & Hollin, 1995) outline the essential elements of conducting N-of-1 experiments:

1. **Repeated Measurements:** Hayes (1981) stated that repeated measurements are the absolute core of N-of-1 methodology. Since estimates of the stability, level, and trend of the data (against which treatment effects might be seen) are drawn from within the subject, the researcher must have a detailed record of client progress across time. Hayes (1981) suggested that repeated measurements should start early, and the researcher should use several measures if possible. In addition, assessment should be completed under reasonably consistent conditions to avoid variability caused by inconsistent measurement procedures (Hayes, 1981; Rothwell, 2007).
2. **Establishment of a Stable Baseline:** The second critical element in N-of-1 designs is an estimate of the degree of the cases's variability in the dependent/outcome variable of interest (Hayes, 1981; Long & Hollin, 1993). The N-of-1 design rules out any concerns with between-case variability because all measurements are taken from a single case. However, there is an issue of within-case variability; fluctuations in mood and behaviour that naturally occur within any individual case. This is managed by establishing a stable baseline before the introduction of the 'intervention' (Mitchell & Jolley, 2001). To establish a stable baseline, at least three measurement points indicating no meaningful change are needed (Hayes, 1981).
3. **Specification of conditions:** This element advocates the need for all research to have clear specification of the independent variable.
4. **Replication:** One of the major criticisms of N-of-1 methodology is that it lacks external validity or generalisability (Long & Hollin, 1995). Further, Hilliard (1993) suggested that replication is necessary in N-of-1 research to improve external validity. Replication involves producing repeated studies with clearly specified treatment and measurement procedures, and detailed descriptions of client characteristics (Galassi & Gersh, 1993).

A number of other methodological concerns have been raised with N-of-1 designs; one of these concerns is multiple intervention interference (Long & Hollin, 1995). This issue relates to potential difficulties with separating effects when an individual case has been subjected to multiple interventions or components (Galassi & Gersh, 1993). The concern with the carry-over effects relates to the potential for the initial intervention's effects persisting even after the phase has been removed (Mitchell & Jolley, 2001). Hersen and Barlow (1984) recommended replication using an alternative intervention sequence to address this issue. This 'counter-balancing' is one option, the other is to continue each phase until stability was observed. Replication and counter-balancing also minimises other methodological concerns; maturation, measurement effects, and coincidental external events (Hayes, 1981). Further design considerations relate to the implementation of intervention phases.

Firstly, it is suggested that each new phase should begin in “full force”, in other words, from the start of each intervention phase the case should be engaging in tasks that form the core hypothesised active ingredient of the particular intervention. Gradual implementation might minimize otherwise apparent differences between phases (Hayes, 1981).

In deciding the length of each intervention phase, most researchers agree that intervention phases should continue until some stability in the data emerges (Long & Hollin, 1995); changing phases on time alone can also produce unclear results (Galassi & Gersh, 1993). On the contrary, other authors suggest that phases should be kept to the same length (Hersen & Barlow, 1984). This is because widely different phase lengths may produce errors in interpretation. Once again, Hayes (1981) suggested that the choice about phase length is a matter of degree, and that the threat to validity posed by either alternative can be minimised by replication.

If one were to choose a variable length of intervention phase (as most prefer), the issue of determining stability comes to the fore. The reliable change index (RCI) was designed to capture change over and above such error variation (Jacobson & Truax, 1991). Three of the key components in the RCI are the reliability of the dependant/outcome measure, the natural variability (standard deviation) in the score in a comparable sample population, and the degree of confidence that the change is due to the intervention. It should be pointed out that the RCI is not a significance test; it is a benchmark against which practical significance (not statistical significance) can be judged.

N-of-1 trials are relatively cost effective (when compared to other controlled trials), and unavoidable where comparable cases (be they individuals or whole organisational units) are rare. Where replication and counter-balance in intervention phases can be achieved the generalizability of the findings are considerably better than a conventional case study. Yet N-of-1 protocols are not ideal in every case. They are often protracted studies where the possible beneficial effects of some intervention are being (at least for a period), withheld for the sake of establishing a clear causal link. In this sense, N-of-1 protocols are not ‘naturalistic’.

Conclusion

Case studies and N-of-1 protocols have largely been used in organisational research for purpose of solving critical issues in operation and processes (Ravina, Cummings, McDermott, & Poole, 2012). They have been a major source of information for most organisations as they have provided a detailed analysis of actual events. Case studies revolve around the functioning of the organisation and various issues that affect the running of the organisation.

Case studies have been used extensively in organisational research to provide holistic information in various fields, while N-of-1 protocols are somewhat less common. In either case, the use of these methodologies in the 'field' should be further expanded and refined. The relative benefits are clear, and the relative limitations can, in most cases, be minimised.

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