Chapter 6

Limitations &

Implications of Study
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The limitations of current research findings can be understood by looking at the limitation of the methodological aspects involved in the research work, theoretical ideas on which the research is based, and the validity and soundness of research findings in predicting the future patterns. Methodological aspects of the research include the issues related to the tools used for data collection, issues related to sampling, and the statistical methods used to analyze the obtained data. Theoretically and conceptually the current research is based on bounded rationality paradigm and effort has been made to look at their implication for the organizational processes like innovation and excellence. The strength and limitations of this and its sister outcomes might also become part of the strength and limitation of the current research work. Finally, predictive power of the current research findings in explaining the future trends in innovation will be important in determining the significance of the current research work. All these evaluative aspects have been discussed in detail in the following sections.

6.1 Limitations of the study

There are two major tools used in the current research: one, Innovation as a heuristic scale which was developed during the process of research; and second, the Excel Scale developed by Sharma et al. (Sharma, Netermeyer, & Mahajan, 1990a). Although, the innovation as a heuristic scale possess a good reliability coefficient ($\alpha = .963$), and its items were selected after adequate psychometric procedures but the results obtained by the scale may be limited due to the reasons discussed below.

The scale is based on a set of 19 innovation related heuristic used by Indian entrepreneurs chiefly based in and around Gujarat-Mumbai industrial area, given by Prof. Mathew J. Manimala (1992). While identifying entrepreneurial heuristics the scale puts an overwhelming emphasis on search of creative ideas and opportunities in one’s
environment as 11 out of 17 items\(^1\) selected in the final scale are related to an adaptive search of new ideas and information in the business ecology of the entrepreneur/manager. Further as compared to 17 items on SAH there are just 7 items on FFH subscale. This may have two major implications: one, the search factor (SAH) may skew the result in its favour as compared to fast and frugal factor (FFH). This could be the reason behind the effect of SAH’s ability of having a direct bearing on the business excellence giving rise to a partial mediation model; second, the large number of items on creative ideas (n = 11) may have a confounding effect with the danger of SAH may turning into a measure of creativity heuristic rather than innovation heuristic. Although creativity and innovation are intimately related and creativity is a starting point of innovation but creativity becomes innovation only when it is implemented (Amabile, 1996). However, enough measures were taken before running the proposed structural equation model, and the result (see figure 4.4, chapter 4) shows that the regression weight of SAH and FFH over heuristic intelligence are 1.10 and 1.21 respectively. Hence, we can say that SAH has no skewing effect on heuristic intelligence, and the role of both the heuristic in bringing business excellence is fairly balanced when mediated by the heuristic intelligence.

Another limiting factor of the current research could be that innovation in Indian context is an emergent concept (Kumar & Puranam, 2011) which may give rise to many alternate theoretical propositions (Tiwari, & Herstatt, 2012). There could be alternative models which may show an equal or better fit indices as there is no single best way through variables may casually related to each other especially when they are studied under presumed environmental uncertainties and limited choices faced by entrepreneurs and managers. The one model that was also found to be fitting with data was the partial mediation model suggested after the mediation analysis in which SAH was shown to have a direct bearing on the business excellence along with its effect being mediated through the heuristic intelligence variable. However, in structural equation modelling technique it is not uncommon to see two or more alternative models that fit a specific

\(^1\) 2 items were deleted after the doing reliability analysis and principal component analysis.
data set equally well, or, subject to certain restrictions, fit any data set meeting the restrictions equally well (Spirtes et al., 1997). However, in the present case when the possible competing models were tested only one model was found to be showing fit which was discarded on the basis of conceptual grounds and the propositions of the research, as in case of competing models the researcher may take the theoretical proposition and his objectives as the direction for choosing the suitable model rather than fall for arbitrariness (Spirtes et al., 1997; Byrne, 2001). In case of present research the major theoretical model guiding the research framework was bounded rationality approach (Gigerenzer et al., 1999; Gigerenzer, 2000; Gigerenzer, 2002) to cognition. An Entrepreneur/manager, while innovating, will not and cannot go for an exhaustive search to judge all possible alternatives and select the best one. So, the search heuristic has meaning only when it is fast and frugal and adapted to its ecology (i.e., ecological rational). Hence, a joint effect of SAH & FFH as hypothesized in the proposed model is theoretically more sound as compared to their effect in isolation.

The Excel scale (Sharma, Netermeyer, & Mahajan, 1990a) is a standardized tool with reportedly good Cronbach’s Alpha reliability coefficient ranging from .89/.90 (Sharma et al., 1990a) to .92 (Caruana et al., 1995; Sandbakken, 2002). However, the scale is explicitly based on 8 attributes of excellence given by Peters & Waterman (1982), and its matter of further scrutiny how important are these attributes for managers and entrepreneurs in the current business context. Also, the sample doesn’t include the real life innovators so the obtained data might essentially reflect the perception of managers/entrepreneurs regarding the nature of interaction between variables as presented in the proposed model rather than innovation per se. Further, the validity of the current model needs to be explored by confronting it with real life business events in past, present and future. The ability to predict other (or future) data arising from the same latent process is often seen as a mark of a model’s usefulness or quality, and it is commonly assumed that a model’s fit to a given sample provides a good clue to this predictive ability (Preacher,
The predictive ability of this model needs to be tested in future by testing its fit for the samples manifesting the interplay of variables presented in the model.

Further, the two major multivariate techniques have been used in the current research may bring in their own strengthening and limitationary influence to the research outcomes. Although, factor analysis is a quite useful technique of ‘orderly simplification’ (Burt, 1940) through which we can condense and simplify the multivariate data (Kothari, 2008) but before use and interpretation of its results there should always be an elaboration upon the quality of data, like sufficiency of sample size, normalcy of data, etc., from which the factors have been derived (Child, 2006). These issues along with their implications have already been addressed in chapter 3 (Methodology) and chapter 4 (Data Analysis & Interpretation). Although utmost care has been taken while naming and interpretation of the two obtained factors but there is considerable subjectivity involved in determining the number of factors and the interpretation of such factors (Tryfos, 1998). To deal with this, the number of factors extracted have been based on the rigorous statistical procedure but naming and interpretation of factors have been done after the expert discussion and careful scrutiny of the research literature.

6.2 Implications of the study

Recently, the use of factor analysis to provide evidence for a theory has increased even among those who earlier emphasized on its descriptive character (Pugesek, Tomer, & von Eye, 2003). The theoretical implications of the obtained factors have already been discussed in chapter 5 (Discussion), however, the proposed model have been tested using structural equation model which brings its own bag of advantages and disadvantages (Werner & Schermelleh-Engellike, 2009), like any other statistical method, which might also influence the results of the study. The major advantages associated with SEM are the availability of more valid conclusions because it uses several indicator (i.e., observed) variables to predict a construct (unobserved variable). In current research two major indicators (i.e., SAH & FFH), having good reliability coefficients ( \( \alpha_{SAH} = .9 \), & \( \alpha_{FFH} = \))
Further, SEM takes into account the measurement error and excludes it from the analysis which again enhances the validity of its results. However, the parameter estimation process in SEM is based upon maximum likelihood approach which is further based upon certain assumptions like large sample size, multivariate normality, etc. Some assumptions, like multivariate normality, are rarely achieved (Werner & Schermelleh-Engellike, 2009) which might have its own implications for the obtained results. These issues have already been addressed while discussing the practical issues involved in SEM analysis in chapter 4 (i.e., Data Analysis and Results).

The present study is a sincere attempt to study the nature of relationship between innovation and excellence within the framework of bounded rationality paradigm. The study could have both theoretical and practical implication. Theoretically, the study posits two new factors, i.e. SAH & FFH, underlying innovation heuristic and their joint influence measured as heuristic intelligence. These variables may require further assessment and validation along with measuring their instrumentality in bringing business excellence through other independent researches. The research literature is replete of creative search and use of information (Lundvall, 1985; Lussier, 1995; Wang & Ahmad, 2004; Afzal, 2009) to design fast and frugal products/processes (Xia & O’Gorman, 2003; Catrene, 2008) to achieve excellence but the current research have attempted to see these two factors in terms of abilities. As the research sample’s responses might be based upon its perception, which could also be a limiting factor of the study, the results of the study are indicating that people and organizations possessing the ability of adaptive search (by practicing SAH) and offering frugal innovations (by practicing FFH) are being perceived as more competent and capable of better growth and excellence.

The idea of heuristic intelligence may be received critically among the researchers and academicians but the intelligent use of heuristics is gradually finding a place among the
researchers of intelligence in the form of intelligence of intuition, gut or unconscious mind (e.g., Simon, 1987b; Loftus & Klinger, 1992; Gladwell, 2005; Gigerenzer, 2007; Kaufman, 2011). To what extent heuristic intelligence relates with other types of intelligence, for e.g. practical intelligence (Sternberg, 1988, 1999), will warrant another study and a detailed study exploring formally the ability of a person to use heuristics for arriving at successful solutions along with the underlying sub-factors (i.e., heuristic intelligence) will be of strong heuristic value per se.

On practical side, the one implication of study could be that it may help managers and entrepreneurs to beat the rationality burnout caused by a heavy emphasis placed on to appear rational while making decisions. However, this issue has long been explored under the bounded rationality and behavioural economics research. The seemingly non-rational-heuristic approach to decision making is itself a rational behaviour in a world of constraints and uncertainty. The two identified factors, i.e. SAH & FFH, may nudge the budding entrepreneurs and managers to exercise these heuristics in their various behaviours like decision making, product designing, process improvement, redesigning consumer experiences, selecting a new employee, creating future strategies to adapt and achieve excellence in a fast and frugal way.

6.3 Chapter Summary
The chapter begins with highlighting the major limitations that might have crept in the current research due various theoretical and methodological issues. The problem associated at theoretical levels involves the locating the two extracted factors in the research literature along with their validity issues. The model may require further validation for different samples involving similar predictors and output variables. The heuristic intelligence variable should be studied as a formal type of intelligence viz-a-viz the formal literature on intelligence along with carrying out a comparative assessment. The possible practical implication of the model for various managerial behaviours have also been highlighted.