Guest editorial

Evidence based modelling in management

The idea of "Scientific management" was conceptualized and advocated by Frederick Winslow Taylor at the beginning of the twentieth century, and it is said that much of the management thinking since then has been either a negation or an elaboration of it. The famous book in which he enunciated his theories, *The Principles of Scientific Management*, had a strong impact on subsequent management thinking. His idea was to divide work between managers and workers, so that the managers plan "scientifically" what is to be done and the workers then do it. Unlike Taylor, who wanted to remove all possible brain work from the shop floor, handing all action, as far as possible, over to machines, Dr Gordon Guyatt, a young McMasters University residency coordinator in internal medicine, promoted a novel method of teaching medicine which he termed as "Scientific Medicine". Dr Guyatt's critical methodology implied that current clinical decisions were less than scientific. He described the core curriculum of the residency program as "Evidence-Based Medicine" (EBM); the idea that decisions in medical care should be based on the latest and best knowledge of what actually works. Dr David Sackett, another individual associated with EBM, defines it as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients". It is the spirit of critical methodology from the field of medicine that has fired the imagination of some academicians and practitioners of management, and they want to make evidence-based management (EBMgt) mainstream for making effective managerial decisions.

The emergence of EBMgt as a separate discipline lies in the healthcare sector (Sackett and Rosenberg, 1995; Sackett *et al.*, 1996). In early 1999, the systematic foundation of EBMgt started to appear and the entry of EBMgt into the behavioural sciences enabled more effective decision-making. In the first decade of the twenty-first century, EBMgt gained popularity owing to evidence oriented organizing, strategic finance, marketing, healthcare finance and policymaking (Walshe and Rundall, 2001; Sanderson, 2002; García Del Junco *et al.*, 2010; Armstrong, 2011; Rowley, 2012; Tourish, 2013).

Managers often make decisions that are not based on the current best evidence of what may work, as even experienced executives may sometimes neglect to seek out new evidence because they trust their past experience more than research. Though they may be aware that their personal observation cannot be generalized on account of inadequate samples, they somehow strongly feel that information acquired first-hand is far richer in comparison to inferences from a journal article. Lots of managers, likewise, get their companies into trouble by importing, without sufficient thought, performance management and measurement practices from their past experience.

EBMgt involves decision-making through a systematic, controlled and critical use of the best evidence that is available from multiple sources and by triangulating this evidence to arrive at a decision. By doing so, the managers increase the probability of making an effective decision. Companies can become successful and maximize profits through EBMgt by using managerial intuition and experience, latest research from journals and industry

practices and, more importantly, by incorporating insights from the organizational and the environmental context. One expert advice or statistic or one piece of research or one consumer insight will not rescue a company from years of ineffective managerial decision-making. It has to incorporate EBMgt as its core business philosophy.

Data are often noisy, difficult to collect and incomplete, but we pride ourselves in adopting more rigorous and computationally intensive analytical methods in the context of EBMgt. In our haste, we mistake correlation for causation and even regression as causation, and hence, we may see mountains when there aren't any. We often look to the past cases to guide the future, while our world is full of black- swan events. We may ignore confounding variables which could explain common causation, and we ignore mediation and moderating effects of these variables. Sometimes, we may apply tests and methodologies for statistical significance that are inappropriate and flawed, resting on inapplicable assumptions that are no more valid. We are not talking about just Type I and Type II errors. The very method of hypothesis testing may be flawed. Context, time, geography and environment may collude to produce results by chance. Testing and interactive effects through the very act of reading the data can taint it. Our methods of data collection may be rife with sampling errors and non-sampling errors. We might be asking the wrong survey questions. The reliability and validity of our questionnaire may be inadequate.

Science works through the formulation of a hypothesis and testing it through evidence to come to a conclusion. For example, before we invest a lot of time in evidence-based promotions in the face of customer scepticism, we need to ask: "What evidence would she need to change her mind?" Unfortunately, if the answer is, "Honestly there's nothing you could show me that would change my mind", then there is no use persuading through endless fact-based promotions, thus saving everyone a lot of time. During the 1980s, Apple tried to use evidence-based advertising to persuade IT professionals in big companies to adopt the Mac. They tried ads as well as research studies to prove that the Mac was user-friendly and cheaper to own in the long run but failed miserably. It was only the gentle persistence of storytelling and the advocacy by evangelists that finally proved successful.

In 1985, The Coca-Cola Company's share lead over its chief competitor, in its flagship market, with its flagship product, had been slowly slipping for 15 consecutive years. The cola category in general was dull. Consumer preference for Coca-Cola was dipping, as was consumer awareness. That changed, of course, in the summer of 1985 as the consumer outcry over "new Coke" was replaced by consumer affection for the Coca-Cola classic. The fabled secret formula for Coca-Cola was changed, adopting a formula preferred in taste tests of nearly 200,000 consumers. What these tests didn't show, of course, was the bond consumers felt with their Coca-Cola – something they didn't want anyone, including The Coca-Cola Company, tampering with (Coca-Cola 2017). The simple fact is that all the time, money and skill poured into consumer research on the new Coca-Cola could not measure or reveal the deep and abiding emotional attachment to the original Coca-Cola felt by so many people. The passion for the original Coca-Cola – and that is the word for it, passion – was something that caught the company by surprise. It is a wonderful American mystery, a lovely American enigma, and you cannot measure it any more than you can measure love, pride or patriotism.

Though it is also true that the evidence is never perfect, and we must always be tentative about the trustworthiness of the evidence, regardless of whether it is drawn from experience or from scientific research. We can nevertheless appraise it critically, as it could be biased in a particular direction by enquiring about the method of gathering of this evidence.

Sometimes the best available evidence is hardly convincing at all, while at other times it is so compelling that no one doubts it. In other situations there is very little or no quality evidence available. In those cases we have no other option but to work with the limited evidence at hand and supplement it through learning by doing. (Rousseau, 2006).

Yet, EBMgt is still preferable to the weak alternatives that are based on authority, consultant's spiel, season's flavour and fad, apparent reason or just plain observations. The alternative is full of biases that are not easy to observe or measure – namely, cognitive biases. Human beings suffer from multiple cognitive biases such as anchoring bias, availability Bias, selection bias, recency effect and framing bias (Tversky and Kahneman, 1975). But, the alternatives rely on the worst kind of bias, namely, agreement bias, to push through a version of the truth. Then, the "truths" don't lend themselves to falsification at all, as it is forbidden to look for evidence that might falsify the "truth". Anyone stepping outside the accepted norm is forced into compliance. EBMgt may be flawed with errors, but it is transparent and explicit about these and lets the managers decide. The effective managers know its flaws, and ineffective ones can overlook it to their perdition. EBMgt is about forming a theory through a repeatable and falsifiable hypothesis. The managers know that their theory is true only and only because there are no data to prove it wrong. Tom Davenport has advocated in his book *Competing on Analytics* that companies should use business intelligence to pinpoint the most profitable strategies through the use of hard evidence to reassess old assumptions and ideas, instead of just going by their intuition. What is not routinely done is bringing evidence from the latest research in journals to bear on the problems in various organizational areas at hand and perhaps going beyond one's domain and looking proactively at research from other fields too.

Modelling at its simplest means thinking structurally about decision problems to make informed management decisions. EBMgt enhances the effectiveness through well-informed decisions based on reliable evidence from varied sources. This special issue of the *Journal of Modelling in Management* seeks to draw attention to the new movements in the field of business such as big data, business analytics, reverse innovation, business models and social media. A great deal of scientific research has been carried out involving issues relevant to management practices. We propose that EBMgt means making decisions based on the best accessible facts, that is scientific findings and unbiased organizational facts, which are based on critical thinking and best available contemporary and optimal evidence, to explicitly use them in management and decision-making processes. Based on this premise, we have research articles from diverse fields exhibiting how EBMgt can inform decision-making and enhance organizational performance.

The first paper examines factors influencing tourist destination brand selection behaviour pertaining to the Indian tourism sector. The outcome of this research paper should enable tourism marketers, tourism service providers, tourism brand managers and consultants to create better linkages between the prospective tourists' preferences and the marketing mix of destination brands by using EBMgt modelling. The second article describes dynamic capabilities and their impact on research organizations' R&D and innovation performance. The empirical findings are evidence that there exists a positive influence of the dynamic capabilities on research organizations' R&D and innovation performance. Explicitly, sensing, seizing and reconfiguring the dimensions of dynamic capabilities have a positive impact on R&D and innovation results; consequently, the peculiarities of their interdependencies are identified. The third paper speaks about causal modelling of human resource (HR) flexibility and firm performance in Indian information technology (IT) industries. HR flexibility could exist across IT firms. Organizations are required to anticipate and respond promptly to changing conditions in a way that effectively

manages both technical and stakeholder complexity. The fourth manuscript attempts to model the key barriers to lean construction using interpretive structural modelling (ISM). Cultural differences is the most important barrier to lean construction, while employees' resistance to change and lack of performance measurement systems are the least significant barriers.

The fifth article demonstrates the interaction of factors for flexibility in supply chains. Top management commitment, strategy development for flexible supply chain (SC), application of advanced technology and IT tools, information sharing in SC members and trust development among supply chain members have emerged as major driving factors. Logistics and warehouse management, supplier flexibility, distribution flexibility and manufacturing flexibility have emerged as dependent factors. The sixth paper describes the risk-agility interactive model and effectiveness of risk as a driver of organizational agility. The results of data analysis showed that supply chain risk factors could be considered as a driver affecting organizational agility. In addition, in this study, supply chain risk factors were ranked using ISM. The presented comprehensive model indicated that based on causal relationships between risk factors, sovereign risk as the basis for model (three levels) and product and customer satisfaction risks as the output of the model (level 1) were considered.

The seventh paper speaks on environmentally concerned consumer behaviour, with evidence from consumers in Rajasthan, India. The major finding of the study is that consumers living in rural areas are well aware about the environmental movement, but probably, marketers have not fully explored the potential for environment-friendly products. The study strongly argues that organizations should leverage on rural market opportunity in India. It confirms the need to tailor marketing mix for rural markets to determine behavioural dimensions of consumer decision-making. The last article analyses the inventory model in a four-echelon integrated supply chain–modelling and optimization. The findings showed that the model is applicable for real-world supply chain problems in cases where echelons are going to do an executive external integration. Also, the interior point algorithm has a satisfactory performance and a high efficiency in terms of optimum solution for solving nonlinear and large models.

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