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Sustainable production framework for cement manufacturing firms: A behavioural perspective

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ABSTRACT

Understanding sustainable production is becoming increasingly important for production and operations managers, mainly due to a shortage in natural resources. Sustainability requires many changes in behaviour at all levels. Few studies within the sustainable production literature have empirically disentangled the underlying behavioural concepts of sustainable production. To address this gap, this study utilizes the theory of planned behaviour (TPB) to develop a theoretical framework to explain sustainable production behaviour. Survey data gathered from 128 Indian cement manufacturing units suggest that attitude, subjective norms or social pressures and perceived behavioural control are predictors of the intention for sustainable production which then predicts sustainable production behaviour. The research contribution of this study is twofold: firstly, the current study highlight that the influence of social pressures or subjective norms on intention is greater than attitude and perceived behavioural control; and secondly it may be noted that intention is not a strong predictor of the sustainable production behaviour. Finally, our study based on limitations offers extensive future research directions.

1. Introduction

Due to unsustainable production and consumption practices, the planet is facing serious threats in terms of rapid depletion of natural resources [26,34,56,62,84]. Especially in developing economies Krajnc and Glavič [56] have argued that unsustainable production is the main cause of environmental damage. O'Brien [68] noted that producers are answerable to the society if they fail to strike a balance between economic growth without minimising negative impacts on planet. Thus, sustainable production has received serious attention from academics and practitioners over the past decades since the 1992 United Nations Conference on Environment and Development where it was identified as one of the important pillars of sustainable development, which helps to achieve social, environmental, and economic sustainability.

Despite the efforts taken by various agencies, the success rate of sustainable production initiatives in developing economies is low in comparison to developed economies [74]. In recent years, sustainable production and consumption has been the focus of the discussion amongst research communities [12,20,26,27,39–41,48,50,64]. While there is a rich body of literature on sustainable production and consumption, the existing literature often lacks a theory focused approach to explain the complexity surrounding sustainable consumption and production related programs. This may be attributed to both the complexity of such programs, and to human behavioural issues. For instance, Bendoly et al. [9] note in one of the seminal works on behavioural operations management that many operations management scholars have failed to address such behavioural issues. Dubey et al. [31] attempted to explain sustainable consumption and production behaviour using an integrated theoretical framework grounded in

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institutional theory and agency theory. The research focusing on behavioural complexity governing the action of the producers towards sustainable production or consumption or both is still underdeveloped [2,37]. Corral [23] have further noted the importance of cooperation for change in sustainable consumption and production systems. Hence, the current study attempts to address two research objectives:

- To develop a theoretical model to explain cement industry sustainable production behaviour.
- To empirically validate the model and based on statistical analyses, some recommendations for further research and practice can be made.

Following Ajzen [3] arguments, the theoretical framework is firmly grounded in the theory of planned behaviour (TPB) to explain sustainable production behaviour and its impacts on triple bottom line (TBL). In this way, this study aimed to explain how attitude, subjective norm and perceived behavioural control will predict the sustainable production behaviour. By empirically validating our theoretical framework, we make important contributions to the existing literature and theory on sustainable production. In addition, our findings offer insights for managers, supervisors or regulators who seek to better understand the link between behavioural intention and sustainable production behaviour. The rest of this article is organized as follows. The next section focuses on theoretical framework and hypothesis development. The third section focuses on our research design. The fourth section discusses our data analyses and results. The fifth section discusses the findings and the sixth section presents the conclusions, our contributions to existing literature, managerial implications, limitations and further research directions.

2. Theoretical framework and hypotheses development

The theoretical model consists of five constructs: attitudes towards behaviour, subjective norms, perceived behavioural control, intention to conduct sustainable production, and sustainable production behaviour (see Fig. 1). These constructs form the basis of the theory of planned behaviour (TPB). The TPB is regarded as the extension of the theory of reasoned action (TRA) (see [35]). However, the basic underlying assumption of TPB is that behaviour is not a voluntary action but it is under control. Thus, TPB is a theory which predicts deliberate behaviour, because behaviour can be deliberative and planned [3]. Thus, in addition to the TRA, TPB includes perceived control beliefs following arguments by Ajzen [3]. Considering TPB assumes that sustainable production behaviour is determined by individual intention to embrace sustainable production. The intention is a function of his/her attitude toward the behaviour, his/her subjective norms and perceived behavioural control [3,4]. Intention is the cognitive representation of the person's readiness to demonstrate a behaviour, and it is regarded by many scholars and practitioners as the most salient

antecedent of behaviour (Weigel et al. [87]).

2.1. Sustainable production

Hopwood et al. [46] noted that sustainable development has been used widely, often carries different meanings. Broadly, sustainable development is an attempt to address the pressing concern towards social, environmental and economic issues. Sustainable production has gained tremendous attention in recent years due to acute shortages of natural resources in terms of energy, safe drinking water and clean air [56]. Considering O'Brien [68] and Krajnc and Glavič [56] we outline the characteristics of sustainable production, which have been also examined by scholars in recent years (see [26,41,72,73,27,39]). These characteristics are: reduction in the use of materials, reduction in the use of energy consumption, use of closed loop supply chains, minimization of waste, products reuse, product recycle, vehicle routing optimization for minimization of distance covered during transportation, use of cleaner and green technologies, conduct of life cycle assessment, and consideration of the social role played.

There is rich literature that has either focused on sustainable manufacturing [27,30,39,40] or sustainable production [26,68,56]. Most the contributions in these areas are primarily from a social science or engineering point of view, and there are few contributions aimed towards management issues. The literature does not pay attention to behavioural issues, giving us the impetus for this paper. To address this gap, we draw on TPB which is discussed next.

2.2. Theory of planned behaviour (TPB)

The theory of planned behaviour (TPB) has been extensively used in marketing, technology and innovation management and information system related research to explain behavioural intention, following its conceptualization by Ajzen [3,4,5]. TPB is an extension of the theory of reasoned action (TRA), which was developed by Fishbein [35] to predict human behaviour. However, Ajzen [3] argued that by including a third construct (i.e. perceived behavioural control), the efficacy of the theory can be improved. Thus, according to TPB, human behaviour can be explained by the three constructs: attitude, subjective norm and perceived behavioural control, which together lead to the formation of behavioural intention. The theory is efficacious in research on sustainability topics. For instance, Aboelmaged [1] has used TPB to predict the adoption of e-procurement in a developing country. Tonglet et al. [82] used TPB to explain recycling behaviour. Tonglet et al.'s [82] arguments based on TPB have been supported by other scholars (see, [75,58,13,42,88]). Liang et al. [60] predicted the inclination of employees to voice their concerns about their organisations. Hence, based on prior research we can argue that TPB can be useful theory to explain sustainable production behaviour.

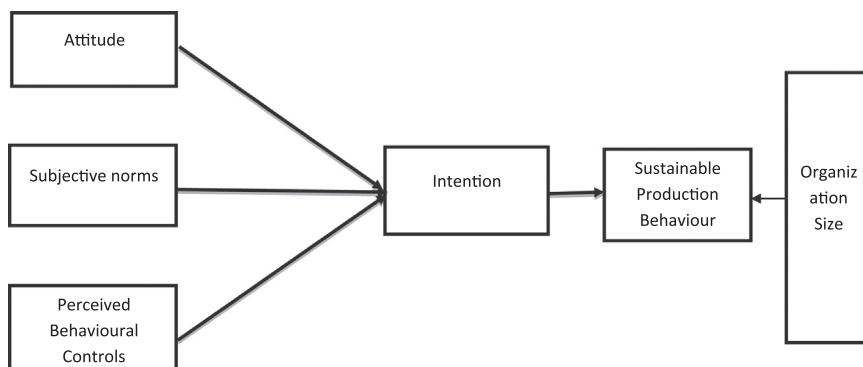


Fig. 1. Theoretical model.

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