



Research article

The effect of perceived rewards on radical innovation: the mediating role of knowledge management in Indian manufacturing firms



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ABSTRACT

This paper examines the mechanisms through which employees' perception of rewards influences their radical innovation. The paper develops and empirically tests a model proposing that perceived rewards influence radical innovation via the mediating mechanisms of knowledge acquisition and knowledge sharing. Data from three Indian manufacturing companies were collected using a questionnaire. Responses from 235 employees were analysed (using structural equation modeling via AMOS27) to examine the links between perceived rewards, knowledge sharing, knowledge acquisition, and radical innovation. The findings showed that: 1) perceived rewards had positive and significant relationships with radical innovation, knowledge acquisition, and knowledge sharing; 2) knowledge acquisition had a positive and significant relation with radical innovation, but knowledge sharing was not significantly related to radical innovation; and 3) knowledge acquisition mediated the relationship between perceived rewards and radical innovation. No support was found for the mediating role of knowledge sharing in radical innovation. The paper examines the overlooked role of perceived rewards in facilitating knowledge behaviours and radical innovation. In addition, the practices examined in the model are assessed as perceived by employees, rather than as perceived or intended by managers.

1. Introduction

Innovation is vital for organisations, and its successful introduction is closely linked to an organisation's knowledge base (Camelo-Ordaz et al., 2011; Damanpour, 2010; Fu et al., 2015; Minbaeva et al., 2012; Shipton et al., 2006). Knowledge sharing and acquisition are two knowledge-management processes that enhance employee and organisational performance (Lombardi et al., 2020; Lin and Lee, 2005), in addition to fuelling extra-role behaviours such as innovation (Chang et al., 2007).

Within knowledge-management processes, human resources are critical for the successful acquisition and application of an organisational knowledge base (Andreeva et al., 2017). The literature on human resource management (HRM) has indicated that the behavioural perspective of employment relations explains employee performance, innovative work behaviour (IWB), and, engagement (e.g., Minbaeva et al., 2012; Shipton et al., 2006; Zhou and Li, 2012). To promote favourable behaviour among employees, social exchange theory (SET) indicates that their perceptions of organisational arrangements can determine their level of engagement and motivation at work (Blau,

1964). More specifically, when an organisation signals to employees that they are valued and supported, employees feel obliged to repay it in kind. This reciprocation takes the form of positive behaviours such as knowledge acquisition and sharing (Liao et al. (2010)).

Scholars have explored and identified what elements can foster engagement in knowledge acquisition, knowledge sharing and innovation in the workplace. Among the internal drivers, rewards are among the most influential of HRM interactions (Lawler, 1973). Rewards demonstrate organisational investment and support for employees in promoting their levels of performance and behaviour at work (Rai et al., 2018; Ramamoorthy et al., 2005). Knowledge-management literature has emphasised the critical role that they can play in supporting knowledge-acquisition and -sharing behaviours (Durmusoglu et al., 2014).

However, despite HRM's successes, there is still a need to develop its frameworks, together with knowledge management and innovation, to offer a more comprehensive mechanism for these processes (Andreeva et al., 2017). Because employees possess different types of knowledge and employee interaction can lead to knowledge acquisition and sharing, more attention should be paid to the role of employees in promoting

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innovation through knowledge-management activities. The existing literature on HRM, knowledge management and innovation lacks identification of what promotes knowledge-oriented behaviour and innovation (Zhou and Li, 2012; Lombardi et al., 2020). The identification of rewards as a key to innovation has received little attention, and recent studies have been unable to reach consistent conclusions about them (e.g., Andreeva et al., 2017; Seeck and Diehl, 2017).

This paper is the next step in that research. Following claims by Nonaka and Takeuchi (1995), Hislop (2003), Camelo-Ordaz et al. (2011) and Flor et al. (2018), this study posits that the introduction of innovation demands employees' willingness to acquire and share knowledge and to exert extra efforts to participate in challenging tasks. However, because innovation is a multifaceted process, employees' engagement in knowledge acquisition and sharing and the suggestion of new ideas and solutions during the introduction of innovation might fluctuate (Camelo-Ordaz et al., 2011). Therefore, rewarding employees can generate persistent interaction and the willingness to acquire and share knowledge.

More specifically, building on SET, this paper responds to recent calls in the literature for the need to explore the link between rewards and knowledge management in sustaining innovation (e.g., Andreeva et al., 2017; Camelo-Ordaz et al., 2011; Lombardi et al., 2020). The paper focuses especially on the role played by rewards in achieving radical innovation and the mediating role of knowledge acquisition and sharing, specifically in India's manufacturing industry. As mentioned, the role of rewards in fostering innovation is ambiguous, and studies have obtained contradictory findings (Bos-Nehles et al., 2017; Lombardi et al., 2020). Most studies on the topic have been conducted in Western contexts, and there is a clear lack of research about the Indian context (Seeck and Diehl, 2017). Additionally, there is a need to identify the mechanisms through which knowledge behaviours can be promoted. Moreover, most existing studies have ignored employee perceptions in relation to innovation (Seeck and Diehl, 2017), the effect of rewards and employee willingness to engage in knowledge-acquisition and -sharing behaviours. This paper aims to fill this gap by considering the role of employee perceptions in radical innovation.

The paper also aims to contribute to the literature of HRM, knowledge management and innovation by showing how knowledge can sustain the relationship between HRM and innovation. It also contributes to understanding the 'black box' of HRM by minimising the gap between the HRM practices that management has planned and anticipated and the way employees perceive those practices. This will help managers and employees to clearly understand the effective role that rewards can play in promoting innovation.

2. Theoretical background and hypothesis development

A large part of the enhanced performance and activities linked to the extra-roles that employees might be involved in is explained by the behavioural aspects of employment relationships (Sun et al., 2007). For instance, labels such as innovative work behaviour, engagement,

motivation, and knowledge acquisition and sharing are all explained by behavioural traits (Bos-Nehles et al., 2017; Rai et al., 2018). A topic of interest among scholars, therefore, is to explore and explain what drives such behaviours which are aimed at obtaining a competitive advantage, outperforming competitors and developing successful innovations. Central to organisational innovativeness is the employees' capacity to innovate (Van de Ven, 1986; Jiang et al., 2012). Employees are the source of ideas and knowledge upon which new products and services depend and knowledge itself is the source of ideas, inventions and competitiveness for organisations (Rai et al., 2018). Nevertheless, being conceptualised as a type of behaviour, knowledge acquisition and sharing are linked to motivators and enablers (Andreeva et al., 2017). Rewards appear to be significant in promoting employees' behaviours and interactions, specifically in terms of knowledge acquisition and sharing (Foss et al., 2015). The research model is shown in Figure 1.

2.1. Rewards

According to Lawler (1973), rewards are the most influential aspect of the HR system interventions that can shape employee behaviour. Rewards reflect organisational recognition of employees' efforts towards goal attainment as well as their extra-role efforts and behaviours (Chen and Hsieh, 2006). Rewards are also associated with motivation and engagement at work, which can lead to higher levels of productivity and performance (Rai et al., 2018). Irrespective of whether they are monetary or non-monetary, rewards are critical elements in the psychological sphere of any employment relationship (Stiles et al., 1997).

Rewards signal organisational support and care for employees in recognition of their achievements, contribution, and behaviours in promoting idea creation and risk taking (Andreeva et al., 2017). In addition, rewarding employees may influence their sense of achievement, making them feel the desire to fulfill organisational goals (Camelo-Ordaz et al., 2011). In this respect, the self-direction and motivation of knowledge workers can lead to knowledge sharing when performing tasks.

2.2. Social exchange theory

SET is one of the most influential theoretical paradigms for explaining behavioural traits in the employment relationship (Cropanzano and Mitchell, 2005). It is widely conceptualised as a set of interactions that can lead to obligations and reciprocations (Blau, 1964). The fundamental base for such interactions depends on the actions and arrangements the other party has taken and applied. Moreover, SET is likely to generate an improved relationship between employer and employee, which can result in enhanced organisational performance. Accordingly, scholars have linked SET to favourable employee outcomes such as IWV (e.g., Ramamoorthy et al., 2005) and innovation (e.g., Vanhala and Ritala, 2016). SET is developed when the employer shows that they take care of their employees (Blau, 1964). For this to take place, employers need to introduce arrangements that signal to employees that they are valued and cared for (Wayne et al., 1997). When this harmony is developed,

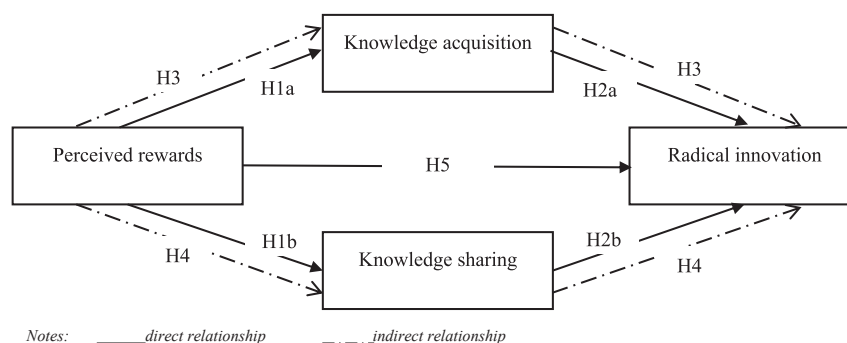


Figure 1. Research model.

employees will then reciprocate by exerting additional efforts that go beyond their described job duties (Sanders et al., 2010). The notion of reciprocation is the underlying concept of the SET. Organisations have different tools and arrangements to show employees that they are valued, supported and cared for. Among these arrangements, HRM practices – specifically motivation-enhancing practices like rewards – are of significant importance (Vanhala and Ritala, 2016; Wayne et al., 1997).

Theoretically and empirically, such interactions and the feeling of obligation to pay an organisation back will encourage employees to successfully complete multifaceted tasks that require creativity and IWB (Ramamoorthy et al., 2005). This leads to positive behavioural and attitudinal consequences in the form of enhanced performance outcomes such as innovation (Janssen, 2000). Interestingly, the outcomes of social exchange between the employer and employee tend to be in the form of long-term rather than short-term obligation. SET has been used as a theoretical framework in a number of extant studies that link HRM practices to enhanced organisational productivity and performance and the stimulation of positive and innovative behaviours (e.g., Janssen, 2000; Ramamoorthy et al., 2005; Sanders et al., 2010). This study will therefore use the SET as a theoretical framework that underpins the relationship between rewards and favourable knowledge-acquisition and -sharing behaviours, as well as the exertion of extra effort to innovate.

2.3. Radical innovation

Damanpour (2010) defined innovation as the introduction and transformation of new ideas into products and services that are new to the organisation and market. It is conceived as a means through which organisations respond to a turbulent market environment, shortened product life cycle, increased competition and the pressure to continuously introduce new and improved products and services (Henderson and Clark, 1990; Lennerts et al., 2020; Tellis et al., 2009).

Jansen et al. (2006) and Van de Ven (1986) have argued that innovation is a source of competitive advantage and organisational survival. In respect to its typology, it is classified as a product, service, market or administrative and technological development (Damanpour, 1991; Schumpeter, 1934). Depending on its level of novelty, scholars have identified innovation as ranging from incremental to radical. Incremental innovation reflects minor changes to existing products and services (Henderson and Clark, 1990). Such innovations are expected to be easily accepted by customers and are, therefore, associated with less disruption to competitors, less extensive resources and less risk in development (Jansen et al., 2006). Radical innovation, however, entails the introduction of major changes to current products and services, which can lead to fierce competition and therefore represents higher levels of risk (Shaikha and O'Connor, 2020). Radical innovation allows for the introduction of totally new products, which can facilitate obtaining more customers and entering new markets (Lennerts et al., 2020). It promises greater rewards for an organisation when introduced successfully (Shaikha and O'Connor, 2020; Tellis et al., 2009). To promote radical innovation, however, organisations need to develop their capacity to innovate (Damanpour, 2010), obtaining knowledge (Flor et al., 2018) and access to more resources including capable human resources (Tellis et al., 2009; Van de Ven 1986). Organisational capacity to innovate comes from employees who possess knowledge, introduce new ideas and face challenges head on (Zhou and Li, 2012). Therefore, motivating employees and enlarging their potential and capacity to engage in radical innovation is of critical importance if organisations seek to innovate successfully.

2.4. Knowledge acquisition and sharing

Each organisation has its own knowledge base that can be rare, unique and inimitable. This knowledge is a valuable organisational resource and can allow an organisation to develop its competitive advantage (Collis, 1994; Barney, 1991; Teece, 2007). It enables

organisations and employees to respond to changes in the market and to understand customers' needs more effectively (Nonaka and Von Krogh, 2009). More importantly, knowledge develops human resources capabilities to introduce new products and services (Barley et al., 2018; Bock et al., 2005; Forés and Camisón, 2016). The literature identified two processes to develop an organisation's knowledge base: knowledge acquisition and knowledge sharing (Cabrera et al., 2006). Knowledge acquisition refers to accessing and obtaining new knowledge that may originate from external or internal sources (Nonaka et al., 2000), and it is vital for developing new products and services. Acquiring new knowledge is also associated with organisational learning and employee development (Kim and Lee, 2010). Knowledge sharing is defined as the process through which the knowledge is being transferred and disseminated among to organisational members (Andreeva et al., 2017). Knowledge sharing takes two forms; knowledge collecting which refers to persuading others to share their knowledge, and donating which is about internal willingness to share one's own knowledge with others (Kamasak and Bulutlar, 2010). For knowledge acquisition and sharing processes to take place, employees need to feel motivated and supported by their management (Rohim and Budhiasa, 2019).

In addition to developing employees' capacity to innovate, knowledge enhances organisational renewal and survival because it contributes to the value creation of available resources (Minbaeva et al., 2012). If an organisation lacks knowledge, it will not matter if it has available resources, management support and motivated employees; those elements will not be enough to introduce valuable and successful products. Knowledge sharing, however, facilitates the optimal use of both intangible and tangible resources (Smith et al., 2005), which are critical elements in the organisational capacity to innovate. Employees and organisations alike continuously require new knowledge to develop product and market differentiation. Obtaining knowledge resources within an organisation is expected to facilitate employees' efforts to combine ideas, introduce new solutions and tackle complex tasks, as well as to support their efforts when engaged with extra roles such as innovation (Camelo-Ordaz et al., 2011; Černe et al., 2017). Knowledge acquisition and sharing are especially useful when employees are faced with multifaceted tasks that require employee interaction, purposeful use of available resources and the introduction of new technology at work (Zhou and Li, 2012), all of which are considered enabling factors for innovation.

2.5. Rewards on knowledge acquisition and knowledge sharing

Fundamentally, knowledge originates from, and is held by, individuals in the organisation (Kim and Lee, 2010). Employees' behaviours and their willingness to acquire and share their knowledge are shaped and influenced by practices imposed by management (Zhou and Li, 2012). Wide agreement exists on the behavioural aspects of employment relationships which are promoted through rewards in encouraging positive employee behaviours towards risk taking, idea generation, knowledge creation and knowledge sharing (Durmusoglu et al., 2014).

Knowledge is defined as a mix of experiences, information, understanding of different concepts and contextual facts and the interrelation between them, which together might provide a framework and original ways of obtaining and understanding new information, which may ease task performance (Davenport and Prusak, 1998). Knowledge management research has identified different processes for understanding what knowledge is and how it is formed (Liu and Liu, 2008). Among these processes, knowledge acquisition and sharing are identified as a crucial part of knowledge management.

Employees are the repositories of knowledge and its various management processes (Nonaka and Takeuchi, 1995). Knowledge acquisition is part of knowledge management, which can lead to the development of a knowledge base in the organisation. The literature identifies two activities related to the acquisition of new knowledge: seeking and acquiring such knowledge; and interaction and collaboration between

employees and business units using existing knowledge to create something new (Kim and Lee, 2010). In this respect, SET frames the employment relationship as one of give and take. Employees offer their services and make efforts to accomplish tasks, while their organisation offers them remuneration in return. A major part of employees' activities requires knowledge to facilitate task completion, and knowledge sharing to widen the potential exploration of new ideas and solutions (Lin and Chen, 2007). Knowledge in itself will not create value if it is not shared (Liu and Liu, 2008). Employees' efforts with regard to knowledge behaviours will lead to greater benefits and value, they are likely to acquire and share their knowledge if they receive rewards (Rohim and Budhiasa, 2019). According to Lawler (1992), without a proper reward mechanism, behavioural involvement is likely to weaken over time.

Motivating employees to acquire and share knowledge necessitates a set of organisational arrangements; in particular, ones related to human resource management (Hislop, 2003; Andreeva et al., 2017). The literature stresses the need for more work on the relationship between HRM and knowledge management (Hislop, 2003; Rohim and Budhiasa, 2019). Similarly, scholars have emphasised the instrumental role of rewards in fostering knowledge management (Foss et al., 2015). A recent study by Rohim and Budhiasa (2019) found that rewards play a significant role in employees' knowledge sharing attitudes, while Kim and Lee (2010) found that knowledge sharing capabilities demand interaction and collaboration between employees.

Rewards have been recognised as a vital HRM function, through which motivation and engagement can be stimulated (Monsen et al., 2010). To acquire and share knowledge, employees must feel they want to do so; in order for this to happen, motivation, involvement and engagement aspects of the employment relationship must be present (Zhou and Li, 2012). Rewards can lead to higher motivation and engagement at work in the form of reciprocal behaviour resulting from organisational investment and recognition of employees' efforts and behaviours (Ramamoorthy et al., 2005). In considering the effects of multiple HRM practices, including rewards, Camelo-Ordaz et al. (2011) found that knowledge sharing positively affects innovation performance. Therefore, it is sensible to predict that rewards can promote employee behaviours towards knowledge acquisition. Hence, the following hypothesis is developed:

H1a. *Perceived rewards are positively related to knowledge acquisition.*

Expectancy theory (Vroom, 1964) claims that employees' engagement with certain activities is largely dependent on their expectations of participating in them. In this regard, rewards can facilitate the willingness and ability to acquire and share knowledge. According to Cabrera et al. (2006), rewards can predict the extent to which employees seek to share their knowledge. In other words, if employees perceive that their efforts to acquire knowledge from different resources and share it with their colleagues will be rewarded in order to facilitate task performance and generate purposeful ideas, they will be more likely to engage in knowledge-sharing activities (Durmusoglu et al., 2014).

Knowledge extraction and exploitation in terms of both explicit and tacit knowledge can be stimulated through rewards. Explicit knowledge, also known as codified knowledge, refers to that which is stored in codes; formal knowledge in numbers and words kept on databases and accessible to anyone in the organisation (Hansen et al., 1999). On the other hand, tacit knowledge refers to that which employees acquire by experience, through challenging tasks and personal skills. This kind of knowledge is not stored on databases nor is written down; rather, it is shared among group members, face to face with different members of the organisation. Obtaining explicit knowledge is made through familiarisation with organisational rules, regulations and work procedures. Showing interest in developing this aspect signals employees' willingness to develop their knowledge (Hansen et al., 1999). Therefore, the availability of a mechanism that rewards employees for such behaviours is likely to result in advanced levels of knowledge acquisition and sharing.

Rewarding employees can also stimulate tacit knowledge, which can save time, reduce complexity and enable organisations to pursue and initiate more projects, as well as to develop communication channels (Suh et al., 2020), which is crucial for critical activities such as innovation (Hansen et al., 1999). Psychologically, the gaining of rewards is likely to outweigh the costs associated with the efforts exerted to acquire and share knowledge, consequently resulting in higher motivation and engagement (Bonner et al., 2000).

However, relying solely on knowledge acquisition is not sufficient for sustaining competitive advantage; rather, knowledge that is useful and shared with other organisational members is the source of competitive advantage (Lombardi et al., 2020). Therefore, rewards can ensure that knowledge acquisition and sharing are purposefully utilised and implemented to secure competitive advantage (Crene et al., 2017). According to Foss et al. (2015), knowledge sharing reflects cooperative behaviour in an organisation through which individuals interact and collaborate with each other to access new knowledge and usefully implement that which exists. Hence, the literature has recognised knowledge acquisition and sharing as a form of organisational citizenship behaviour which can generate favourable outcomes and effective contributions (Sun et al., 2007).

Knowledge sharing leads to the generation of new ideas and solutions and to critical thinking, so it can enhance the innovation capacity of the organisation (Andreeva et al., 2017; Lombardi et al., 2020). In fact, knowledge sharing involves two processes: sharing or giving knowledge to employees; and receiving knowledge from employees. This highlights the interaction between knowledge acquisition and knowledge sharing, both of which are critical for organisational performance and innovativeness (Chang et al., 2007). The absence of rewards mechanisms might hinder the acquisition and sharing of knowledge (Foss et al., 2015). Consequently, if organisations are to develop their employees' capacities and knowledge in order to be more innovative and competitive in the market, they should implement a reward system that promotes employees' behaviours with regard to knowledge acquisition and sharing.

Conversely, employees are less likely to share their knowledge if they are not motivated (Camelo-Ordaz et al., 2011; Ipe, 2003). Ipe identifies that personal motivators take two forms: internal and external. The internal concerns the power and status resulting from preserving knowledge to be shared. However, the hiding of knowledge to gain power is detrimental for the organisation and employees (Davenport, 1997). Fear of knowledge exploration and sharing as a result of a lack of valuable returns from the organisation will have a negative impact on knowledge (Flor et al., 2018; Ipe, 2003).

Based on the above discussion, rewards as a motivational tool appear to generate higher levels of employee engagement in knowledge sharing, which can lead to finding solutions, reducing uncertainty and developing new ideas. Therefore, the following hypothesis is developed:

H1b. *Perceived rewards are positively related to knowledge sharing.*

2.6. Knowledge sharing, acquisition and radical innovation

Many innovation activities depend heavily on employees and their inputs into the related processes (Damanpour, 2010). They are the cornerstone of innovation as they are the source of ideas and process different phases of product or process development (Subramaniam and Youndt, 2005). This notion of knowledge and innovation as a process is highlighted by Nonaka and Takeuchi (1995), who point out that in order for the knowledge possessed at the individual level to create value, it needs to be enlarged and disseminated at the organisational level (Flor et al., 2018). Resources that are valuable, rare, inimitable and non-substitutable are the main source of competitive advantage (Barney, 1991). In this regard, knowledge acquisition and sharing allow for the development of individual and organisational knowledge to be conceived as organisational resources that can contribute to competitiveness and innovativeness (Barney, 1991).

The acquisition and sharing of knowledge support the multi-stage process of innovation, which typically demands continuous support and inputs from different levels (Cohen and Levinthal, 1990). Employees are expected to engage in innovation at any phase, and a key to their engagement is their knowledge. Radical innovation entails the introduction of novel ideas and major developments to existing products and services (Barba-Aragón and Jiménez-Jiménez, 2020). At the individual level, radical innovation requires two factors: acquiring and sharing knowledge; and personal motivators such as rewards (De Winne and Sels, 2010).

Because radical innovation leads to value creation and developing organisational competitiveness at a rate that differs from that of incremental innovation (Tellis et al., 2009), it demands that the acquisition of new knowledge be applied at various levels of the innovation phase. These can range from gathering market information, understanding rivals' tactics, absorbing trends and making technological advances to effective transformation and combination of different resources (Andreeva et al., 2017; Brachos et al., 2007). In addition, a study by Liao et al. (2010) found that knowledge acquisition is related to innovation capability through the mediating effect of absorptive capacity. This was confirmed in a recent study by Papa et al. (2018), where they concluded that knowledge acquisition influences innovation performance. Kim et al. (2020) also found knowledge acquisition to be positive for innovation and capable of mediating the relationships between dynamic, hostile and complex environments and innovation by forcing firms to seek and acquire new knowledge in order to develop their capacity to innovate.

A large part of knowledge acquisition entails employee learning and development that can facilitate the introduction of new products and services. This will also enlarge the pool of solutions the organisation has. If organisations are to survive in a dynamic environment, acquiring knowledge is considered a means of adapting to changes (Teece, 2007). Therefore, based on the above discussion and findings from the literature, it can be predicted that knowledge acquisition promotes radical innovation.

H2a. *Knowledge acquisition is positively related to radical innovation.*

Knowledge without sharing will result in almost no value for innovation, since it is a multifaceted process which needs constant feeding from resources and knowledge, as these are the raw materials to fuel it (Nonaka and Takeuchi, 1995). Most importantly, as innovation is a complex process, knowledge provides employees with the ability to control and organise innovation processes. Furthermore, knowledge which is particularly shared among employees is easier to integrate into organisational patterns and norms, which can generate greater value in fuelling innovation (Forés and Camisón, 2016). Organisation-specific knowledge and experiences encapsulated by tacit knowledge are shared through knowledge behaviours and interactions among employees (Nonaka and Von Krogh, 2009). These experiences and knowledge are valuable, but very difficult to imitate, which promotes competitiveness and innovativeness (Nonaka et al., 2000). Such interactions will usually take place when introducing innovation. Combining existing knowledge with that which is newly acquired allows for a diverse knowledge base, which serves as a pool for novel ideas and solutions (Forés and Camisón, 2016).

Organisational units and individuals hold different kinds of knowledge, meaning that it is fragmented at the organisational level (Smith et al., 2005). Such knowledge is greatly needed during innovation processes, as individual knowledge may become obsolete if it is not shared in alignment with organisational values (Minbaeva et al., 2012). Fragmented knowledge is likely to be accessible and of value when shared, allowing for maximisation of task efficiency and performance (Minbaeva et al., 2012).

The sharing of knowledge between those who possess it and those who do not implies a voluntary act which results in shared ownership (Swan et al., 2007). This facilitates idea generation, combining unconnected information, views and resources, which allows for the creation of

knowledge that can fuel innovation (Cohen and Levinthal, 1990). Creating and building new knowledge is achieved by absorbing the shared knowledge possessed by others, without this being a compulsory act. Individual-specific behaviours, in particular knowledge acquisition and sharing, constitute critical elements of innovation (Shipton et al., 2005). Recent work on knowledge management has claimed that knowledge sharing can nurture radical innovation. For instance, Andreeva et al. (2017) found that knowledge sharing is significant for radical innovation.

Cohen and Levinthal (1990) have stressed the importance of knowledge sharing for innovation. Employee interaction, especially among those who have different types of knowledge, enhances the organisational ability to innovate, while knowledge sharing helps to create an intellectual climate in the organisation, which can support innovation. For knowledge to be better utilised, thus leading to effective innovation, both the knowledge sender and receiver should be willing to transmit and absorb knowledge in order to create something new. Swan et al. (2007) and Brachos et al. (2007) both found that knowledge sharing was significantly affecting innovation. Therefore:

H2b. *Knowledge sharing is positively related to radical innovation.*

2.7. Rewards and radical innovation

Rewarding employees is defined as an outcome of employment relation that is perceived to be of value and satisfactory by the employee (Lombardi et al., 2020). Whether offered in monetary or non-monetary forms rewards are associated with enhanced levels of engagement (Rai et al., 2018), performance (Chen and Hsieh, 2006), promoting sense of being supported (Muduli, 2016) and positive behaviours such as innovative work behaviour (Ramamoorthy et al., 2005) and knowledge management (Durmusoglu et al., 2014). Rewards are conceptualised as an instrumental element of psychological climate of the employment relation which is critical for employees' satisfaction and engagement at work (Chen and Hsieh, 2006).

Rewards represent a mechanism which fuels radical innovation and knowledge behaviours by promoting employee engagement and involvement (Foss et al., 2015). Radical innovation leads to increased job demands and the need to deal with high levels of uncertainty; however, knowledge can reduce the ambiguity and uncertainty associated with radical innovation (Barba-Aragón and Jiménez-Jiménez, 2020). According to Blau's (1946) social exchange theory (SET), in a social exchange the received benefits from one party will be reciprocated by the other party in the form of exchange. Lazzarotti et al. (2015) highlighted the need to better implement HRM practices of rewards, recruiting and training to promote knowledge-related behaviours and enhance the ability to innovate. Studies also recognised the crucial role that HRM practices can play in promoting behaviours linked to knowledge management that facilitate organisational innovation (e.g., Cabrera and Cabrera, 2005; Laursen and Foss, 2003). Employees' capacity to engage in and promote organisational innovation depends on their ability to find solutions and exert extra efforts. An available rewards system leads to effective use of organisational resources and allows for knowledge to be used more purposefully (Andreeva et al., 2017; Lazzarotti et al., 2015). Employees who receive rewards perceive their organisation as caring, which results in their making extra efforts to reciprocate that care and contribute to organisational development. This may take the form of various types of behaviours, such as engagement, knowledge sharing and – as a result – innovation. Additionally, as innovation consists of various phases from idea generation to transformation, knowledge forms a cornerstone through which employees can develop their ideas, find new solutions and translate ideas into actual products and services (Laursen and Foss, 2003). Here, a reward system is expected to propel employees to seek new knowledge and share solutions with their colleagues, as well as to increase employees' willingness to participate in radical innovation overall. Knowledge forms an intangible asset that can lead to meaningful

utilisation of resources and technology and that can offer valuable input for the organisation when applied successfully.

Therefore, the following hypotheses are developed:

H3. Knowledge acquisition mediates the relationship between perceived rewards and radical innovation.

H4. Knowledge sharing mediates the relationship between perceived rewards and radical innovation.

Consequently, rewards can stimulate positive perceptions of organisational care and support, resulting in developed levels of performance and engagement at work (Ramamoorthy et al., 2005). As innovation involves different phases and radical forms containing a variety of challenging activities (Damanpour, 2010), it is therefore critical for employees to be motivated and engaged, and in this respect, rewards represent a motivational tool that can trigger employees' participation in radical innovation (Barba-Aragón and Jiménez-Jiménez, 2020). Based on the empirical evidence between perceived rewards, knowledge behaviours, and radical innovation, Therefore:

H5. Perceived rewards are positively related to radical innovation.

3. Data and methodology

3.1. Sample and procedure

A purposive sampling approach was used given that the target group of participants was specified as employees engaged in manufacturing processes or innovation-focused activities within manufacturing firms. To that end, several manufacturing firms in the pharmaceutical and technology industry in New Delhi, India, were approached via their HRM or public relations managers. After the nature of the study was explained to them, three firms agreed to participate. The rationale behind choosing these firms is that they are knowledge-intensive firms involved in activities related to innovation, specifically radical innovation, which requires more resources, technology and human interaction and collaboration (Chandy and Tellis, 2000). This was confirmed by the consent form provided to each firm prior to its participation in the study. Additionally, all participating

Table 1. Scores for reliability, validity and CFA loadings.

Construct	Mean	Std.	Item description	Loadings CFA	Cronbach's Alpha	Composite Reliability	AVE
Perceived Rewards Source: Snell and Dean (1992).	4.102	0.812	I get paid for my contribution	0.80	0.841	0.843	0.573
			I get paid for my performance	0.78			
			Wages in my work unit are competitive for this industry	0.69			
			Pay levels in my unit are better than other firms	0.75			
Knowledge acquisition Source: Lin and Lee (2005).	4.031	0.790	I use the processes that my organisation has for generating new knowledge based on existing knowledge	0.82	0.852	0.852	0.658
			I use the processes that my organization has for acquiring customer knowledge.	0.79			
			I use the processes that my organisation has for acquiring knowledge on new products and services	0.82			
Knowledge sharing Source: Zárraga and Bonache (2003).	4.385	0.639	In my work team, I have learnt new things from my colleagues that only they knew.	0.86	0.711	0.799	0.505
			In my work team, I have shared knowledge and experiences from my past (in this company or in others) that only I knew.	0.63			
			In my work team, it is normal that, as a result of ideas contributed by a member, we have related ideas that we had never considered before, and which we go on to develop.	0.77			
			I show my co-workers how to perform the most difficult part of the work	0.54			
Radical innovation Source: Jansen et al. (2006).	3.707	0.871	Our unit accepts demands that go beyond existing products and services.	0.88	0.894	0.909	0.714
			We invent new products and services.	0.74			
			We frequently utilize new opportunities in new markets.	0.86			
			We regularly search for and approach new clients in new markets	0.89			

Table 2. Discriminant validity.

	Rewards	Radical innovation	Knowledge acquisition	Knowledge sharing
Rewards	0.757			
Radical innovation	0.753	0.845		
Knowledge acquisition	0.574	0.560	0.811	
Knowledge sharing	0.286	0.202	0.310	0.711

Note: The AVE square roots are shown diagonally in bold. The values below the diagonal are the correlations between constructs.

Table 3. Hypothesis testing.

	Estimate	S.E.	C.R.	P	Hypothesis Remarks
KNACQUS <— REWARDS	.480	.059	8.366	***	H1a: Perceived rewards → Knowledge acquisition (Supported)
KNSHRNG <— REWARDS	.269	.044	4.265	***	H1b: Perceived rewards → Knowledge sharing (Supported)
RADINOV <— KNACQUS	.216	.060	3.940	***	H2a: Knowledge acquisition → Radical innovation (Supported)
RADINOV <— KNSHRNG	-.005	.081	-.109	.913	H2b: Knowledge sharing → Radical innovation (Not supported)
RADINOV <— REWARDS	.548	.064	9.710	***	H5: Perceived rewards → Radical innovation (Supported)

Notes: Results for H3 and H4 are shown in Table 4.

firms have a total number of employees over 300, as confirmed by each firm during the process of requesting their approval for participation and prior to disseminating the questionnaire to collect data. The reason for targeting such firms is that these firms are more capable of introducing innovation and specifically radical innovation as it requires more resources, technology and human interaction and collaboration (Chandy and Tellis, 2000). A total of 570 questionnaires were sent out by email, and 235 valid responses were collected, representing a 41.2% response rate. The data were collected between December 2019 and January 2020.

3.2. Measures

Regarding the measures used, all responses were captured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

3.2.1. Perceived rewards

This point was measured using a five-item scale adopted from Snell and Dean (1992) that measured the availability of reward mechanisms from the employees’ perspective and the extent to which rewards were offered based on the introduction of new ideas, contributions and performance. One sample item was, ‘I get paid for my contribution’.

3.2.2. Knowledge acquisition

A scale consisting of five items measured employees’ perceptions of organisational processes that involved available knowledge and the acquisition of new knowledge. The scale was adopted from Lin and Lee (2005) and based on the work of Gold et al. (2001). A sample item included, ‘My organisation has processes for generating new knowledge based on existing knowledge’.

3.2.3. Knowledge sharing

Knowledge sharing was measured by adopting the five-item scale developed by Zárraga and Bonache (2003) to measure employees’ perceptions of participation and engagement of knowledge sharing at work. One sample item was, ‘In my work team, I have learnt new things from my colleagues that only they knew’.

3.2.4. Radical innovation

Radical innovation was measured by five items adopted from Jansen et al. (2006) to capture respondents’ answers about the rate of introduction of novel ideas and products, whether they introduced completely new products and services to their unit, and if they accepted demands that went beyond existing products and services. A sample item was, ‘We invent new products and services’.

Table 4. Mediation test.

Model	R ²	Coefficient	SE	P	95% LL	95% UL
Direct effects						
REWARDS → KNACQUS	.2302	.4974	.0596	.0000	.3800	.6148
REWARDS → KNSHRNG	.0721	.1881	.0442	.0000	.1010	.2752
Mediators (knowledge acquisition and sharing) → Radical innovation						
KNACQUS → RADINOV		.2363	.0610	.0001	.1161	.3566
KNSHRNG → RADINOV		-.0089	.0823	.9144	-.1710	.1533
Direct effect of REWARDS → RADINOV (Perceived Rewards → Radical innovation)		.6215	.0635	.0000	.4963	.7466
Indirect effects						
REWARDS → KNACQUS → RADINOV (H3: Perceived rewards → Knowledge acquisition → Radical innovation)		.1176	.0340		.0536	.1846
REWARDS → KNSHRNG → RADINOV (H4: Perceived rewards → Knowledge sharing → Radical innovation)		-.0017	.0165		-.0351	.0315
Total effect						
		Effect				
		0.7374	0.5640	0.0000	0.6262	0.8486

Notes: based on 5,000 bootstrap subsamples. Mediation (indirect effects) is significant when effect score is positive and no zero intersects the LL and UL.

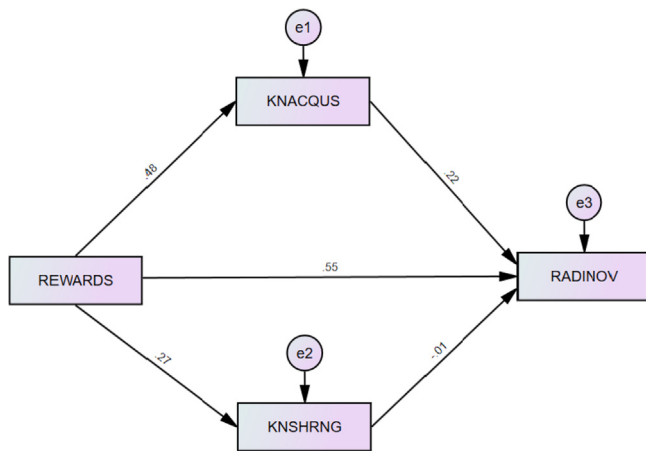


Figure 2. Structural model significance.

4. Results

4.1. Validation of the measurement model

AMOS27 structural equation modelling was used to analyse the data. Confirmatory factor analysis (CFA) with certain fit indices enabled the assessment of internal reliability and the validity of the scales. Composite reliability (CR) was measured for all the scales, and their values were above the threshold of 0.7 (Byrne, 2016; Hair et al., 2010). Validity was checked using average variance extracted (AVE), and the scores for all the scales were above the cut-off point of 0.5 (Fornell and Larcker, 1981), thus confirming adequate convergent validity. Table 1 shows scores for CR, AVE and items loading for each construct. In addition, the squared correlation between the constructs was lower than the AVEs, indicating appropriate discriminant validity, as shown in Table 2. To assess the model fitness, results for the initial model revealed that fit indices of normed chi-square (CMIN/df), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), Tucker Lewis index (TLI), normed fit index (NFI), and root mean square error of approximation (RMSEA) were not within satisfactory limits. Therefore, model purification was performed and resulted in satisfactory scores for the main fit indicators of the model (CMIN/df = 1.841, GFI = .931, AGFI = .892, CFI = .963, TLI = .949, NFI = .923 and RMSEA = .060).

4.2. Hypothesis testing

Tables 3 and 4 show the results. Additionally, Figure 2 displays the output for the structure model. All hypotheses are confirmed except the one about the influence of knowledge sharing on radical innovation. An interesting finding is that rewards have a positive and significant relationship with radical innovation ($B = .548, p < 0.001$). In fact, the findings indicate that rewards are the most significant variable in fostering radical innovation. Therefore, (H5) is supported. This finding is very important for the current debate on the impact of rewards on innovation, as previous studies have obtained inconsistent findings in this regard. Research findings also show that rewards have a positive and significant effect on knowledge acquisition ($B = .480, p < 0.001$), thus confirming (H1a). This is consistent with the findings of previous studies, which have shown that rewards motivate knowledge behaviours. Hypothesis 1b concerns the impact of rewards on knowledge sharing; the results show a positive effect ($B = .269, p < 0.001$), which is consistent with current studies, suggesting that knowledge sharing is a discretionary and voluntary behaviour that requires engagement and motivation. Employees' knowledge behaviour is largely dependent on the motivation that the organisation offers. According to Lawler (1973), rewards are probably the most influential aspect of HRM functions.

Regarding the impact of knowledge behaviour on innovation, results demonstrate that knowledge acquisition has a positive and significant effect on radical innovation ($B = .216, p < 0.001$) so (H2a) is supported. Surprisingly, no support is reported for the impact of knowledge sharing on radical innovation ($B = -.005, p = 0.913 > 0.05$), meaning that (H2b) is not supported.

To test for mediation, PROCESS v2.16 software (Hayes, 2013) was used. PROCESS software will generate 5,000 samples with a bootstrapping confidence level of 95% for the intervals of the indirect effect. If the effect score is positive (effect > 0) and no zero score intersects the lower (LL) and upper (UL) intervals, then mediation is significant at the 95% confidence level (Hayes, 2013, 2017). Table 4 shows the mediation results for hypotheses H3 and H4.

As shown in Table 4, the mediation results indicate that only knowledge acquisition mediates the relationship between perceived rewards and radical innovation ($B = .1176, p < 0.001$) which confirms (H3). There is no support for the mediating role of knowledge sharing in radical innovation (H4), since the score of zero intersects the LL (-.0315) and UL (.0351) values. This is probably not consistent with the literature on knowledge management and innovation. While the majority of studies on knowledge sharing and innovation indicates a positive relationship, this study investigates the impact of knowledge sharing on radical innovation, and not on innovation in general.

5. Discussion and conclusion

The main aim of this paper is to study employee perceptions of the impact of rewards on radical innovation by considering the mediating role of knowledge acquisition and knowledge sharing. The paper focuses specifically on radical innovation, which offers a more specific scope for contribution than innovation in general. Innovation is defined as the introduction of new products and services which can be new to the organisation as well (Damanpour, 2010). Radical forms of innovation require a fundamental change in current products and services and, as a result, demand more resources than incremental innovation, as well as more collaboration, access to new knowledge and employee willingness to participate in all phases. This study found that rewards have a direct and positive effect on radical innovation. This finding is of a unique importance, given that results of previous studies offered mixed findings, some studies concluding that rewards have a negative relationship with innovation (Sue-Chan and Hempel, 2016) and others uncovering a positive relationship (Zhao and Chadwick, 2014). It is probable that rewards, as a critical HR instrument, primarily influence specific forms of innovation; this study suggests that radical innovation is one of them.

The norm of reciprocation as framed by the SET explains employee behaviours with respect to organisational practices. As discussed, when offered rewards, employees reciprocate by putting more effort into their tasks; this reciprocation can facilitate a competitive advantage. Furthermore, favourable behaviours towards organisational rewards can facilitate a greater use of existing resources, which will allow for higher levels of involvement in the creation of new ideas and introducing new products, especially in manufacturing firms.

The impact of rewards on radical innovation can also be explained by the knowledge-management mechanisms, specifically knowledge acquisition. Knowledge acquisition facilitates the development of new and creative ideas, as well as a better utilisation and coordination of resources (Brachos et al., 2007), which are critical elements in the introduction of radical innovation. Because knowledge resides within employees (Lin and Lee, 2005), who are the ones to share, create and apply their knowledge, it is critical for organisations to motivate those employees. In this study, rewards proved to be significant for promoting employee behaviour in respect to knowledge sharing and acquisition.

Radical innovation entails high levels of complexity and a wide availability of resources, and the findings in this study suggested that it requires employees to engage in increased job demands. The findings also showed that intangible resources – specifically acquiring knowledge

– are significant for radical innovation. This finding was expected because acquiring new knowledge facilitates the process of idea generation and implementation. Knowledge acquisition is a dynamic behaviour that frequently calls for organisational support to allow its occurrence, and employees interpret the introduction of rewards as a signal of support offered by their organisation. This support leads to the employee motivation, knowledge acquisition and novel ideas necessary for the introduction of radical innovation (Martín-Pérez and Martín-Cruz, 2015). Employees' perceptions of organisational arrangements can induce their motivation and involvement in various ranges of tasks. Additionally, employees are likely to engage in extra roles such as innovative work behaviour and innovation when they perceive that their organisation support them (Bos-Nehles et al., 2017).

Current studies on IWB have obtained contradictory findings about the impact of rewards on IWB. The majority of these studies have found that rewards negatively affect IWB (e.g., Bysted and Hansen, 2013; Dorenbosch et al., 2005), and only a few have found a positive relationship (e.g., Ramamoorthy et al., 2005). Ramamoorthy et al. (2005) further explained this relationship as social exchange, indicating that employees feel obliged to repay their organisation and agree on something of mutual benefit to both employee and employer, which is referred to as the psychological contract. Employees' perceptions of the introduction of certain practices, specifically the motivation-enhancing practice of rewards, is likely to be reciprocated by extra effort, increased motivation and other positive behaviours. This explains employee behaviours regarding knowledge sharing and acquisition, as these represent a vital behavioural aspect of the employment relationship; rewards in this respect allow for the fulfilment of the psychological contract. This study has also explored the knowledge behaviour mechanism that enables rewards to foster radical innovation. In addition to the direct positive impact of rewards on radical innovation, knowledge behaviour was also found to play a significant role in radical innovation.

Knowledge acquisition is a dynamic behaviour that frequently calls for organisational support to allow its occurrence. Employees interpret the introduction of rewards as a signal of support offered by their organisation which leads to the introduction of radical innovation. This study found that knowledge acquisition has a positive and significant effect on radical innovation, mediating the relationship between rewards and radical innovation, but it also showed that knowledge sharing has no significant effect on radical innovation, which is inconsistent with most previous studies (Zhou and Li, 2012). However, a few studies have reported similar findings. For instance, Kamasak and Bulutlar (2010) found no significant effect for knowledge sharing on radical innovation. In this study, it is probable that because radical innovation entails novel ideas and complex forms of knowledge, employees might have been reluctant to share their knowledge due to the complex process. Moreover, the present study measured the extent of employees' knowledge-sharing behaviours with no explicit focus on the form of knowledge sharing.

6. Implications for theory and practice

The study makes a number of contributions to the literature. First, the paper explained the reward-innovation link from the perceptions of employees, by considering the interfering role of knowledge acquisition and knowledge sharing. The study focused on how rewards can affect radical innovation from the knowledge-based perspective. Despite agreement in the literature that HRM practices can promote innovation, little work has been done on the type of innovation these practices may promote. The majority of HRM-innovation studies have identified innovation as innovation performance (e.g. Shipton et al., 2006; Jiménez-Jiménez and Sanz-Valle, 2008; De Winne and Sels, 2010) and offer insights into how HRM practices can impact innovation, but with little attention to or distinction made between the types of innovation that HRM practices can promote; for example, incremental vs radical innovation. This study extends the literature on HRM and innovation by identifying the degree of novelty that innovations can offer through the

impact of rewards. Second, the study focused on rewards as an HRM practice by studying the role they can play in knowledge behaviours and radical innovation. Extant studies offer mixed results and explanations on the impact of rewards on innovation. The arguments on the impact of such rewards fail to offer consistent findings or conclusions; for instance, some studies (Shipton et al., 2006; Zhao and Chadwick, 2014) found that reward systems are positive for innovation, while Sue-Chan and Hempel (2016) found a negative moderating impact of rewards on innovation. Debate and arguments in this line of studies are furthered by clarifying and identifying what type of innovation rewards can foster; namely, radical innovation. This would also benefit managers and innovation practitioners to pay more attention to the role of rewards in developing an organisational capacity to innovate.

Third, the study examined the mechanism through which rewards can affect radical innovation. The role of knowledge behaviours (acquisition and sharing) has been identified as crucial for innovation because knowledge forms the base for ideas and solutions and for reducing complexity (Camelo-Ordaz et al., 2011; Lin and Lee, 2005). Knowledge acquisition and sharing contribute to firms' knowledge base (Andreeva et al., 2017); however, little is known about what drives knowledge behaviours (Camelo-Ordaz et al., 2011). Such behaviours are claimed in the literature to be linked with motivational factors (Foss et al., 2015), and it is widely agreed that rewards promote employees' motivation and engagement at work.

Fourth, this study offers significant implications for managers and organisations. If organisations are to introduce radical innovation to secure a market lead and be a primary mover, more attention should be paid to employee engagement in knowledge behaviours. More specifically, managers are encouraged to motivate their subordinates to acquire and share new knowledge with their colleagues to create a supportive environment for innovation. One way to do that is through the effective implementation of rewards systems as an incentive mechanism and to signal support to employees. Recognising employee efforts is critical for their engagement in knowledge acquisition and sharing, in addition to enhancing their willingness to innovate.

7. Limitations and directions for future research

While this study offers important findings, it also contains some limitations. First, the study is cross-sectional, which might limit the conclusions on the relationship between the variables. Future research involving longitudinal studies may minimise such an effect. The study also focuses on a single HRM practice related to radical innovation, whereas combining other HRM practices such as appraisal or training to measure the interaction between different HRM practices and their impact on radical innovation could be interesting. With regard to knowledge management, although rewards are acknowledged to motivate knowledge acquisition and sharing, future research could consider whether they can affect other aspects of knowledge management, specifically knowledge application. The study measures the relationship between rewards and radical innovation through the mediation of knowledge acquisition and sharing at the individual level; that is to say, employees' perceptions of this relationship. However, managers' perceptions might differ from those of employees, therefore future research could consider their perceptions in order to examine the variations that might lead to poor implementation and outcomes of rewards and other HRM practices. Additionally, exploration of the link that facilitates the role of knowledge acquisition and sharing in the achievement of radical innovation could be expanded by studying what mediates or moderates this link.

Declarations

Author contribution statement

Motases Thneibat: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

The data that has been used is confidential.

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The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

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