Received 30 September 2016
Revised 16 March 2017
8 June 2017
Accepted 14 June 2017

HRM and innovative work behaviour: a systematic literature review

Anna Bos-Nehles
Department of Business Administration, School of Behavioural, Management and Social Sciences, University of Twente, Enschede, The Netherlands, and
Maarten Renkema and Maike Janssen
Department of Human Resource Management, School of Behavioural, Management and Social Sciences, University of Twente, Enschede, The Netherlands

Abstract

Purpose – Although we know that HRM practices can have a huge impact on employees' innovative work behaviour (IWB), we do not know exactly which practices make the difference and how they affect IWB. Thus, the purpose of this paper is to determine the best HRM practices for boosting IWB, to understand the theoretical reasons for this, and to discover mediators and moderators in the relationship between HRM practices and IWB.
Design/methodology/approach – Based on a systematic review of the literature, the authors carried out a content analysis on 27 peer-reviewed journal articles.
Findings – Working with the definitions and items provided in the articles, the authors were able to cluster HRM practices according to the ability-motivation-opportunity framework. The best HRM practices for enhancing IWB are training and development, reward, job security, autonomy, task composition, job demand, and feedback.
Practical implications – The results of this study provide practical information for HRM professionals aiming to develop an HRM system that generates innovative employee behaviours that might help build an innovative climate.
Originality/value – A framework is presented that aggregates the findings and clarifies which HRM practices influence IWB and how these relationships can be explained.

Keywords Qualitative, Systematic literature review, HRM practices, Innovative work behaviour, AMO theory, Best practices for innovative work behaviour

Paper type Literature review

Introduction

Today, innovation is an indispensable factor in enabling organisations to adapt to rapid economic changes and gain a competitive advantage. Research has shown that innovation is beneficial for the performance of organisations (Damanpour, 1991; Jiménez-Jiménez and Sanz-Valle, 2011; Thornhill, 2006) because organisations can then respond to challenges faster and are better at exploiting new products and market opportunities. Despite the burgeoning research interest in innovation at the level of the firm, there is a dearth of knowledge about how innovation can be fostered at the individual level. However, this is the knowledge that is needed if organisations are to pursue innovative strategies and align

The authors would like to thank Edel Conway for her invaluable comments and edits on an earlier version of this paper.

Personnel Review
Vol. 46 No. 7, 2017
pp. 1228-1253
Emerald Publishing Limited
0048-3486
DOI 10.1108/PR-09-2016-0257

employee behaviours with that strategy. According to Agarwal (2014, p. 43), "one option for organisations to become more innovative is to encourage their employees to be innovative".

This paper sets out to address this gap in understanding by providing a systematic review of the evidence on the link between HRM practices and innovative work behaviour (IWB) at the employee level. IWB can be characterised as "the intentional creation, introduction and application of new ideas within a work role, group or organization, in order to benefit role performance, the group, or the organization" (Janssen, 2000, p. 288). Employees are able to initiate innovations because they are in frequent contact with processes and products and can detect potential improvements and opportunities for new developments. However, innovation only occurs if employees engage in activities aimed at generating and implementing ideas. Consequentially, management needs to know how IWB can be shaped and stimulated. *Inter alia*, the design of HRM practices has been identified as a factor in predetermining IWB (Laursen and Foss, 2003; Shipton *et al.*, 2006).

Although many studies have found support for a linkage between HRM and innovation (Laursen and Foss, 2003; Messersmith and Guthrie, 2010; Jiménez-Jiménez and Sanz-Valle, 2008; Mumford, 2000; Shipton *et al.*, 2006) by the former influencing and shaping individuals' attitudes, behaviours and knowledge, they all link HRM to innovation on the organisational level. However, employees' innovative behaviours are central to the innovative capacity of organisations as individuals can be seen as the cornerstone of every innovation. Despite its importance, knowledge about IWB and how it can be influenced is fragmented and inconsistent. As such, organisations may be restricted in their ability to innovate because they do not know how to trigger employees in a way that will encourage them to engage in IWB. For this reason, gaining deeper insight into the factors that influence IWB, and how they do this, is of great relevance as it will provide a more coherent picture of the relationship between HRM and IWB. This review contributes to the IWB literature in two ways. First, since it is crucial to understand the complex relationship between HRM and IWB, this paper clarifies which HRM practices are the best in terms of encouraging IWB. The literature already provides insights into the best practices for organisational performance, such as high-performance work practices (HPWPs) (e.g. Combs *et al.*, 2006) and for employee commitment, such as high-commitment work practices (HCWPs) (e.g. Zhou *et al.*, 2013). However, in this study, we are seeking to identify those practices that are most effective in enhancing innovation and, more specifically, the IWB of employees. Second, we provide a framework that aggregates the findings and investigates the mechanisms that can explain why as well as how and when HRM practices are linked to IWB (Seeck and Diehl, 2016) – that is, we aim to understand the theoretical reasons for and discover mediators and moderators in the relationship between HRM practices and IWB.

The systematic review of the HRM practices-IWB literature is based on 27 articles whose content has been carefully analysed to identify the best HRM practices for boosting IWB. We use the ability-motivation-opportunity (AMO) framework to structure our results and analyse which ability-enhancing, motivation-enhancing and/or opportunity-enhancing HRM practices are best when it comes to stimulating IWB (Bello-Pintado, 2015; Jiang *et al.*, 2012). The AMO framework stresses that the combination of abilities, motivations and opportunities affects organisational performance through discretionary effort (Appelbaum *et al.*, 2000). Here, we focus on IWB as a form of discretionary effort (e.g. Janssen, 2000). Since the AMO framework is argued to be a way to expand the theoretical underpinnings of the HRM-innovation relationship (Seeck and Diehl, 2016), we feel justified in using this framework for the HRM-IWB relationship.

In the remainder of the paper, we will present the research approach and carefully describe the review process. In the results section, we present the HRM practices that come out as best in terms of promoting IWB, provide evidence for the found relationships and explain the linkage based on various theoretical approaches. Combining the various

findings results in a conceptual framework that highlights high-innovation HRM practices plus mediators and moderators that explain the HRM-IWB relationships and the relevant theoretical approaches. The practical implications, limitations and suggestions for future research will be addressed in the discussion section of the paper.

Methodology

Research approach

Since the objective of this study was to develop an integrated framework that includes the various relationships between all possible HRM practices and IWB. In order to derive this integrated framework, we performed a systematic literature review since this approach offers the possibility of analysing in-depth all the relevant articles on this topic, as well as having the potential to detect other unexplored concepts. Further, systematically reviewing a literature stream enhances the quality of the review process and outcomes by deploying a transparent and reproducible procedure (Tranfield *et al.*, 2003) and by incorporating a comprehensive and unbiased search for identifying and evaluating an extensive amount of literature (Mulrow, 1994). For content analysing the final sample of articles we used an inductive research approach.

Description of the review-process: data collection

The Scopus, ISI Web of Knowledge, and Google Scholar databases were used as data sources. Scopus and ISI Web of Knowledge are the most comprehensive databases of peer-reviewed journals in social sciences, and Google Scholar is one of the largest databases available. For the initial search, we used the following search terms and keywords independently, and combined using the Boolean "AND" and "OR" operators: "innovative work behaviour (IWB)", "employee innovative behaviour", "individual innovation", "HRM practice" and "human resource management (HRM)".

Description of the inclusion criteria

The articles identified had to match certain criteria in order to be included in this review. Research on innovative behaviour has increased tremendously since Scott and Bruce's (1994) seminal paper (Bonesso and Tintorri, 2014). Thus, for this systematic literature review, we only selected articles that were published from 1994 onwards. Further, the articles needed to: be published in peer-reviewed journals that had an impact factor since these are considered to provide valid data and therefore have the most influence in the field (Podsakoff *et al.*, 2005); be written in English; contain research about IWB; investigate HRM practices -IWB relationships; and present the results of these individual relationships separately.

Data extraction procedure

The first step of the sample analysis included a check for redundant data. Following this, the abstracts were reviewed against the inclusion criteria. If the paper still appeared relevant, the methodology and discussion sections were then read and summarised including any impacts of HRM practices on IWB. An open coding procedure was executed leading to an inductive content analysis.

Figure 1 presents a flow chart visualising the selection process for articles to be included in this review. Step 1 identified a total of 796 articles (Google Scholar: 549; Scopus: 126; and ISI Web of Knowledge: 121 articles). Step 2 reduced the sample by 73 articles because of redundancies between the different search engines. In Step 3, the abstracts of the remaining 723 articles were checked regarding the inclusion criteria, leading to the removal of a further 645 articles, which left 78 articles. The introduction,

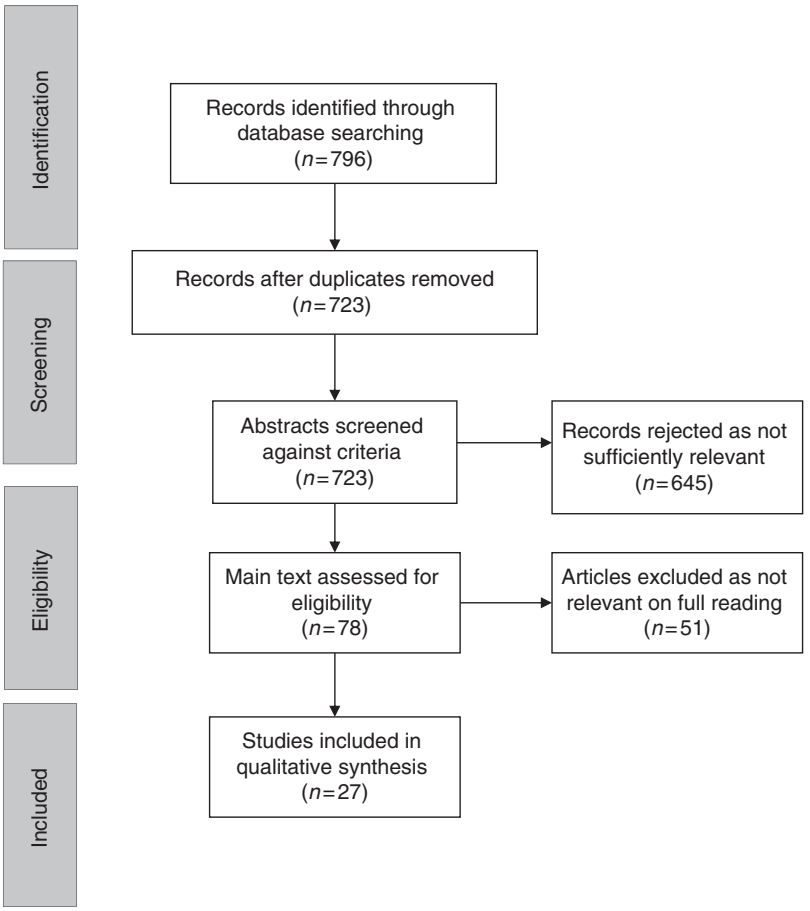

Figure 1.
Prisma flow chart visualising the article selection process

methodology and discussion sections of these articles were checked in detail against the inclusion criteria (Step 4), leading to a further 51 articles being rejected. This final filter left 27 articles that fully met the inclusion criteria.

Description of the sample analysis

To ensure that the studies included used a consistent interpretation of IWB, the authors' definitions were reviewed and the items used to measure IWB examined. After assuring ourselves that the IWB conceptualisation was consistent with what was required for inclusion in our review, the HRM practices investigated were evaluated as part of the content analyses. The articles were compared regarding the following factors: the research question/objective, the theoretical framework(s) adopted, the HRM practices considered, the sample employed, the research design and method and the key findings. The definitions adopted and the alignment of these definitions to the measures used were evaluated. This was to ensure that the HRM practices investigated by the various researchers were broadly similar. In this way, the identification of the best HRM practices for encouraging IWB is based on an inductive approach, which means that we did not develop a list of HRM practices a priori, but based our findings on those HRM practices that were found to affect IWB in our sample. The 27 articles

in our final sample highlighted several HRM-IWB relationships, and we clustered the independent variables around distinct HRM practices based on the conceptualisation of HRM in the original articles. For example, while Janssen (2005) and Ramamoorthy *et al.* (2005) describe the role of independence and freedom to carry out tasks, Fernandez and Moldogaziev (2013) examined empowerment. Based on the conceptualisations of these HRM variables, we clustered them together around job autonomy.

Results

IWB

In this review, IWB is defined as the intentional behaviours of individuals to produce and implement new and useful ideas explicitly intended to benefit the individual, group or organisation. This definition implies that IWB is more than creativity although creativity is a necessary part of IWB, especially in the beginning, in order to generate new and useful ideas (Scott and Bruce, 1994). However, IWB is broader than creativity as it also includes the idea promotion and implementation phase. As such, IWB is expected to generate innovative outputs and therefore benefit the individual, the group or the organisation. Innovative outputs can range from the expansion and renewal of products, services, procedures and processes to the evolution of new production methods and new management systems (Crossan and Apaydin, 2010; Tidd *et al.*, 2001).

How to conceptualise and measure IWB has been the focus of a number of studies. For example, Dorenbosch *et al.* (2005) divided IWB into two main stages: the invention and then the implementation of ideas. Scott and Bruce (1994) split it into three stages: the generation of novel and useful ideas, the search for sponsorship and, finally, the implementation of generated and promoted ideas. However, the generation of ideas is a broad concept and De Jong and Den Hartog (2010) argue that it is also important to consider what gives rise to idea generation. They therefore came up with a fourth IWB stage: the recognition of opportunities or problems. Although IWB is described as a set of stages, De Jong and Den Hartog (2010) failed to find any evidence for the distinctiveness of the different phases. Rather, IWB could be characterised as a mix of discontinuous and interrelated behaviours, where individuals are most likely to be involved in any combination of these activities at any one time (Scott and Bruce, 1994). This is in line with previous investigations in which IWB is seen as a one-dimensional construct (Scott and Bruce, 1994; Janssen, 2000). Although IWB theoretically appears to be multidimensional, empirical evidence is difficult to collect because of the apparent high intercorrelations among the stages.

HRM practices and their effects on IWB

Having conceptualised HRM practices based on the AMO framework, we structure the results on the relationship between HRM practices and IWB as ability-enhancing HRM practices, motivation-enhancing HRM practices and opportunity-enhancing HRM practices (Jiang *et al.*, 2012). Our analysis identified seven HRM practices that could be categorised as best in terms of encouraging IWB. We found one ability-enhancing HRM practice: training and development; two motivation-enhancing HRM practices: reward and job security; and four opportunity-enhancing HRM practices: autonomy, task composition, job demands and time pressure, and feedback.

Ability-enhancing HRM practice. Training and development. The HRM practice of "training and development" was found to significantly influence IWB in several studies (e.g. Knol and van Linge, 2009; Pratoom and Savatsomboon, 2012; Zhang and Begley, 2011) and all these studies found a direct positive effect. We also saw that "training and development" is a composite of various activities that aim to develop competence and knowledge within organisations. For example, a number of studies (Zhang and Begley, 2011;

Ong *et al.*, 2003; Pratoom and Savatsomboon, 2012; Knol and van Linge, 2009) examined knowledge resources and knowledge management and their relationship with IWB, while others (e.g. Bysted and Jespersen, 2014; De Spiegelaere *et al.*, 2012) interpreted training and development as covering competence and career enhancing practices.

The proposed theoretical relationship between "training and development" and IWB differed among the studies. Knol and van Linge (2009), Ong *et al.* (2003) and Pratoom and Savatsomboon (2012) explain the relationship from a human capital and knowledge perspective, in which training and development practices can help to increase employee knowledge, skills and abilities, that employees can then utilise to engage in IWB. Others, such as Sanders *et al.* (2010), explain the relationship between training and development and IWB as a social exchange phenomenon (Blau, 1964) in which employees understand training and development practices as the organisation's personalised commitment to themselves, which they need to reciprocate through positive attitudes and behaviours that are not formally rewarded or contractually enforceable, such as IWB.

The relationship between training and development practices and IWB has been found to be moderated by the organisational context. Bysted and Jespersen (2014) found that the relationship differs between private and public organisations, and that the effect on IWB of training and development practices is lower in public organisations than in private organisations. It was argued that training and development practices have less effect on idea generation and the realisation of innovative ideas for public employees because public employees are generally more highly educated than private employees and, therefore, further competence development in the form of training and development practices have less effect on IWB engagement in these organisations.

Motivation-enhancing HRM practices. Reward. Rewarding employees has been shown to affect employees' engagement in IWB (e.g. Bysted and Jespersen, 2014; Sanders *et al.*, 2010; Zhang and Begley, 2011). Although some researchers have labelled this HRM practice differently, the descriptions are similar. Labels range from expectancy clarity (Bysted and Hansen, 2015), where the focus is on the linkage between innovative performance and reward, to financial mechanisms (Bysted and Jespersen, 2014), and primary and secondary organisational rewards (Sanders *et al.*, 2010; Zhang and Begley, 2011), which may include non-financial benefits as well as pay (Ramamoorthy *et al.*, 2005).

Findings about the relationship between rewards and IWB are ambiguous. Most studies (e.g. Bysted and Hansen, 2015; Bysted and Jespesen, 2013; Dorenbosch *et al.*, 2005; Sanders *et al.*, 2010) found significant negative relationships between reward and IWB dimensions, but some also detected a significant positive linkage between financial and non-financial rewards and IWB. Ramamoorthy *et al.* (2005) explained the positive relationship by referring to psychological contracts in which employees and employers "have agreed" to get the best out of their relationship for both parties. Janssen's (2000) findings are consistent with those of Ramamoorthy *et al.* (2005) in the sense that both suggest that the mutual relationship between the employer and employee influences IWB; however, Janssen (2000) further argued that perceptions of effort-reward fairness were necessary for this mutual relationship to emerge.

In trying to explain the relationship between rewards and IWB, authors mainly draw on insights from the self-determination theory (Gagné and Deci, 2005), but also from the social exchange theory (Blau, 1964). Depending on the theories used to explain the relationship, authors have selected mediators and moderators to explain how rewards and IWB are related, and how they contributed to establishing the link. Janssen (2000) heavily relies on social exchange theory arguments to support a relationship between rewards and IWB, and argues that employees who feel that their efforts are being fairly rewarded feel obliged to reciprocate through IWB. Inspired by this idea, Ramamoorthy *et al.* (2005)

used psychological contract arguments to select mediators such as "expectations met" and "obligation to innovate".

Drawing on the self-determination theory, financial rewards (e.g. bonuses) and indirect financial rewards (e.g. health insurance) can be expected to reduce employees' motivation to engage in IWB, at least when their motivations were intrinsic in nature (Sanders *et al.*, 2010). Further, when rewards are based on performance, they have been found to especially inhibit IWB (Fernandez and Moldogaziev, 2012). Performance is usually defined in terms of short-term outputs and outcomes, and this signals to employees that it is better to focus on "proven ways of doing things" rather than engage in more risky means that challenge the status quo (Fernandez and Moldogaviez, 2012, p. 177). However, when employees are not intrinsically motivated to engage in IWB, but rather perceive IWB as an extra-role behaviour, they expect to be rewarded for such extra effort. This was shown by Zhang and Begley (2011) who found that when organisations used compensation systems to signal to their employees that extra-role behaviours, such as IWB, were recognised and valued, employees perceived their engagement in IWB as of value. However, employees tend to reciprocate with IWB when they feel fairly rewarded for their efforts (Janssen, 2000), when rewards are not based on cost reductions related to implementation, or when they feel they are rewarded for their contribution to the innovation process rather than its outcome (Fernandez and Moldogaziev, 2012). The extrinsic motivation argument would seem especially relevant to public organisations since innovation is considered to be a top-down process. Bysted and Jespersen (2014, p. 234) concluded that public employees needed a clear signal before they would indulge in IWB because they considered IWB to be risky behaviour and thus "it has to be ordered and paid for by the system".

Job security. Based on the social exchange theory, one would expect a positive relationship between job security and IWB because people would reciprocate the job security with discretionary efforts. However, this HRM practice was the least studied in our survey with only two papers referring to it (Bommer and Jalajas, 1999; De Spiegelaere *et al.*, 2012). Moreover, the data in our review only provided evidence for job insecurity having an effect on IWB. Employees perceive job insecurity for various reasons; for example, they may be afraid of being laid off due to downsizing or restructuring within the organisation. Fears surrounding events could also arise and be dispersed throughout the organisations when co-workers are affected by downsizing (Bommer and Jalajas, 1999). Based on the job demands-resources theory (Bakker and Demerouti, 2007), job insecurity is usually treated as a job demand and this explains the negative hypotheses.

From the creativity literature, we know that job insecurity is negatively related with creativity (Probst *et al.*, 2007; Sverke *et al.*, 2002) as it reduces the long-term engagement and commitment of employees to their work. Bommer and Jalajas (1999) hypothesised that feeling threatened would lead to mixed behavioural and motivational outcomes regarding IWB. It was suggested that, on the one hand, employees' performance would decrease in the sense that they would be less willing to make suggestions or fear taking risks; on the other hand, it was posited that employees would be more motivated to perform well so that they would lower the risk of being laid off (Bommer and Jalajas, 1999). Thus, job insecurity could lead to either higher or lower levels of IWB. Both hypotheses are based on fear, which in general would not be seen as a strong motivation for IWB. De Spiegelaere *et al.* (2012) studied insecurity over job content: that employees fear that the content of their work might change, rather than employment insecurity (fear of losing one's job). In this respect, they were able to show evidence for both the positive and negative hypotheses of the influence of job security on IWB. Job content insecurity led to lower levels of IWB for blue-collar workers, but to higher levels of IWB for white-collar workers, which was explained by blue-collar workers being motivated to engage in IWB by extrinsic aspects of their work,

such as job security, whereas white-collar workers are motivated by intrinsic motivational aspects, such as autonomy or work content.

Opportunity-enhancing HRM practices. Autonomy. Although authors label this HRM practice in different ways in the various papers, they all describe "job autonomy" in a very similar way. Most of the studies describe autonomy as the degree of independence and freedom that employees experience in how they carry out their tasks and roles (e.g. Janssen, 2005; Ramamoorthy *et al.*, 2005).

A number of studies (Fernandez and Moldogaziev, 2012; Knol and van Linge, 2009; Marane, 2012) have investigated the concept of empowerment, which consists of two main types: psychological empowerment and structural (i.e. through leadership) empowerment. This empowerment refers to perceptions of psychological state or of leadership style rather than HRM practices as outlined above. However, two of Spreitzer's (1995) four features of psychological empowerment, "self-determination" and "impact", reflect experiences of the working environment and can be related to autonomy (Knol and van Linge, 2009; Fernandez and Moldogaziev, 2012). "Self-determination" is defined as "the freedom that people have in deciding how to do their work" and "impact" is described as the extent to which "the organization takes employees' ideas seriously" (Knol and van Linge, 2009, p. 361).

Our analysis revealed that when the effect of autonomy on IWB was tested, autonomy was most often found to have a direct effect on IWB, although four articles considered autonomy as an intervening variable and proposed an indirect influence on IWB. Nearly all the studies found a significant positive relationship between autonomy and IWB. It seems that the more employees are independent and free to determine how they compose their job, the more they will engage in IWB. As such, autonomy is an important HRM practice for multiple dimensions of IWB since it is significantly positively related to idea generation and idea realisation (Bysted and Jespersen, 2014).

The effect of autonomy on IWB can be explained by various theories, most notably by the social exchange theory (Blau, 1964), self-determination theory (Gagné and Deci, 2005), cognitive evaluation theory (Deci and Ryan, 1985) and job demand-resources (JD-R) theory (Bakker and Demerouti, 2007). The social exchange theory argues that autonomy, or employee empowerment, work as a motivational factor in triggering IWB (Marane, 2012; Ramamoorthy *et al.*, 2005). Marane (2012), for example, argues that where employees trust their top management, in the sense that they feel that their organisation cares for them, they feel obligated to reciprocate value in terms of IWB, and thus trust functions as a mediator. Ramamoorthy *et al.* (2005) used the psychological contract between employer and employee to explain the social exchange, thereby adding "obligation to innovate" as a mediator in their research. However, they found that the direct effect of autonomy on IWB was stronger than the mediated effect.

Based on ideas from the self-determination theory, several authors see intrinsic motivation as an explanation for the relationship between autonomy and IWB (De Spiegelaere *et al.*, 2012; Ohly *et al.*, 2006; Sanders *et al.*, 2010). Ohly *et al.* (2006), for instance, argue that empowered employees are more intrinsically motivated and this, in turn, triggers proactive behaviours such as IWB. Sanders *et al.* (2010) and De Spiegelaere *et al.* (2012) also see intrinsic motivation as behind the positive influence of autonomy on IWB. They further argue that different occupational groups perceive different levels of intrinsic motivation and that this moderates the effect of autonomy on IWB.

Based on the ideas of the cognitive evaluation theory (Deci and Ryan, 1985), Abstein and Spieth (2014) provide an explanation for why intrinsic motivation contributes to the positive autonomy-IWB link. This theory argues that, when they are involved in decision making, employees gain a feeling of having self-determination and competence that, in turn, fosters their intrinsic motivation.

The JD-R theory considers autonomy to be a job resource and thus hypothesises a positive effect between autonomy and IWB. Evidence of this effect has been found by various researchers including De Spiegelaere *et al.* (2012) and Ramamoorthy *et al.* (2005).

The effect of autonomy on IWB has been found neither to differ between public and private organisations (Bysted and Hansen, 2015) nor between sectors (Bysted and Jespersen, 2014), but it does differ between organisations that have different home countries (Zhang and Begley, 2011). A company's home country was shown to moderate the relationship between autonomy and IWB in that the empowerment conceptualisation of autonomy was significant positively related to IWB for employees working in US-owned companies in China but not significantly related for employees of Chinese-owned firms. In addition, there is evidence that autonomy has a stronger effect on IWB for those employees who have opportunities to learn and develop (Fernandez and Moldogaziev, 2012).

Task composition. Task composition is widely considered to be an important HRM practice in determining IWB (e.g. Dorenbosch *et al.*, 2005; Ohly *et al.*, 2006). Although studies use terms such as task variety, job complexity and routine vs non-routine tasks, we label this variable "task composition" since this better reflects aspects of job design other than autonomy and also includes routinisation as part of job complexity.

Based on ideas from the self-determination theory (Gagné and Deci, 2005) and cognitive evaluation theory (Deci and Ryan, 1985), appropriate task composition could help motivate employees to carry out complex jobs in which they obtain considerable job-related knowledge and skills that help generate and implement new ideas (Noefer *et al.*, 2009; Urbach *et al.*, 2010). In our sample, the findings regarding the relationship between the composition of tasks and IWB were mixed. Challenging and stimulating jobs were argued to trigger the intrinsic motivation of employees, which was considered important for engagement in IWB (Noefer *et al.*, 2009; Sanders *et al.*, 2010). Although positive relationships were hypothesised, most studies tended to find only that routine tasks had a negative effect on IWB. Employees do not seem to consistently perceive a varied job as stimulating or satisfying, maybe because it gives rise to additional tasks that might lead to work overload (De Jong *et al.*, 2015). As such, it could be argued that complex jobs should also involve some degree of routinisation in the form of pre-determined tasks that can be repeatedly and predictably accomplished. Tasks that are particularly routine can help preserve important cognitive and time resources that are necessary to generate and implement useful ideas (Ohly *et al.*, 2006).

Job complexity has been shown not to have a significant impact on creativity (Ohly *et al.*, 2006) or on idea generation (Urbach *et al.*, 2010), but to significantly affect implementation (Ohly *et al.*, 2006; Urbach *et al.*, 2010). Ohly *et al.* (2006) explain these findings with the suggestion that employees who frequently carry out particular tasks can use their spared cognitive and time resources to generate and implement new and useful ideas. Further, they argue that this might only be the case when routinisation appears in specific tasks, not in job content, because repetition in the latter dimension might lead to tedium. Job complexity is assumed to affect the implementation of ideas because employees who fulfil complex jobs might have appropriated the necessary know-how to implement their ideas through a broad acquisition of knowledge and skills. De Spiegelaere *et al.* (2012) found differences in the effect of routine tasks on IWB for white-collar and blue-collar workers. The authors suggested that stimulating and challenging jobs might be more important for motivating white-collar employees than for blue-collar employees to engage in IWB, and therefore the more routine tasks that white-collar employees have to fulfil, the less IWB they will show.

Job demands and time pressure. Based on JD-R theory (Bakker and Demerouti, 2007), job demands have been investigated as a possible antecedent of IWB (e.g. Janssen, 2000; De Spiegelaere *et al.*, 2012; Wu *et al.*, 2014). Job demands are considered in terms of a heavy

workload resulting from too much work to do within a restricted timeframe (Janssen, 2000). The literature views such time pressure as an important job demand (Noefer *et al.*, 2009; Ohly *et al.*, 2006; De Spiegelaere *et al.*, 2012; Wu *et al.*, 2014) and it is thus considered as a job challenge (De Spiegelaere *et al.*, 2012).

Several studies have investigated possible intervening variables such as effort reward fairness, job resources and occupational groups (Janssen, 2000; Martín *et al.*, 2007; De Spiegelaere *et al.*, 2012). The findings regarding linkages between job demands and IWB were mixed. Job demands were only positively related to IWB when reward fairness was apparent or when job resources, such as structured work with clear goals, were inherent to one's job. In terms of time pressures, a moderate level was considered optimal in triggering employees' innovative behaviours, because excessive time pressure may lead to cognitive overload and an overly low level may not provoke sufficient cognitive and behavioural activation within employees to trigger IWB (Ohly *et al.*, 2006). Noefer *et al.* (2009) added to these findings that time pressure has a negative impact on idea generation, but a positive one on idea implementation. These authors argue that balanced time pressure activates problem coping strategies, which lead to quicker implementation of ideas in order to more rapidly eliminate inefficient work processes.

Feedback. Feedback has been proposed as an important factor in influencing IWB for various reasons. First, feedback has been considered as a valuable source of information regarding how tasks should be accomplished and whether an employee's performance is appropriate for achieving desired goals. Thus, with feedback, employees are better able to detect problems and opportunities. Second, armed with this information, employees might be able to implement more effective and efficient ways of working. Since IWB involves a complex pattern of behaviours, gaining different views – at least from a second source – could help employees successfully engage in such complex behaviours. Of our sample, only Knol and van Linge (2009) investigated feedback as potentially having a direct influence on IWB, while other studies treated feedback as a moderating variable, meaning that factors such as time pressure, skill variety, resistance to change and psychological contract, and their relationship with IWB, were influenced by feedback from the job itself or from colleagues or supervisors (e.g. Battistelli *et al.*, 2011; Chang *et al.*, 2013; Noefer *et al.*, 2009).

The theories used to explain the various relationships uncovered included the trait activation theory (Lievens *et al.*, 2006) and the idea that the social side of one's job (i.e. feedback from colleagues and supervisors) was important since this could weaken the negative effects of a transactional contract and increase the positive effects of a relational contract on IWB (Noefer *et al.*, 2009).

Feedback from supervisors regarding work processes and performance was found to positively influence IWB by enhancing job-related knowledge and self-confidence (Knol and van Linge, 2009). Feedback was especially found to encourage IWB among employees who were rather resistant to change (Battistelli *et al.*, 2011) by reducing their feelings of lacking confidence and thereby influencing their adaption to changes through IWB. In this respect, Noefer *et al.* (2009) only found a significant impact of supervisory feedback on the implementation-oriented stages of IWB. They argued that feedback helped employees to keep track of work proceedings, enabling them to structure their tasks more effectively, thereby reducing time pressure and creating space for employees to implement their ideas.

Discussion

Theoretical implications

The aim of this study was to establish which HRM practices influence IWB, and to better understand these relationships. Based on the AMO conceptualisation of Jiang *et al.* (2012), this systematic review revealed that the best HRM practices in terms of boosting IWB

consist of one ability-enhancing HRM practice (training and development), two motivation-enhancing HRM practices (rewards and job security) and four opportunity-enhancing HRM practices (autonomy, task composition, feedback and job demand and time pressure). As such, most of the relevant HRM practices are related to enhancing opportunity, and focussed on the job design. Job design is generally considered as an important resource when it comes to employees' motivation to innovate (De Jong *et al.*, 2015; De Spiegelaere *et al.*, 2012; Dorenbosch *et al.*, 2005; West and Farr, 1990), and our results confirm the important role that job characteristics such as autonomy, task composition and feedback play in establishing employees' IWB.

The best HRM practices in terms of encouraging IWB are predominantly found in high-commitment work systems (HCWSs). The systematic literature review by Seeck and Diehl (2016) indicated the importance of HCWSs for innovation, and our review comes to a similar conclusion for HCWPs and IWB. Zhou *et al.* (2013) argued that a high-commitment philosophy is beneficial in achieving innovation outcomes because practices such as employment security establish employees' psychological commitment to the organisation and motivate employees to take risks.

Having identified the best HRM practices for IWB, we further aimed to discover why – that is to understand the theoretical bases for the HRM-IWB relationship, and the how and when – that is to understand the role of mediators and moderators in this relationship (Seeck and Diehl, 2016). Our framework, presented in Table I, summarises the best HRM practices for encouraging IWB based on the AMO framework, the moderators and mediators involved and the theories used in coming to these relationships.

Motivation-enhancing HRM practices were found to have a debatable influence on IWB, with most related findings suggesting a negative relationship. This negative relationship was usually explained using the self-determination theory, in which motivation-enhancing HRM practices will only affect the IWB of people who are extrinsically motivated. If their company offered motivation-enhancing HRM practices, such as rewards or job security, intrinsically

AMO factors	Best HRM practices for IWB	Mediators	Moderators	Theories
Ability-enhancing HRM practices	Training and Development (+)	Knowledge transfer	Occupational groups; public/private sector; company's home country	Social exchange theory; human capital theory; knowledge perspective
Motivation-enhancing HRM practices	Reward (+/−)		Company's home country; public/private sector	Social exchange theory; self-determination theory;
	Job insecurity (+/−)		Occupational groups	Job design-resources theory
Opportunity-enhancing HRM practices	Autonomy (+)	Obligation to innovate; Psychological contract	Company's home country; occupational groups; trust; LMX; opportunity to learn and develop	Social exchange theory; self-determination theory; cognitive evaluation theory; job design-resources theory
	Task composition (+/−)	LMX	Occupational groups; feedback from supervisor; LMX	Self-determination theory; job design-resources theory; knowledge perspective
	Job demands (+/−)		Occupational groups; feedback from supervisor; job resources; effort-reward fairness	Self-determination theory; job design-resources theory
	Feedback (+)		Psychological contract; traits	Trait activation theory

Table I.
HRM-IWB framework

motivated employees would react by reducing their engagement in IWB. This finding is contradictory to the results for performance outcomes, as presented by Jiang *et al.* (2012), who viewed motivation-enhancing HRM practices as a valuable tool in increasing individual or organisational performance. Discretionary efforts, such as IWB, are usually not anticipated, and also not rewarded, and thus cannot be assured through motivation-enhancing HRM practices. Other studies have found similar results for other motivation-enhancing HRM practices, such as performance-related pay, which can also result in less innovation when pay is based on short-term performance and the financial benefits of implemented innovations (e.g. Fernandez and Moldogaziev, 2012). These findings call for different motivation-enhancing HRM practices, ones that do not appeal to employees' external motivation. Possibilities include non-material incentives (Li *et al.*, 2006), recognition (Cooke and Saini, 2010) and learning-oriented appraisals (Shipton *et al.*, 2006).

Ability-enhancing and opportunity-enhancing HRM practices were generally found to have positive effects, not only on performance but also on IWB. However, for those HRM practices that can be categorised as job demands, such as job complexity and time pressure, it seems that a moderate level of demands can be positive for IWB, but that high levels of job demands can have negative consequences for IWB. Here, Ohly *et al.* (2006) found that a moderate level of time pressure was best for activating IWB, since high levels of time pressure may result in cognitive overload and low levels may be insufficient to incite cognitive and behavioural activation within employees to engage in IWB. A notable observation concerning ability- and opportunity-enhancing HRM practices is the lack of research into whether ability-enhancing HRM practices such as selection and staffing (Shipton *et al.*, 2006), and opportunity-enhancing HRM practices, such as employee involvement and teamwork (Seeck and Diehl, 2016), have a role in determining IWB. While there is evidence that these practices are important for innovation (e.g. Seeck and Diehl, 2016), further research is necessary to determine whether this is also true for IWB.

The effect of HRM practices on IWB is most often explained through three theoretical approaches: the self-determination theory, job demands-resources theory and social exchange theory. According to the self-determination theory (Gagné and Deci, 2005), certain HRM practices, such as autonomy or task complexity, increase the intrinsic motivation of employees, which then results in higher IWB engagement. For employees who are not intrinsically motivated, motivation-enhancing HRM practices could be used to motivate them to engage in IWB. The job demands-resources theory (Bakker and Demerouti, 2007) distinguishes between job demands and job resources. Job demands are aspects of the job that require physical and mental effort and therefore have physical and psychological costs, while job resources are those aspects of a job that help to achieve goals, reduce demands or stimulate personal development (Bakker and Demerouti, 2007). Job resources, such as autonomy, would then usually result in higher levels of IWB. IWB could appear to be a solution for those whose jobs have moderately high demands, because employees could use IWB to cope with the demands. However, if job demands become too high, employees will engage less in IWB. In comparison, social exchange theory (Blau, 1964) will always hypothesise higher levels of IWB because the theory assumes that employees perceive HRM practices as investments in themselves, which they will then reciprocate with something of value to the organisation, such as IWB.

Whereas current papers argue that moderators and mediators deserve more attention in the HRM and innovation research (e.g. Seeck and Diehl, 2016), our findings show that there is still limited attention for contingencies that explain HRM-IWB relationships. Three moderators stand out as influencing the HRM-IWB relationship: occupational groups (De Spiegelaere *et al.*, 2012); public/private organisations (Bysted and Hansen, 2015; Bysted and Jespersen, 2014); and differences in organisations' home country (Zhang and Begley, 2011).

Research shows that employees of different occupational groups react differently to job demands. For example, job security positively affects IWB for white-collar workers but negatively for blue-collar workers (De Spiegelaere *et al.*, 2012). Research on HRM practices-IWB relationships also found differences between the public and the private sector. Employees in the public sector do not seem to be less innovative than their colleagues in the private sector (Bysted and Hansen, 2015), although there are differences regarding the HRM practices -IWB relationship across sectors. Here, motivation-enhancing HRM practices, such as rewards, were found to have a positive effect for public employees, but not for private employees, since public employees regard IWB as an extra-role behaviour for which they need clear signals and expect to be rewarded (Bysted and Jespersen, 2014). The last moderator that we found in our review was the organisation's home country. For example, Zhang and Begley (2011) found that empowerment practices had a stronger effect on the IWB of China-located employees of a US-owned multinational than those of a Chinese-owned equivalent.

Practical implications

Before implementing HRM practices with the goal of boosting IWB, organisations need to decide for which occupational groups and units they want to encourage such behaviours. Research shows that the impact of HRM practices on IWB can differ depending on task and job types (Scott and Bruce, 1994). If employers want to encourage the IWB of their knowledge workers, they should implement empowering practices by expanding the decision latitude of these employees in terms of the composition and organisation of their tasks (e.g. De Jong and Kemp, 2003). The jobs of these employees need to be designed to include challenge and stimulation. Additional financial rewards should only be implemented with caution since they might undermine the intrinsic motivation of knowledge workers. However, with blue-collar workers, financial rewards do seem to be beneficial in boosting IWB (De Spiegelaere *et al.*, 2012).

Adopting practices that enhance the abilities (i.e. training) and opportunities (i.e. autonomy) of employees may help organisations to foster the IWB of targeted employees. When striving to increase IWB, organisations should be cautious when adopting motivation-enhancing HRM practices since these can have mixed effects on IWB. Further, our literature research has shown that the effect of many practices is context-dependent and, therefore, practitioners should carefully analyse which practices align with their organisational context. Nevertheless, providing employees with autonomy in their jobs does seem to consistently be one of the very best practices for boosting IWB and can therefore be viewed as a crucial practice in improving the IWB of employees.

Limitations

This research is not without its limitations. On a micro-level, the contents of each article could have influenced the results. The articles reviewed were sorted based on the HRM practices investigated in order to conduct an in-depth content analysis aimed at answering the research question. However, this classification could have been biased since there is a lack of universally agreed definitions for particular HRM practices, and authors use various wordings for the same HRM practice. We tried to resolve this problem by closely inspecting the measurements linked to individual HRM practices, and thereby maximise our objectivity. However, as even the items used sometimes varied from one article to another in their precise terminology, this still required some interpretation. As such, the method is not free of bias and will be influenced by previous experiences and existing knowledge, and has the danger of equating matters that might not have been meant in exactly the same way. Therefore, in order to reduce this potential diffusion, further research is encouraged that more clearly determines the distinct HRM practices. Furthermore, our analysis could only draw on practices that have been reported in the existing HRM-IWB literature. There might

well be other best practices that have not been reported. For example, recruitment and selection, as well as employee involvement, were not included in our analysis as these practices have not been tested in relation to IWB. Nevertheless, since selectivity in staffing and employee involvement are considered to be HPWPs (Combs *et al.*, 2006), they could easily have an impact on IWB.

Since IWB is a multidimensional construct consisting of various IWB dimensions, a limitation of this research is the focus on IWB rather than on its different dimensions. Research has indicated that HRM practices can have different effects on idea generation and on idea implementation. Our analysis has shown, for example, that task complexity has a negative effect on creativity and idea generation, but a positive effect on idea implementation (Ohly *et al.*, 2006; Urbach *et al.*, 2010). A more recent study (Veenendaal and Bondarouk, 2015) shows that perceptions of training and development have a significant effect on idea generation but not on idea promotion and idea implementation. However, since the focus of our research is on IWB, and we aimed to discover the HRM practices that significantly affect IWB, we limited our selection to articles that investigated IWB or innovative behaviours. Most of the 27 articles included treated IWB as a one-dimensional construct, although eight did differentiate between distinct dimensions of IWB as discussed in our results.

Suggestions for future research

The literature review we have undertaken supports the conclusion that HRM practices affect IWB. However, the different methods used for measuring and interpreting IWB in the articles have a major influence on the reported findings. One danger is that asking employees to rate their IWB could lead to socially desirable answers. For example, Janssen (2000) found different effects on self-rated and on leader-rated IWB. Especially when employees perceived IWB as a measurement tool for determining career development, they were likely to overestimate their innovative potential. Future research should address this issue by using triangulation in order to more reliably evaluate the innovative behaviours of employees.

As already noted, most articles considered IWB as a one-dimensional construct (see also De Jong and Den Hartog, 2010; Bonesso and Tintorri, 2014). However, some scholars, such as Noefer *et al.* (2009), treated IWB as a two-dimensional construct and found that HRM practices had different effects on idea generation and on idea implementation. Given this distinction, future research could usefully explore IWB based on it having these two dimensions since this could produce more insightful results on how HRM practices affect IWB. Recently, Veenendaal and Bondarouk (2015) tested the separate effects of four HRM practices on idea generation, idea promotion and idea application and confirmed that the effect of HRM practices on IWB differed per dimension. There is evidence that implementing innovative ideas is a complex process that requires the involvement of various stakeholders and needs to be supported in different ways than the generation of innovative ideas (e.g. Bos-Nehles *et al.*, 2017).

In this research, we focused on the IWBs of individual employees. Future research could address how the IWBs of employees on the individual level affect the innovation output and performance at the organisation level. This would require a multilevel approach to HRM-innovation research (Shipton *et al.*, 2016) that examines how HRM practices can facilitate the process by which innovations move up from individual initiatives on the work floor. It has been argued that HRM practices that are targeted at integrating knowledge across the organisation must be present for innovations to emerge (Lin and Sanders, 2017) since these will generate an environment in which individuals can pursue their innovative initiatives (Shipton *et al.*, 2016). Future research should therefore assess on which organisational level HRM practices are most effective.

Finally, recent reviews of the HRM-innovation relationship have shown that bundles of HRM practices are more strongly linked to organisational innovation than single practices (Seeck and Diehl, 2016). For example, Laursen and Foss (2003) found support for the view that complementarities between HRM practices can enhance innovation performance. While our literature review was focused on identifying best individual HRM practices, future research could focus on bundles of HRM practices and their influence on IWB. Possibly, the best HRM practices identified in this study could together form a "High-Innovation HRM System" that includes ability-, motivation- and opportunity-enhancing HRM practices that encourage IWB. In combination, these best practices may be more strongly related to IWB because of complementarities and synergies among them.

References

*Marked articles were included in the systematic review.

*Abstein, A. and Spieth, P. (2014), "Exploring HRM meta-features that foster employees' innovative work behaviour in times of increasing work-life conflict", *Creativity and Innovation Management*, Vol. 23 No. 2, pp. 211-225.

Agarwal, U.A. (2014), "Linking justice, trust, and innovative work behaviour to work engagement", *Personnel Review*, Vol. 43 No. 1, pp. 41-73.

Appelbaum, E., Bailey, T., Berg, P. and Kallenberg, A. (2000), *Manufacturing Advantage: Why High-Performance Work Systems Pay Off*, Cornell University Press, Ithaca, NY.

Bakker, A.B. and Demerouti, E. (2007), "The job demands-resources model: State of the art", *Journal of Managerial Psychology*, Vol. 22 No. 3, pp. 309-328.

*Battistelli, A., Montani, F. and Odoard, C. (2011), "The impact of feedback from job and task autonomy in the relationship between dispositional resistance to change and innovative work behaviour", *European Journal of Work and Organizational Psychology*, Vol. 22 No. 1, pp. 26-41.

Bello-Pintado, A. (2015), "Bundles of HRM practices and performance: empirical evidence from a Latin American context", *Human Resource Management Journal*, Vol. 25 No. 3, pp. 311-330.

Blau, P.M. (1964), *Exchange and Power in Social Life*, Wiley, New York, NY.

*Bommer, M.S. and Jalajas, D.S. (1999), "The threat of organizational downsizing on the innovative propensity of R&D professionals", *R&D Management*, Vol. 29 No. 1, pp. 27-34.

Bonesso, S. and Tintorri, S. (2014), "Bridging the fields of innovative behaviour and human resource management: a systematic review and future research directions", paper presented at the 9th International Workshop on Human Resource Management, Seville, 30-31 October.

Bos-Nehles, A.C., Bondarouk, T. and Nijenhuis, K. (2017), "Innovative work behaviour in knowledge-intensive public sector organizations: the case of supervisors in the Netherlands fire services", *The International Journal of Human Resource Management*, Vol. 28 No. 2, doi: 10.1080/09585192.2016.1244894.

*Bysted, R. and Hansen, J. (2015), "Comparing public and private sector employees' innovative behaviour", *Public Management Review*, Vol. 17 No. 5, pp. 698-717.

*Bysted, R. and Jespersen, K. (2014), "Exploring managerial mechanism that influence innovative work behaviour: comparing private and public employees", *Public Management Review*, Vol. 16 No. 2, pp. 217-241.

*Chang, H.-T., Hsu, H.-M., Lious, J.-W. and Tsai, C.-T. (2013), "Psychological contracts and innovative behaviour: a moderated path analysis of work engagement and job resources", *Journal of Applied Social Psychology*, Vol. 43 No. 10, pp. 2120-2135.

Combs, J., Liu, Y., Hall, A. and Ketchen, D. (2006), "How much do high-performance work practices matter? A meta-analysis of their effects on organizational performance", *Personnel Psychology*, Vol. 59 No. 3, pp. 501-528.

Cooke, F.L. and Saini, D.S. (2010), "(How) Does the HR strategy support an innovation oriented business strategy? An investigation of institutional context and organizational practices in Indian firms", *Human Resource Management*, Vol. 49 No. 3, pp. 377-400.

Crossan, M.M. and Apaydin, M. (2010), "A multi-dimensional framework of organizational innovation: a systematic review of the literature", *Journal of Management Studies*, Vol. 47 No. 6, pp. 1154-1191.

Damanpour, F. (1991), "Organizational innovation: a meta-analysis of effects of determinants and moderators", *Academy of Management Journal*, Vol. 34 No. 3, pp. 550-590.

Deci, E.L. and Ryan, R.M. (1985), *Intrinsic Motivation and Self-Determination in Human Behavior*, Springer, Boston, MA, pp. 11-40, doi: 10.1007/978-1-4899-2271-7.

De Jong, J.P.J. and Den Hartog, D.N. (2010), "Measuring innovative work behaviour", *Creativity and Innovation Management*, Vol. 19 No. 1, pp. 23-36.

De Jong, J.P.J. and Kemp, R. (2003), "Determinants of co-workers innovative behaviour: an investigation into knowledge-intensive services", *International Journal of Innovation Management*, Vol. 7 No. 2, pp. 189-212.

*De Jong, J.P.J., Parker, S.K., Wennekers, S. and Wu, C.-H. (2015), "Entrepreneurial behavior in organizations: does job design matter?", *Entrepreneurship Theory and Practice*, Vol. 39 No. 4, pp. 981-995.

*De Spiegelaere, S., Van Guys, G. and Van Hootegem, G. (2012), "Job design and innovative work behavior: one size does not fit all types of employees", *Journal of Entrepreneurship, Management and Innovation*, Vol. 8 No. 4, pp. 5-20.

*Dorenbosch, L., Van Engen, M.L. and Verhagen, M. (2005), "On-the-job innovation: the impact of job design and human resource management through production ownership", *Creativity and Innovation Management*, Vol. 14 No. 2, pp. 129-141.

*Fernandez, S. and Moldogaziev, T. (2012), "Employee empowerment, employee attitudes, and performance: testing a causal model", *Public Administration Review*, Vol. 73 No. 3, pp. 490-506.

Gagné, M. and Deci, E.L. (2005), "Self-determination theory and work motivation", *Journal of Organizational Behavior*, Vol. 26 No. 4, pp. 331-362.

*Janssen, O. (2000), "Job demands, perceptions of effort-reward fairness and innovative work behaviour", *Journal of Occupational and Organizational Psychology*, Vol. 73 No. 3, pp. 287-302.

*Janssen, O. (2005), "The joint impact of perceived influence and supervisor supportiveness on employee innovative behaviour", *Journal of Occupational and Organizational Psychology*, Vol. 78 No. 4, pp. 573-578.

Jiang, K., Lepak, D.P., Han, K., Hong, Y., Kim, A. and Winkler, A. (2012), "Clarifying the construct of human resource systems: relating human resource management to employee performance", *Human Resource Management Review*, Vol. 22 No. 2, pp. 73-85.

Jiménez-Jiménez, D. and Sanz-Valle, R. (2008), "Could HRM support organizational innovation?", *The International Journal of Human Resource Management*, Vol. 19 No. 7, pp. 1208-1221.

Jiménez-Jiménez, D. and Sanz-Valle, R. (2011), "Innovation, organizational learning, and performance", *Journal of Business Research*, Vol. 64 No. 4, pp. 408-417.

*Knol, J. and van Linge, R. (2009), "Innovative behaviour: the effect of structural and psychological empowerment on nurses", *Journal of Advanced Nursing*, Vol. 65 No. 2, pp. 359-370.

Laursen, K. and Foss, N. J. (2003), "New human resource management practices, complementarities and the impact on innovation performance", *Cambridge Journal of Economics*, Vol. 27 No. 2, pp. 243-263.

Li, Y., Zhao, Y. and Liu, Y. (2006), "The relationship between HRM, technology innovation and performance in China", *International Journal of Manpower*, Vol. 27 No. 7, pp. 679-697.

Lievens, F., Chasteen, C.S., Day, E.A. and Christiansen, N.D. (2006), "Large-scale investigation of the role of trait activation theory for understanding assessment center convergent and discriminant validity", *Journal of Applied Psychology*, Vol. 91 No. 2, pp. 247.

Lin, C.H.V. and Sanders, K. (2017), "HRM and innovation: a multi-level organizational learning perspective", *Human Resource Management Journal*, Vol. 27 No. 2, pp. 300-317.

*Lu, L., Lin, X. and Leung, K. (2012), "Goal orientation and innovative performance: the mediating roles of knowledge sharing and perceived autonomy", *Journal of Applied Social Psychology*, Vol. 42, pp. 180-197.

*Marane, B.M.O. (2012), "The mediating role of trust in organization on the influence of psychological empowerment on innovative behaviour", *European Journal of Social Sciences*, Vol. 33 No. 1, pp. 39-51.

*Martín, P., Salanova, M. and Peiró, J.M. (2007), "Job demands, job resources and individual innovation at work: going beyond Karasek's model", *Psichothema*, Vol. 19 No. 4, pp. 621-626.

Messersmith, J.G. and Guthrie, J.P. (2010), "High performance work systems in emergent organizations: implications for firm performance", *Human Resource Management*, Vol. 49 No. 2, pp. 241-264.

*Messmann, G. and Mulder, R.H. (2014), "Exploring the role of target specificity in the facilitation of vocational teachers' innovative work behaviour", *Journal of Occupational and Organizational Psychology*, Vol. 87 No. 1, pp. 80-101.

Mulrow, C.D. (1994), "Systematic reviews – rationale for systematic reviews", *British Medical Journal*, Vol. 309 No. 6954, pp. 597-599.

Mumford, M.D. (2000), "Managing creative people: strategies and tactics for innovation", *Human Resource Management Review*, Vol. 10 No. 3, pp. 313-351.

*Noefer, K., Stegmaier, R., Molter, B. and Sonntag, K. (2009), "Great many things to do and not a minute to spare: can feedback from supervisors moderate the relationship between skill variety, time pressure and employees' innovative behavior?", *Creativity Research Journal*, Vol. 21 No. 4, pp. 284-293.

*Ohly, S., Sonnentag, S. and Pluntke, F. (2006), "Routinization, work characteristics and their relationships with creative and proactive behaviors", *Journal of Organizational Behaviour*, Vol. 27 No. 3, pp. 257-279.

*Ong, C.-H., Wan, D. and Chng, S.-H. (2003), "Factors affecting individual innovation: an examination within a Japanese subsidiary in Singapore", *Technovation*, Vol. 23 No. 7, pp. 617-631.

Podsakoff, P.M., MacKenzie, S.B., Bacharach, D.G. and Podsakoff, N.P. (2005), "The influence of management journals in the 1980s and 1990s", *Strategic Management Journal*, Vol. 26 No. 5, pp. 473-488.

Pratoom, K. and Savatsomboon, G. (2012), "Explaining factors affecting individual innovation: the case of producer group members in Thailand", *Asia Pacific Journal of Management*, Vol. 29 No. 4, pp. 1063-1087.

Probst, T.M., Stewart, S.M., Gruys, M.L. and Tierny, B.W. (2007), "Productivity, counterproductivity and creativity: the ups and downs of job insecurity", *Journal of Occupational and Organizational Psychology*, Vol. 80 No. 3, pp. 479-497.

*Ramamoorthy, N., Flood, P.C., Slattery, T. and Sardessai, R. (2005), "Determinants of innovative work behaviour: development and test of an integrated model", *Creativity and Innovation Management*, Vol. 14 No. 2, pp. 142-150.

*Sanders, K., Moorkamp, M., Torka, N., Groeneveld, S. and Goeneveld, C. (2010), "How to support innovative behaviour? The role of LMX and satisfaction with HR practices", *Technology and Investment*, Vol. 1 No. 1, pp. 59-68.

*Scott, S.G. and Bruce, R.A. (1994), "Determinants of innovative behavior: a path model of individual innovation in the workplace", *Academy of Management Journal*, Vol. 37 No. 3, pp. 580-607.

Seeck, H. and Diehl, M.R. (2017), "A literature review on HRM and innovation-taking stock and future directions", *The International Journal of Human Resource Management*, Vol. 28 No. 6, pp. 913-944.

Shipton, H., Budhwar, P., Sparrow, P. and Brown, A. (2016), "Human resource management, innovation and performance: looking across levels", in Shipton, H., Budhwar, P., Sparrow, P. and Brown, A. (Eds), *Human Resource Management, Innovation and Performance*, Palgrave Macmillan, London, pp. 3-27.

Shipton, H., West, M.A., Dawson, J., Birdi, K. and Patterson, M. (2006), "HRM as a predictor of innovation", *Human Resource Management Journal*, Vol. 16 No. 1, pp. 3-27.

Spreitzer, G.M. (1995), "Psychological empowerment in the workplace: dimensions, measurement, and validation", *Academy of Management Journal*, Vol. 38 No. 5, pp. 1442-1465.

Sverke, M., Hellgren, J. and Näswall, K. (2002), "No security: a meta analysis and review of job insecurity and its consequences", *Journal of Occupational Health Psychology*, Vol. 7 No. 3, pp. 242-264.

Thornhill, S. (2006), "Knowledge, innovation and firm performance in high-and low-technology regimes", *Journal of Business Venturing*, Vol. 21 No. 5, pp. 687-703.

Tidd, J., Bessant, J. and Pavitt, K. (2001), *Managing Innovation: Integrating Technological, Market and Organisational Change*, 2nd ed., John Wiley, Chichester.

Tranfield, D., Denyer, D. and Smart, P. (2003), "Towards a methodology for developing evidence-informed management knowledge by means of systematic review", *British Journal of Management*, Vol. 14 No. 3, pp. 207-222.

*Urbach, T., Fay, D. and Gora, A. (2010), "Extending the job design perspective on individual innovation: exploring the effect of group reflexivity", *Journal of Occupational and Organizational Psychology*, Vol. 83 No. 4, pp. 1053-1064.

Veenendaal, A. and Bondarouk, T. (2015), "Perceptions of HRM and their effect on dimensions of innovative work behaviour: evidence from a manufacturing firm", *Management Revue*, Vol. 26 No. 2, pp. 138-160.

West, M. and Farr, J. (1990), "Innovation at work", in West, M. and Farr, J. (Eds), *Innovation and Creativity at Work: Psychological and Organizational Strategies*, Wiley, New York, NY, pp. 3-13.

*Wu, C.-H., Parker, S.K. and de Jong, P.J. (2014), "Need for cognition as an antecedent of individual innovation behaviour", *Journal of Management*, Vol. 40 No. 6, pp. 1-24.

*Zhang, Y. and Begley, T. (2011), "Perceived organizational climate, knowledge transfer and innovation in China-based research and development companies", *The International Journal of Human Resource Management*, Vol. 22 No. 1, pp. 34-56.

Zhou, Y., Hong, Y. and Liu, J. (2013), "Internal commitment or external collaboration? The impact of human resource management systems on firm innovation and performance", *Human Resource Management*, Vol. 52 No. 2, pp. 263-288.

Further reading

Ryan, R.M. and Deci, E.L. (2000), "Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being", *American psychologist*, Vol. 55 No. 1, pp. 68-78.

Corresponding author
Anna Bos-Nehles can be contacted at: a.c.nehles@utwente.nl

Appendix

Table AI.
Description and most important findings of the included articles

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
Abstein and Spieth (2014)	Exploring HRM Meta-features that foster employees' innovative work behaviour in times of increasing work–life conflict	21 companies in Germany	Semi-structured interviews (qualitative)	One-dimension	Autonomy	Cognitive evaluation theory Involvement	Autonomy of employees influences IWB positively and can enhance individual innovative performance through involvement and cognitive evaluation theory	*Creativity and Innovation Management*
Battistelli *et al.* (2011)	The impact of feedback from job and task autonomy in the relationship between dispositional resistance to change and innovative work behaviour	1 University in Florence; 270 employees	Survey	One-dimension	Autonomy Feedback	Trait activation perspective	Autonomy does not moderate the relationship between dispositional resistance to change and IWB; feedback, in contrast, moderates the relationship between resistance to change and IWB (high feedback leads to a positive relationship between resistance to change and IWB)	*European Journal of Work and Organizational Psychology*
Bommer and Jalajas (1999)	The threat of organisational downsizing on the innovative propensity of R&D professionals	150 R&D employees of 15 different firms	Survey	Two dimensions	Job (in)securty	Threat-Rigidity Model	Job insecurity is significantly negative related to willingness to take risks as well as significantly negative related to willingness to make suggestions	*R&D Management*
Bysted and Hansen (2015)	Comparing public and private sector employees' innovative behaviour	8.310 employees from Denmark, Norway, Sweden	Survey	One-dimension	Reward (expectancy clarity) Autonomy	Risk culture Room for innovation (organisational support/ innovative climate) Intrinsic motivation Sector type	Autonomy influences employees' IWB positively (no difference between private and public sector employees was found; less clarity between innovative performance and reward is negatively related to IWB, this relationship is more apparent for public sector employees	*Public Management Review*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
Bysted and Jespersen (2014)	Exploring managerial mechanism that influence innovative work behaviour: comparing private and public employees	8.310 employees from Denmark, Norway, Sweden	Survey	Two-dimensions	Reward Competence development Autonomy	Intrinsic motivation Sector type	Autonomy is significantly positive related to IWB irrespective of sector type; competence development is significantly positive related to IWB, but sector type moderates this relationship; reward is negatively related to IWB, however, public sector employees respond well to reward when IWB is expected	*Public Management Review*
Chang *et al.* (2013)	Psychological contracts and innovative behaviour: a moderated path analysis of work engagement and job resources	267 dyads of employees and their related supervisors of 30 high-tech firms in Taiwan	Survey	One-dimension	Supervisor feedback	Work engagement Transactional and relational contracts Social side of innovation perspective	The mediated relationship between transactional and relational contracts and IWB via work engagement are each moderated by feedback of supervisors	*Journal of Applied Social Psychology*
Dorenbosch *et al.* (2005)	On the job innovation: The impact of job design and human resource management through production ownership	132 employees of a Dutch government organisation	Survey	Two dimensions	Training and Development Multifunctionality Feedback Reward		Multifunctionality is significantly positive related to IWB as a whole as well as to the implemented oriented stage, but is not significantly positive related to the creativity oriented variable	*Creativity and Innovation management*
Fernandez and Moldogaziev (2012)	Employee empowerment, employee attitudes, and performance: testing a causal model	197,446 US federal employees	Survey	One dimension	Reward training and development Empowerment	Job satisfaction	Empowerment is significantly positive related to IWB; empowerment might also increase job satisfaction, which in turn might improve IWB	*Public Administration Review*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
Janssen (2000)	Job demands, perceptions of effort-reward fairness and innovative work behaviour	170 employees of 1 Dutch organisation (from the food sector)	Survey	One dimension	Effort Reward fairness Job demand	Social exchange theory	Job demand is significantly positive related to IWB when employees perceive their efforts as fairly rewarded	*Journal of Occupational and Organizational Psychology*
Janssen (2005)	The joint impact of perceived influence and supervisor supportiveness on employee innovative behaviour	170 employees from 1 Dutch Company	Survey	One dimension	Perceived influence	Supervisor supportiveness Sociopolitical approach	Perceived influence is significantly positive related to IWB and supervisor supportiveness moderates this relationship	*Journal of Occupational and Organizational Psychology*
De Jong *et al.* (2015)	Entrepreneurial behaviours in organisations: does job design matter?	179 employees from 1 Dutch company	First Survey ($n = 179$ employees) Second Survey three years later ($n = 93$ peers)	One dimension	Autonomy Job variety	Not mentioned	Autonomy increases perceived control over the work environment which in turn enhances motivation and willingness to engage in entrepreneurial behaviours; job variety was not found to enhance entrepreneurial behaviours, maybe due to perceived extra work (horizontal enlargement) instead of perceived enlargement of decision-making tasks (vertical scope)	*Entrepreneurship Theory and Practice*
Knol and van Linge (2009)	Innovative behaviour: the effect of structural and psychological empowerment on nurses	519 registered nurses in the Netherland	Survey	One dimension	Empowerment practices Feedback Opportunity and information	Cognitive mediation theory	Both empowerment (structural) (SE) and psychological (PE) have a significant positive impact on IWB; PE mediates the relationship between SE and IWB, explained by the cognitive mediation theory; further, feedback as part of SE is significantly positive related to IWB;	*Journal of Advanced Nursing*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
							information also seen as part of SE is significantly positive related to IWB	
Lu *et al.* (2012)	Goal orientation and innovative performance: The mediating roles of knowledge sharing and perceived autonomy	248 part time MBA students from a university in China, who also work part time in different companies	Survey	One dimension	Perceived autonomy	Learning Goal orientation	Perceived autonomy does not mediate the relationship between learning goal orientation (LGO) and IWB	*Journal of Applied Social Psychology*
Marane (2012)	The mediating role of trust in organisation on the influence of psychological empowerment on innovative behaviour	245 managers from manufacturing companies	Survey	One dimension	Empowerment	Social exchange theory	Psychological empowerment (PE) has a significant positive impact on IWB; trust partially mediates this relationship	*European Journal of Social Sciences*
Martín *et al.* (2007)	Job demands, job resources and individual innovation at work: going beyond Karasek's model	244 employees from 12 Spanish firms	Survey	One dimension	Job demands	Problem coping strategy Job resources	Job demand and IWB are significantly negative related, Job resources have a marginally moderating effect on this relationship, but turns it into a positive one	*Psichothema*
Messmann and Mulder (2014)	Exploring the role of target specificity in the facilitation of vocational teachers' innovative work behaviour	239 vocational teachers from German vocational colleges	Survey	Four dimensions	Perceived impact	Intrinsic task motivation	Perceived impact is positively related to IWB; intrinsic task motivation is found to be a key antecedent for IWB and partially mediates the relationship between perceived impact and IWB	*Journal of Occupational and Organizational Psychology*
Noefer *et al.*, (2009)	Great many things to do and not a minute to spare: Can feedback from supervisors moderate the relationship between skill variety, time	81 employees of a German university	Survey	Two dimensions	Job variety Time pressure Feedback	Activation theory	Skill variety is significant positive related to idea generation as well as to idea implementation; supervisor feedback does not moderate the	*Creativity Research Journal*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
	pressure and employees' innovative behaviour?						relationship between skill variety and idea generation, only idea implementation increased under high feedback	
Ohly *et al.* (2006)	Routinisation, work characteristics and their relationships with creative and proactive behaviours	278 employees of 1 German high-tech company	Survey	Two dimensions	Job control Job complexity/ Routinisation Time pressure	Supervisor support Activation theory Intrinsic motivation	Job control significantly predicts creativity and proactive behaviours; routinisation is significantly positive related to creativity and proactive behaviours, whereas job complexity, in contrast, is only significantly positive related to proactive behaviours, but not to creativity; time pressure and its relation to creativity and proactive behaviours shows an inverted U-shape; supervisor support was neither significantly positive related to creativity nor to proactive behaviours	*Journal of Organizational Behaviour*
Ong *et al.* (2003)	Factors affecting individual innovation: an examination within a Japanese subsidiary in Singapore	190 employees of a Japanese subsidiary	Survey	Two dimensions	Challenging tasks Training & Development (Knowledge structure)	Leadership Organisational support	Challenging tasks are neither significantly related to idea generation nor to idea implementation; training and development (knowledge structure) is significantly positive related to ideation as well as to implementation; leadership is neither significantly related to idea generation nor to idea implementation, the same was found for organisational support	*Technovation*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
Pratoom and Savatsomboon (2012)	Explaining factors affecting individual innovation: the case of group members in Thailand	1,526 employees from 138 producer groups in 19 different provinces in Northeast Thailand	Survey	One dimension	Training & Development (Knowledge management)	Not mentioned	Knowledge management is significantly positive related to IWB	*Asia Pacific Journal of Management*
Ramamoorthy *et al.* (2005)	Determinants of innovative work behaviour: development and test of an integrated model	204 employees from manufacturing organisations in Ireland	Survey	One dimension	Autonomy Reward	Psychological contracts (expectations met and obligation to innovate)	Autonomy is directly positive related to IWB as well as indirectly via obligation to innovate; reward is directly positive related to IWB and also indirectly related to IWB via expectations met and obligation to innovate	*Creativity and Innovation Management*
Sanders *et al.* (2010)	How to support innovative behaviour? The role of LMX and satisfaction with HR practices	272 employees of 1 Dutch and 3 German technical organisations	Survey	One dimension	Employees influence Work content Reward and flow	Intrinsic motivation leader member exchange (LMX) Social exchange theory	Satisfaction with influence and work content is positively related to IWB; primary rewards are significantly negative related to IWB, secondary rewards do not affect IWB significantly, the same appears for HR flow; LMX is significantly positive related to IWB and influence, primary rewards and work content mediates the relationship between LMX and IWB	*Technology and Investment*
Scott and Bruce (1994)	Determinants of innovative behaviour: a path model of individual innovation in the work place	172 employees of a R&D company in USA	Survey	One dimension	Job variety	Supportive climate LMX Leader role expectations	Job variety does not moderate the relationship between supportive climate and IWB; LMX and leader role expectations are both significantly positive related to	*Academy of Management Journal*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
						Pygmalion effect	IWB; support was significantly positive related to IWB, however, resource supply was significantly negative related to IWB	
De Spiegelaere *et al.* (2012)		893 employees of 17 companies in Belgium	Survey	One dimension	Autonomy Routine Tasks Time pressure Job content insecurity Learning opportunities	Occupational groups Intrinsic motivation	Autonomy leads to positive employee outcomes (IWB); organising tasks is positively related to IWB for white-collar workers and negatively for blue-collars workers; routine tasks have a negative effect for white-collar workers and rather positive effects (ns) for blue collars; job content insecurity and its relation to IWB is positive for white collars and strongly negative for blue collars; time pressure was not significantly related to IWB, no difference between white- and blue- collars was found; learning opportunities are significantly positive related to IWB and occupational groups matter	*Journal of Entrepreneurship, Management and Innovation*
Urbach *et al.*, (2010)	Extending the job design perspective on individual innovation: exploring the effect of group reflexivity	135 employees from 1 software company in Poland	Survey	Two dimensions	Job control Job complexity	Not mentioned	Job control is significant positively related to Ideation, but only marginally significant linked to implementation; job complexity does not predict ideation, but affects idea implementation positively	*Journal of Occupational and Organizational Psychology*

(*continued*)

Table AI.

Author (Year)	Research title	Sample	Research method	IWB explored in…	HRM practices	Other influences/ underlying theory	Most important findings	Journal
Wu *et al.* (2014)	Need for cognition as an antecedent of individual innovation behaviour	179 employees of a research and consultancy firm in the Netherland	Survey	One dimension	Job autonomy Time pressure	Interactionist model of personality	Job autonomy and time pressure moderate the relationship between need for cognition" and IWB in the sense that low job autonomy strengths the positive relationship and high job autonomy weakens it. Regarding time pressure, the results reveal a same pattern, low levels of time pressure strengthen the positive relationship between "need for cognition" and IWB.	*Journal of Management*
Zhang and Begley (2011)	Perceived organisational climate, knowledge transfer and innovation in China-based research and development companies	327 employees of 5 Chinese and 5 US R&D companies located in China	Survey	One dimension	Empowerment Reward Knowledge resources and knowledge transfer	Company's home country Organisational climate	Empowerment is significantly positive related to IWB within American owned firms in China, but is not significantly related to IWB within Chinese-owned firms, which implies a moderator effect of culture; the link between knowledge resources and knowledge transfer is tightly related for American owned companies and the relationship between knowledge transfer and innovation is fully mediated by Chinese-owned companies	*The International Journal of Human Resource Management*