Opening the black box

The mediating roles of organisational systems and ambidexterity in the HRM-performance link in public sector organisations

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Abstract

Purpose – The purpose of this paper is to explore how HIWS may shape organisational capabilities, in particular organisational ambidexterity (OA) – the ability to be both adaptable to the wider world, and internally aligned so that existing resources are used well. Given the demands on public agencies to manage conflicting objectives, and to do more with less in increasingly complex environments, this paper improves our understanding of how HIWS can contribute to public sector performance. The paper sheds light inside the black box of the HIWS/organisational performance link.

Design/methodology/approach – This multi-level quantitative study is based on a survey of 2,123 supervisory staff, and 9,496 non-supervisory employees in 56 government organisations.

Findings – The study identifies two paths to organisational performance. The first is a direct HIWS performance link. The second is a double mediation model from HIWS to organisational systems, to OA and then performance.

Practical implications – A focus on developing HIWS provides an alternative means to public sector performance, than restructuring or other performative activities.

Originality/value – This is one of the few studies that explore how HIWS can develop collective as well as individual capabilities. Studies in the public sector are particularly rare.

Keywords Quantitative, Organisational performance, Public administration, Organisational systems, Conflicting objectives, High involvement work systems, Organisational ambidexterity

Paper type Research paper

Introduction

The ability for an organisation to be adaptable and innovative as well as aligned and efficient has received increasing attention in recent management research literature (Birkinshaw and Gupta, 2013; Junni *et al.*, 2015; O'Reilly and Tushman, 2013). Organisational ambidexterity (OA), the ability to manage the tensions between being "aligned and efficient in […] today's business […] while [being] simultaneously adaptive to changes in the environment" (Raisch and Birkinshaw, 2008, p. 375), resonates with many organisations, including public ones. Intuitively OA is appealing for organisations operating, as government does, in complex environments. OA is concerned with how organisations manage tensions to be innovative, and to deploy these innovations systematically and at scale (Birkinshaw and Gupta, 2013). Government organisations experience tensions between pressures for greater innovation, and increased accountability for performance against pre-determined targets. We contend that this is an ambidexterity dilemma.

Many private sector firms are likely to face these dilemmas too, but they are particular problems in public organisations, and private sector findings cannot be assumed to apply to public organisations (Gould-Williams, 2004). For instance, much of the extant research concerning the human resource management (HRM) – ambidexterity link is based on performance management that is incentivising for executives and seen as fair for others (Junni *et al.*, 2015). However many public sector performance management systems are inflexible and weak (de Waal, 2010), meaning that alternative levers are needed. Organisational performance measurement, pay for performance, and zero-based budgeting are examples of private sector management techniques found to often be harmful in public organisations (Adcroft and Willis, 2005; Perry *et al.*, 2009). Unionisation, formal, bureaucratic processes, and limited access to discipline and stretch mechanisms are further examples of the unique context of public administration (Bryson *et al.*, 2015), meaning that the pathway to ambidexterity is likely to differ from that of private organisations.

Practically our understanding of OA is patchy. Although we know that ambidexterity usually enhances organisation performance, our understanding of its antecedents is limited (Gibson and Birkinshaw, 2004). It is known that ambidexterity can be achieved through both structural and contextual means, and that contextual ambidexterity involves environments which provide stretch, discipline, support and trust, but how this operates through the formal processes that characterise government is unknown (Gibson and Birkinshaw, 2004).

HRM systems, in particular those characterised as high performance or high involvement work systems (HPWS or HIWS), are antecedents to contextual ambidexterity (Patel *et al.*, 2013). The Patel study confirmed that HPWS use is positively related to OA, and that ambidexterity mediates between HPWS and performance. Although the causal pathways through organisational systems (OS) are discussed, they are not tested in that study. Evans and Davis (2005) theorised that internal social structures (such as network ties, reciprocity norms, role making, etc.) may mediate that association, but these relationships still remain largely untested. In public administration Messersmith *et al.* (2011) found that individual attitudinal variables (such as job satisfaction, organisational commitment, and empowerment and citizenship behaviours) were mediators between HPWS and ambidexterity. However the role of collective informal processes such as trust and support, and formal processes were not studied. In a similar vein, mutual investment in employment relationships encourages functional flexibility in the form of employees being able to perform a wide range of tasks well, and this in turn fosters OA (López-Cabrales *et al.*, 2011). However, the systemic means by which this functional flexibility occurs, beyond HR and employment relations practices, is unknown. For example, both formal and informal OS are likely also needed to sustain the intent of the employment relationship, and to build the collective capabilities in which the employment relationships can be enacted.

In HRM research, it is theorised that HIWS build not just individual motivation and cognition, but also collective team and organisational capabilities (Wright and Nishii, 2007). However, how these collective organisational capabilities are constructed is a dark section of the black box with few empirical studies. In ambidexterity research, it is similarly unclear how HRM antecedents synthesise with other organisational antecedents to enable ambidexterity and organisational performance (Junni *et al.*, 2015). The organisational level research reported in this paper focusses on these gaps: how HIWS and OS link together to shape performance via the meta capability of OA.

Public sector organisations have only recently been considered from an ambidexterity perspective (e.g. Smith and Umans, 2015). The contemporary public sector environment is difficult due to factors such as the need for better collaboration between silos, and management of tensions between conflicting objectives. OA in a public sector context is the other focus of this paper. In sum, this research shows how HIWS may enhance formal and

informal OS, ambidexterity, and performance in public sector environments. This organisational level quantitative study is based on a survey of 2,123 supervisory staff, and 9,496 non-supervisory public servants. SmartPLS is used in order to manage this limited sample of 56 organisations.

This research investigates the role of HRM, OS, OA and how these constructs relate to organisation performance in a public sector environment. In the public sector we propose that, without the sharper performance management and other HRM practices of the private sector, it has to rely on other tools to achieve OA. We show that HIWS can foster formal and informal OS, focussed on codified processes to clarify who does what and how things are done, alongside managerial support and trust of staff. These in turn enable ambidexterity, and then performance.

Organisational ambidexterity

Descriptions of ambidexterity are well rehearsed in the management literature (Birkinshaw and Gupta, 2013; Junni *et al.*, 2015; Patel *et al.*, 2013; Raisch *et al.*, 2009). Although earlier writings considered the dilemma between alignment and adaptability to be unsolvable, recent research has been more optimistic, defining ambidexterity as concerning "organisations that are simultaneously exploiting existing competencies and exploring new opportunities" (Raisch *et al.*, 2009, p. 685). A broader definition, and one that is compatible with this research, is what "firms do to manage competing objectives" (Birkinshaw and Gupta, 2013, p. 290). Not surprisingly, OA is usually associated positively with organisational performance (O'Reilly and Tushman, 2013). Fu *et al.* (2016) suggest that the growth of the ambidexterity literature has canvassed four themes. One theme concerns debates over definition and measurement (Birkinshaw and Gupta, 2013); another examines the consequences of ambidexterity; similarly another examines the moderators between ambidexterity and organisation performance; and the fourth investigates antecedents of ambidexterity (Patel *et al.*, 2013; Garaus *et al.*, 2016). What the literature grapples with now is deepening the common understanding of ambidexterity and the factors which enable it, as a path to performance (Junni *et al.*, 2015).

The integration of adaptability and alignment activities is the challenge in order to achieve ambidexterity. Adaptability concerns the ability to explore the wider world, absorb information from it and respond effectively. In contrast, alignment concerns the ability to exploit existing resources well, and so is primarily concerned with efficiency. Contextual ambidexterity, the focus of this study, concerns an organisation environment enabling adaptability and alignment in a single business unit or organisation. In this regard ambidexterity may often lie inherently within the organisational context where individuals manage the tension in the daily conduct of their jobs. Gibson and Birkinshaw (2004) describe contextual ambidexterity as the "behavioural capacity to simultaneously demonstrate alignment and adaptability across an entire business unit" (p. 209) that can be achieved in a context that "encourages individuals to make their own judgements as to how best to divide their time between the conflicting demands of alignment and adaptability" (p. 211). Contextual ambidexterity occurs through carefully crafted systems and processes, which allow "the meta-capabilities of alignment and adaptability to simultaneously flourish" (Gibson and Birkinshaw, 2004, p. 210). Ambidexterity concerns the capacity to scan the environment, explore options and develop and deploy them in efficient ways. This ability to integrate adaptability to the external world, and alignment of internal resources, means innovations can be deployed at scale through the organisation. Equally, a well aligned organisation can quickly share and use new information gained from effective adaptability to its environment. In contrast, many organisations which over-play alignment are unable to respond to changing threats and opportunities (Raisch *et al.*, 2009). An organisation heavily focussed on adaptability is likely to struggle to exploit innovations effectively.

The applicability of ambidexterity in a public sector environment
Gibson and Birkinshaw (2004) found that there were different paths to ambidexterity depending on "the administrative heritage of a given business, and the values of its leaders" (p. 223). Our research focusses on the public sector which has a distinctive administrative heritage and values. Our contention is that OA is highly relevant to the tasks and challenges of the public sector, which has unique circumstances.

OA resonates with pressures on public agencies to do more with less, whilst they often have vague goals, are risk averse, have poor management systems, and face significant dilemmas which make ambidexterity both difficult and important (de Waal, 2010). Public agencies that have focussed on producing standard quantitatively measured outputs, such as welfare payments, are now expected to produce complex, tailored outcomes, such as successful employment, for more diverse stakeholders (Plimmer *et al.*, 2011). Thus we argue that public sector agencies globally are in a classic ambidexterity dilemma. That is, they are expected to be both adaptable to changing demands from stakeholders and internally aligned so they use existing resources efficiently.

In government this is likely to be particularly salient because production processes require both consistency and fairness to stakeholders (standardisation), and are also more uncertain, co-produced and needing mass customisation (Brown and Osborne, 2013). Thus an HRM system, without clear OS, is unlikely to ensure ambidexterity. Contextual ambidexterity seems particularly suitable for government workers who explicitly operate in areas of market failure. Officials must often balance legal compliance and rights against exploring new ways of changing behaviour for diverse clients, such as in a public health, welfare or housing programme. It is therefore not surprising that government work is characterised by "multiple, conflicting goals, as well as the presence of procedural constraints on employee action" (Wright, 2004, p. 62). However, given the variable quality of management practices and systems in public sector organisations, what organisational conditions facilitate ambidexterity in such organisations?

A range of organisational antecedents have been studied by others such as competency and motivation, climate, culture, discipline, intellectual capital, stretch, support, social relationships, trust, structure (see: Junni *et al.*, 2015; Patel *et al.*, 2013). We argue that this range of organisational factors is better described by an overarching term of OS which encompasses both formal (role clarity, clear policies and procedures) and informal aspects (social support, trust). These OS are enabled by commitment based HRM systems. Such systems are of particular importance in public sector organisations, where increasingly services are co-produced with clients, and agencies are required to collaborate. Furthermore, agencies are required to do this despite often being rule bound, and with limited tools to influence employee behaviour (de Waal, 2010). The features, and integration of formal and informal systems is therefore likely to be particularly important, but different from, that in the private sector.

HRM systems, OS and OA
The link between HRM systems and organisational performance has received considerable theoretical and empirical attention (Jiang *et al.*, 2012). Macduffie (1995) showed that a coherent bundle of HR practices (also known as HRM systems) were positively associated with organisation performance. Numerous researchers have reported the link to a range of organisational outcomes, however there is still debate over how that link operates and is best theorised. Indeed part of the issue may lie in the differing definition of HRM systems. The HPWS stream tends to focus on reports of practices by managers (e.g. Patel *et al.*, 2013). In contrast the HIWS stream collects data about how workers experience HRM systems, on the grounds that employee experiences of HR practices are what count and that espoused practices by managers risk self-serving bias. Both theories, however, emphasise the

commitment rather than control of workers, and raising individual worker motivation and ability as pathways to organisational performance. The HPWS literatures also include the shaping of collective capabilities and the social context (Evans and Davis, 2005; Wright and Nishii, 2007). However the logic of HRM systems building collective capabilities through mechanisms such as trust, shared mental models, common understandings, norms and loose ties would equally apply to the HIWS stream, which is the focus of this study.

Commitment based HRM systems can directly improve organisational performance by saving management costs and enabling speedy problem resolution (Pfeffer, 1998). The Vandenberg *et al.* (1999) HIWS model has a number of specific strengths. It focusses on worker experiences rather than a prescriptive and unverified tally of management practices, and enables both an attitudinal and cognitive pathway to employee and organisational performance (Boxall and Macky, 2009). HIWS include practices which emphasise the power (P) (autonomy) to make decisions in one's job; the information (I), including both upward and downward flow; rewards (R); and knowledge (K), usually in the form of training and development. These practices, known as "PIRK", can lead to improved organisational outcomes (Boxall and Macky, 2009). Competent staff with the autonomy to make decisions, who are informed of management goals and purposes, and are rewarded and knowledgeable, save costs and improve effectiveness through both cognitive and motivational paths. A cognitive path ensures better quality decision making as organisations make better use of employees' skills and abilities to solve problems better. The motivational path of HIWS increases affective reactions leading to more effort, lower quit rates, and helps ensure workers take responsibility (Boxall and Macky, 2009; Vandenberg *et al.*, 1999). Hence:

H1. HIWS is positively associated with organisational performance.

The association between HRM systems and ambidexterity has only recently come to the fore in empirical studies. Patel *et al.* (2013) examined HPWS as a systematic tool for enhancing OA. They argued, following Gibson and Birkinshaw (2004), that to achieve contextual ambidexterity organisations need practices which support and motivate individuals to "devote their efforts to activities associated with both alignment and exploration" (p. 1421). That is, for example, practices supporting skill development, adaptability, autonomy and use of discretion. Their study confirmed that HPWS utilisation is positively related to OA, and that ambidexterity mediates the relationship between HPWS and organisation performance:

H2. HIWS is positively and directly associated with OA.

Although possible causal pathways through OS are mentioned, they are not tested in the Patel *et al.* (2013) study. Others investigating the HPWS – ambidexterity connection (Garaus *et al.*, 2016) suggest that ambidextrous HRM systems facilitate the integration of flexibility and efficiency: "the continuous interplay of social integration and formal integration enables knowledge integration and as a consequence, facilitates organisational ambidexterity" (p. 356). This qualitative study usefully shows how micro–HRM practices can shape capability. Arguably, integrative employment practices (those that promote shared understanding of organisational values, processes and products) create social integration, and that integrative work practices (those that manage interfaces and provide for coordination and collaboration) create formal integration such as boundary spanning cross functional teams. In combination, they contend, this enables collaboration and cooperation, or knowledge integration and the bridging of exploration and alignment (i.e. OA). The role of more traditional, public sector OS, such as tightly defined job responsibilities and work procedures, in fostering ambidexterity is not yet studied.

Thus the link between HRM systems and ambidexterity is established, but how it operates in the context of other OS is not yet clear. A range of mediation models have been presented

(Garaus *et al.*, 2016). Junni *et al.* (2015) develop a multi-level theoretical framework of HRM and organisational antecedents of ambidexterity. As well as a direct HR to ambidexterity path, they also propose that HR antecedents, such as HRM systems and employee and leader characteristics, interact with other organisational antecedents such as structure, culture, social relationships, and environment to create ambidexterity. Thus "ambidexterity is achieved when both HR and organisational factors work in concert to support ambidexterity" (2015, p. S23). However, the OS and processes that promote these features have never been specified, and are often private sector based (O'Reilly and Tushman, 2013). Hence our interest in not only HRM systems but also other formal and informal OS which contribute to ambidexterity and ultimately organisation performance. We argue that effective OS can stem from HIWS, and that these systems in turn shape OA.

The distinction between formal and informal systems is well established in organisation studies (Mintzberg, 1979). Formal systems rely on bureaucratic rules that clearly, often narrowly, allocate tasks and production processes. Such standardised processes are a particular feature of government work (Gould-Williams, 2004). In this study, they are referred to as organisational processes, or OP (Langford, 2009). In stable settings with routine processes, where behaviour can be monitored and output measured they reduce uncertainty. Efficient and well-designed organisational processes clarify accountabilities and responsibilities, and are also an important part of OS (Garvin, 2012). Although the causal direction may well be reciprocal, HIWS are likely to elicit and enable good formal processes as part of a wider organisational system. In the PIRK model, job autonomy would elicit clearly defined roles, and informed workers with voice would require and help develop processes. Equally, rewarded and knowledgeable workers would seek clear processes, so achievements could be made and acknowledged.

In contrast, informal systems concern values, beliefs and traditions. In ambiguous situations, when employees must balance complex stakeholder relationships (such as government) they are particularly important as they provide tacit rules of trust and support for effective employee discretion (Falkenberg and Herremans, 1995).

In Evans and Davis (2005) theoretical framework, internal social systems mediate between HR systems and organisational performance. They characterise HPWS as creating internal social systems which enable bridging weak network ties (a key source of information, resource exchange, and flexibility), shared mental models (for collaboration and efficiency), role making (for flexibility and performance) and organisational citizenship behaviour (for cooperation and flexibility). This social context for performance would similarly enable OA through their management of the tensions, or conflicting goals, between adaptability and alignment. For instance, shared mental models would help align the use of existing resources, while bridging weak ties would help the organisation adapt and use new information.

Similarly Gould-Williams (2003) found that bundles of HR practices impacted trust, both interpersonal and systems trust, and that the latter positively predicts organisational performance. For example good jobs which allow for autonomy and discretion in decision making (from HIWS) in turn facilitate trust and support (i.e. the informal social context of OS) and this in turn links to performance. In government organisations, however, HIWS can also be harmful to trust if management uses it to shift blame to employees (Gould-Williams, 2004). Despite the paternalism that characterises much public sector people management, trust in public organisations is often low and "politics and covert criticism prevail" (de Waal, 2010; McCarthy, 2009, p. 295). Although formal and informal systems can be incongruent, and thus harmful, they can also be mutually reinforcing and beneficial. In government good formal systems can be effective green tape that clarify responsibilities yet still allow for effective discretion, particularly when coupled with trusted and supportive informal systems.

HIWS are likely to shape formal (or explicit) organisational processes and systems, as well as informal (or implicit) social systems of trust and support.

Such integrated formal and informal OS likely enables OA, by focussing effort toward organisational goals, streamlining processes and reducing conflict by clearly allocating responsibilities and reducing role stress (Häusser *et al.*, 2010), yet also supporting flexibility, cooperation and citizenship behaviour (Evans and Davis, 2005). Thus complementary formal and informal OS can help manage the paradoxes of OA (Turner *et al.*, 2013). While hierarchy, formal structures and processes can emphasise alignment, less formal structures or processes can emphasise exploration (Tiwana, 2010). Business units can develop OA by "aligning themselves around adaptability" and by refining and enhancing (often informal) processes (Gibson and Birkinshaw, 2004, p. 221). However an organisation that focusses only on adaptability is unlikely to get the efficiencies to sustainably deploy new adaptations. Thus we hypothesised the following relationships:

H3. OS and OA will double mediate the relationship between HIWS and performance, as follows: (a) HIWS is positively associated with OS, (b) OS has a positive association with OA (c) OA is positively associated with organisational performance.

Our hypotheses are summarised below (see model in Figure 1).

Methods
Research design
The data for this study was collected as part of the New Zealand Public Service Association Workplace Dynamics survey during 2013 (Plimmer *et al.*, 2013). The response rate for the survey was approximately 32 per cent. Additional detail on the data collection process is available from the authors. Questionnaire data was collected from 2,123 supervisory and 9,496 non-supervisory employees employed by 56 New Zealand public sector organisations, which had greater than 40 participants. The smallest organisation employed 211 staff, the largest 9,567 (M = 2,621, SD 2,562). The mean of non-supervisory respondents per organisation was 169.6 (SD = 237.9), ranging from a minimum of 27 and maximum of 1,451 while the mean of those with supervisory responsibilities was 37.91 (SD = 50.44), ranging from a minimum of 4 to a maximum of 218.

The mean age of respondents was 47.6 years (SD = 11.5). The majority of respondents were female (68.8 per cent). Participants were ethnically diverse. The largest groups were NZ European (65.7 per cent), Maori (15.7 per cent), and Other European (10.1 per cent). Most (66.2 per cent) had been employed in their current jobs more than five years. A large number of respondents had a university degree (42.0 per cent). Assumptions of normality and multicollinearity showed that the data fell within the suggested ranges. We separate out the individual worker experience from the managerial overview, thus antecedent variables (HIWS and OS) are rated by workers, and consequential variables (OA and performance)
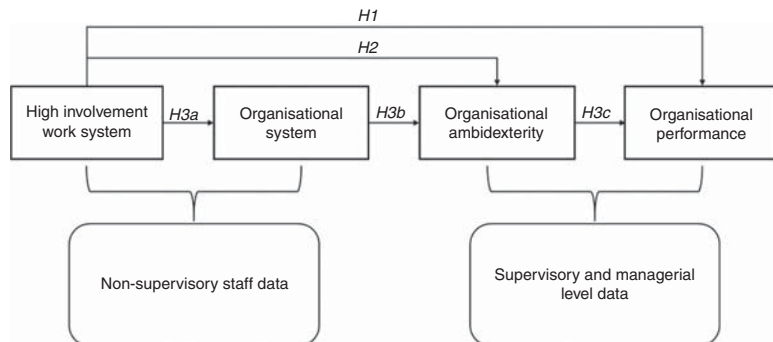

Figure 1.
Hypothesised model

by managers. This unique approach overcomes the problem of common method bias (Podsakoff *et al.*, 2003) which has been noted as a potential limitation of much the existing empirical research on OA (Patel *et al.*, 2013; Fu *et al.*, 2016).

Measurement

All of the scales have been previously used in the literature (sample scale items and associated reliability coefficients are reported in Appendix 1). The data were collected at the individual level and subsequently aggregated into the organisational level – the level of interest in this study. Prior to aggregating the individual level data, we computed the r_{WG} index (James *et al.*, 1993) to check for within-group agreement for each organisation. Intraclass Correlation Coefficient (ICC)(2) scores were similarly calculated. In sum, alphas, ICC(2), r_{WG} and average variance estimates (AVEs) were within commonly used rules of thumb (Cicchetti, 1994; Hulland, 1999) (Appendix 1 and Table I). For instance, ICC(2)s varied from 0.70 to 0.96, which are good to excellent, using Cicchetti's (1994) heuristic rating for ICC scores. The scales have convergent validity as the AVEs were all higher than 0.50 (Hair *et al.*, 2014, p. 107) in the partial least squares analysis. As shown in Table I, the outer loadings were all higher than 0.708 (see Hair *et al.*, 2014, p. 107), which suggest that there was indicator reliability and similarly, there was scale reliability as the composite reliabilities range between 0.89 and 0.93.

Employee level data. HIWS was operationalised as a second order latent variable, computed from four sub-scales, following Vandenberg *et al.* (1999). This 28-item scale measures workers' experiences, rather than the practices commonly espoused by managers, of bundled human resource practices (autonomy (power), information, rewards and knowledge). OS was operationalised with Langford's (2009) organisational processes scale, and Gibson and Birkinshaw (2004) social context for performance scale. The former, three item scale was chosen for its construct validity of formal processes, and its widespread use in Australia and New Zealand (Langford, 2009). The social context scale was chosen for its construct validity in measuring the trust and support aspects of informal systems and its established reliability. AVEs for these two second order factors indicate reasonable discriminant validity (Hulland, 1999).

Supervisor and manager level data. We relied on data collected from 2,123 individuals who held supervisory responsibility to provide information relating to OA and organisational performance. This is because individuals who hold supervisory and managerial positions have a more informed view of organisational capability and performance. This research design is also an attempt to minimise the potential risk of common method bias. Following Gibson and Birkinshaw (2004), the OA construct was operationalized as the product term of organisational adaptability and alignment as it is the capacity to integrate these two competencies in mutually reinforcing rather than additive ways that constitutes OA.

	Mean	SD	R^2	AVE	1	2	3	4	5
1. Organisational size[a]	2,621.10	2,562.46	–	–	1.00				
2. HIWS	3.10	0.19	–	0.74	−0.30*	*(0.86)*			
3. Organisational systems	3.15	0.17	0.77	0.80	−0.12	0.83***	*(0.89)*		
4. Ambidexterity (supervisors)	9.28	1.29	0.39	–	−0.07	0.52***	0.53***	1.00	
5. Organisational performance (supervisors)	2.91	0.29	0.69	0.76	−0.19	0.58***	0.52***	0.77***	*(0.87)*

Notes: [a]$n = 56$ (we were not able to obtain the organisational size data for ten organisations); Discriminant validity is determined by using the Fornell-Larcker criterion by ensuring the square root of the AVE (shown as italics) of each construct is greater than the inter-correlation with other construct in the model (Hair *et al.*, 2014, p. 111). *$p < 0.05$; ***$p < 0.001$

Organisational performance was collected from individuals holding supervisory responsibilities and was measured using the same scale as Gibson and Birkinshaw (2004; α: 0.82, rWG: 0.88). This latter scale was validated by comparing a different sample of results from the same survey, against evaluations of government agencies that had been appraised by the New Zealand State Services Commission using its Performance Improvement Framework (PIF). This identified a Spearman's correlation $\rho = 0.65$ ($p = 0.038$) between ratings of performance and PIF evaluations. In addition, subjective organisational performance scales have been validated across a broad range of research (de Waal, 2010).

Self-reported data are widely used by scholars as they can provide valid indicators of organisational properties (Yang and Hsieh, 2007, p. 865). Although they can raise issues about common method bias, others have noted that the threat of CMV is "overstated, and the effect of common-source bias is not to invalidate relationships uncovered in studies employing self-reported data but to marginally attenuate the strength of the findings [...]" (Yang and Hsieh, 2007, pp. 865-866).

Common method bias. Furthermore, to minimise common method bias risk, we matched employee level data with supervisor level data (see Podsakoff *et al.*, 2003). In addition, we also conducted a Harman's one factor test (see Podsakoff *et al.*, 2003) to check for the effect of common method bias for each of the data sets (i.e. employee and supervisory data sets). Regarding the employees data set, an unrotated EFA found six factors with an eigenvalue of greater than 1.0 and the largest factor explained 18.6 per cent of the variance. Regarding the supervisor data set, an unrotated EFA produced two factors with an eigenvalue of greater than 1.0 and the largest factor explained 48.8 per cent of the variance. Both analyses showed that the unrotated solution were both less than the 50 per cent cut-off thresholds for identifying common method bias using the Harman's one factor test (see Podsakoff *et al.*, 2003). In summary, the present study has taken procedural and statistical steps to minimise common method bias, and results are below established thresholds of concern.

Discriminant validity
In the present study we conducted two tests to check for discriminant validity within the PLS modelling technique. These were the Fornell-Larcker criterion (Hulland, 1999; Fornell and Larcker, 1981) and the examination of cross loading. The Fornell-Larcker test has been used to determine discriminant validity in studies using the PLS modelling technique. This test is done by comparing the square roots of the AVE for the variable of interest with its inter-correlation with the other variables, and if the square root of the AVEs are larger than the inter-correlations, the construct will have discriminant validity. The four constructs used in our model satisfied the Fornell-Larcker test (see Table I). Examination of the cross loading also provided confidence that the items assigned under each latent construct was consistent with the theoretical construct and no cross loading were identified (Hair *et al.*, 2014).

Confirmatory factor analysis was conducted using IBM AMOS v.24 on the non-aggregated data set to determine if the two employee level constructs were measuring the same phenomenon (note: we did not conduct the analysis for the supervisor constructs as we followed Gibson and Birkinshaw, 2004 in computing ambidexterity as an interaction of the two sub-dimensions of the construct). We conducted a nested model comparison test to compare the χ^2 and the degrees of freedom of the two factor model (HIWS and OS as distinct construct: χ^2 34.876, df 8) with the one factor model (treating HIWS and OS as a single factor: χ^2 24.171, df 6). The analysis showed the two factor model had the better fit indices and the changed χ^2 of the nested model comparison

was: 10.705, df 2, $p < 0.001$. It showed that the two factor model (with HIWS and OS as two separate constructs) had a better goodness of fit. Therefore, it shows that the respondents were able to discriminate between these two variables and hence, HIWS and OS were two distinct variables.

After aggregation of the individual data in IBM SPSS v24, SmartPLS 2.0 (Ringle *et al.*, 2005) was used to test the model because of its ability to manage smaller sample sizes (Chin, 1997), as was the case in this study of 56 organisations. This sample size also met the minimum required to run a PLS-SEM modelling for a statistical power of 80 per cent at 0.05 alpha level (see Hair *et al.*, 2014, p. 21). Mediation analyses was conducted using the PROCESS macro (Hayes, 2013).

Findings

Descriptive statistics and inter-correlations are reported in Table I. There were two control variables, namely organisation size and public service sub-sector (dummy variables for regional and national government agencies). Although the four key variables are inter-correlated, the sector variables were not correlated with the variables of interest. Organisational size was negatively correlated with HIWS ($r = -0.30$, $p < 0.05$), indicating that employees in larger organisations report worse HRM experiences, but organisational size was not related to the other variables. Organisational size has also not significantly correlated with study variables, or been controlled for, in similar research (cf. Gibson and Birkinshaw, 2004; Messersmith *et al.*, 2011). Public service sub-sector and size were therefore excluded from the main analysis.

We conducted a path analysis to test the hypotheses in this study. The partial least squares analysis showed that the data has a high goodness of fit with the model as indicated by Tenenhaus *et al.*'s (2005) Global Goodness of Fit index of 0.775 per cent. *H1* and *H3,a-c* were supported, but *H2* was not supported (see Table II).

As indicated by the mediation analysis (with 10,000 bootstrap samples) using Hayes' (2013) Process macro (Model 4), OA was found to fully mediate the relationship between OS and organisational performance ($b = 0.69$ 95% BCa CI (0.217, 1.339)) while HIWS has a statistically significant direct relationship with perceived organisational performance. In order to test *H 3* we undertook a double mediation analysis using Hayes (2013) Process macro (Model 6). The analysis showed that organisational systems and OA were both mediators of the relationship from HIWS to organisational performance ($b = 0.54$ 95% BCa CI [0.24, 1.13]). Results are reported in Figure 2.

Hypotheses	Coefficient	*t*-statistic	Sig. level
H1. HIWS→Organisation performance	0.21	2.2004	*
H2. HIWS→Organisation ambidexterity			ns
H3. Mediation hypothesis:			
Organisation systems and Organisation ambidexterity are mediators of			
HIWS→Organisation performance:			
3a) HIWS→Organisation systems	0.88	34.7492	***
3b) Organisation systems→Organisation ambidexterity	0.53	2.2777	*
3c) Organisational ambidexterity→Organisation performance	0.69	9.6897	***
HIWS→OS→OA→Organisation performance	$b = 0.69$, 95% BCa CI (0.217, 1.339)		

Notes: Total sample: 2,123 supervisory and 9,496 non-supervisory employees from 56 organisations. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table II.
Results of
path analysis

Figure 2.
Results of
path analysis
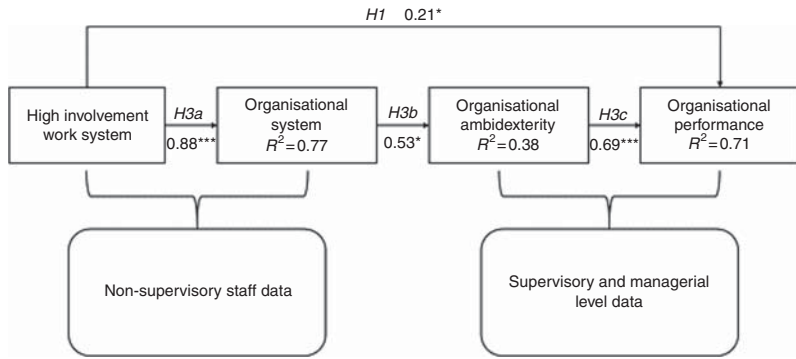
Notes: $n=56$. Only statistically significant findings are shown. $*p<0.05$; $**p<0.01$;
$***p<0.001$

Post hoc analysis

Two *post hoc* analyses were conducted. The first was to see if the direct HIWS – OA relationship occurred at the individual non-supervisory level, even though it was insignificant in the main analysis. Worker ratings of HIWS correlated strongly with worker ratings of OA (rather than supervisor/manager ratings as predicted in *H2*) ($r = 0.68$, $p < 0.01$). This indicates that non-supervisors judge OA differently from supervisors.

The second *post hoc* study was a more fine grained analysis of how components of HIWS, OS and OA contribute to performance (Figure 3). The small sample size means that these exploratory results need to be treated with considerable caution (Button *et al.*, 2013), but we believe they provide useful insights for future research. The power (autonomy), information and reward component support informal systems of trust and support, but this latter variable does not support adaptability, alignment, or performance. In contrast, information, rewards and knowledge link to formal organisational processes, which subsequently enables adaptability and alignment, of which the latter in turn

Figure 3.
Significant
relationships between
dimensions of HIWS,
OS, OA and
performance
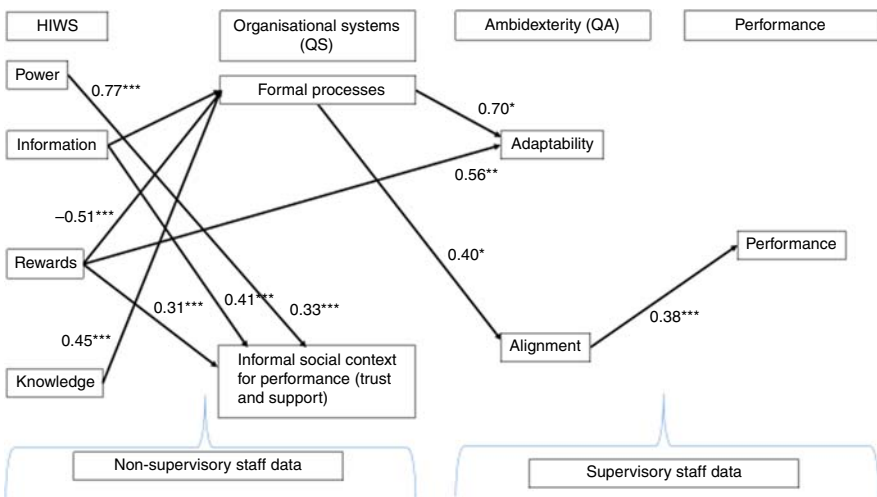
Notes: $n=56$ organisations; Global Goodness of Fit Tenenhaus *et al.* (2005) index$=0.53$

supports performance. The information→organisational processes link seems particularly strong and positive. In contrast, the relationship between rewards and organisational processes is negative.

Discussion

Ambidexterity encapsulates the dilemma facing many government organisations of how to adapt to increasing and complex demands from more diverse stakeholders, and at the same time use existing resources well. In this study we found that HIWS directly aids organisational performance (*H1* supported), but that HIWS is not directly associated with OA (*H2* not supported). OS and OA are partial mediators of the relationship between HIWS and organisational performance (*H3* supported). In more detail we found that HIWS support OS (*H3a* supported), and that OS is positively associated with OA (*H3b* supported). In turn, OA supports performance (*H3c* supported).

The direct relationship between HIWS and organisational performance is consistent with other public administration research linking HR experiences to organisational performance (Gould-Williams, 2003). Although the autonomy, information, rewards and knowledge that comprise HIWS may enable something akin to contextual ambidexterity in the daily conduct of jobs, this does not aggregate to OA at the organisational level as rated by supervisors/managers. This is supported by the *post hoc* analysis of the HIWS > OA link at the non-supervisory individual level. It suggests that workers' experience of contextual ambidexterity differs from that of supervisor/managers', who have a broader view of the organisation, and see ambidexterity beyond the confines of a lower level job. OA requires sound formal and informal systems that span jobs, rather than just high involvement design features within a job. Thus this study indicates how HIWS shape wider organisational capabilities beyond how individual jobs are conducted, by fostering both trust and support, and clear processes. The separate managerial rating of OA and performance clarify the distinctiveness of organisational capabilities, from good jobs, but also shows how good jobs help build these collective capabilities. This research makes clear that performance is achieved through a combination of HR systems and other OS, providing both the motivational (good jobs) and cognitive (good skills, good processes) pathways to perform collectively. The low mean for HIWS indicates considerable room for improvement, particularly in the larger participating organisations.

This study identified a double mediation model to explain the pathway from worker level HIWS to organisational performance via OS and supervisory and managerial rated ambidexterity. Many models place organisational practices and policies as antecedents of commitment based HRM. Instead, this study points to the generative capacity of HIWS to in turn improve OS, and hence OA and performance. In particular we argue that HIWS, through enhanced capability, motivation and trust, would elicit clear role definitions and formal processes, as green tape, to get the job done. Whereas formal processes in government are often seen as rigid and impeding to performance (red tape), processes can also be effective (green tape) when they have valid purposes, are understood, consistently applied, and reasonable in their amount of control (DeHart-Davis, 2009). Unclear processes would risk an environment of normlessness that may clash with highly involved workers, and over controlling processes would be contrary to the trust that stems from HIWS. We argue that such formal processes, with a wider informal social context of trust and support would be sought by involved workers as means to better do their jobs. This combination of formal but clear processes, and trust and support would in turn help managers manage for ambidexterity. It would integrate the innovation and creativity that can come with commitment based HR (Shin *et al.*, 2016), with the formal processes for deployment at scale.

The more fine grained *post hoc* analysis indicated that in government, the social context of informal systems, and adaptability, have no relationship to performance outside the

context of clear formal processes and alignment. They also show how important formal organisational processes are in government, where organisations may lack clear goals, management skills, and also tools such as discipline and stretch, when compared to private sector counterparts (de Waal, 2010; Gibson and Birkinshaw, 2004; Plimmer *et al.*, 2011).

The negative relationship between rewards and OP illustrates how private sector research findings and practices cannot be assumed to apply to public sector organisations. In government, explicit rewards are constrained by public concern about costs and union concern about inequity, are harder to design well, and easily have distorting side effects (Perry *et al.*, 2009). Instead, public service motivation is a salient driver of behaviour (Leisink and Steijn, 2009). These more granular findings also suggest that, in government, ensuring staff are informed, and can inform, should be a focus of attention in order to source good processes and adaptability.

The findings point to the need to focus on management fundamentals such as good HRM systems, and tight OS that are often missing in public organisations (Leggat *et al.*, 2011). Public sector organisations are unlikely to be compelled to be ambidextrous but their stakeholders may benefit considerably if they are ambidexterous.

Limitations and future research implications

The cross sectional nature of the data set make causal direction uncertain. The possibly reciprocal nature of the HIWS→OS relationship warrants study. Future research should consider the possibility of collecting objective performance data and/or multiple level modelling.The leadership attitudes and behaviours of top public sector managers to transform work and OS into OA is under researched. Future research could also further test the effect of the individual HR bundles on mediators and organisational performance.

Conclusion

This study helps explain the black box linkage between HIWS and organisational performance. It demonstrated that HIWS support OS, which in turn enable managerial rated OA and performance. This study also demonstrates that the operationalisation of OA in a public sector context is different to that reported in the existing ambidexterity literature in predominantly private sector organisations. This provides a new avenue for development of OA both theoretically and practically. In summary, OA is an important meta-competency for organisational performance, providing useful operationalisation of many current debates in public administration. Its prerequisites are HIWS and OS. The information dimension of HIWS seems particularly important. Public sector organisations need to focus on both as an avenue to sustainable improved performance.

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(The Appendix follows overleaf.)

Appendix 1. Scales, indicators, factor loadings, composite reliability coefficients and AVEs

Scales and indicators	rwg	ICC(2)	Loadings	t-statistic	Composite Reliability
High Involvement Work System[a] (Vandenberg *et al.*, 1999; second order reflective scale)		0.84			0.92
Power subscale	0.88		0.79	11.64	0.94
I have sufficient authority to fulfil my job responsibilities			0.77	139.24	
I have enough input in deciding how to accomplish my work			0.84	218.57	
I am encouraged to participate in decisions that affect me			0.81	196.24	
I have enough freedom over how I do my job			0.82	171.94	
I have enough authority to make decisions necessary to provide quality customer service			0.82	183.89	
I am encouraged to participate in and make decisions that affect my day-to-day activities			0.84	215.26	
I am given enough authority to act and make decisions about my work			0.87	255.45	
Information subscale	0.96		0.91	44.81	0.94
Organisational policies and procedures are clearly communicated to employees			0.73	131.18	
Management gives sufficient notice to employees prior to making changes in policies and procedures			0.79	170.48	
I receive sufficient notice of changes that affect my work group			0.79	173.84	
Management takes time to explain to employees the reasoning behind critical decisions that are made			0.80	183.69	
Management is adequately informed of the important issues in my work area			0.67	84.65	
Management makes a sufficient effort to get the opinions and feelings of people who work here			0.82	219.20	
Management tends to stay informed of employee needs			0.82	194.58	
The channels of employee communication with top management are effective			0.82	234.39	
Top management communicates a clear organisational mission and how each part of the organisation contributes to achieving that mission			0.76	141.49	
Employees of this company work toward common organisational goals			0.69	101.97	
Rewards subscale	0.93		0.87	22.65	0.93
My performance evaluations within the past few years have been helpful to me in my professional development			0.76	158.93	
There is a strong link between how well I perform my job and the likelihood of receiving recognition and praise			0.84	232.36	
There is a strong link between how well I perform my job and the likelihood of receiving a raise in pay/salary			0.80	173.17	
There is a strong link between how well I perform my job and the likelihood of receiving high performance appraisal ratings			0.83	191.60	
Generally, I feel this organisation rewards employees who make an extra effort			0.85	228.50	
Reward I am satisfied with the amount of recognition I receive when I do a good job			0.83	222.31	
If I perform my job well, I am likely to be promoted			0.74	128.06	
Knowledge subscale	0.96		0.86	22.84	0.96
I am given a real opportunity to improve my skills at this organisation through education and training programmes			0.85	254.20	
I have had sufficient job-related training			0.80	173.19	
My supervisor has helped me acquire additional job-related training when I needed it			0.80	171.53	

Table AI.

(*continued*)

Scales and indicators	rwg	ICC(2)	Loadings	t-statistic	Composite Reliability
I receive ongoing training, which enables me to do my job better			0.87	261.50	
I am satisfied with the number of training and development programmes available to me			0.89	356.28	
I am satisfied with the quality of training and development programmes available to me			0.88	289.80	
The training and educational activities I have received enable me to perform my job more effectively			0.83	185.08	
Overall, I am satisfied with my training opportunities			0.92	554.38	
Organisational Systems[b] *(second order reflective scale)*		0.70			0.89
Social context for performance (Gibson and Birkinshaw, 2004): managers in this organisation…	0.83		0.89	41.27	0.94
… devote considerable effort to developing their subordinates			0.84	221.34	
… give ready access to information that others need			0.85	238.75	
… work hard to develop the capabilities needed to execute our overall organisational strategy			0.86	250.96	
… base decisions on facts and analysis, not politics			0.83	219.16	
… treat failure as a learning opportunity, not something to be ashamed of			0.82	178.79	
… are willing and able to take prudent risks			0.81	170.69	
… set realistic goals			0.82	200.24	
Organisational Processes Subscale (Langford, 2009):	0.96		0.88	30.68	0.89
There are clear policies and procedures for how work is to be done			0.85	223.57	
In this organisation it is clear who has responsibility for what			0.86	269.55	
Policies and procedures are efficient and well-designed			0.86	275.88	
Manager's Perception of Ambidexterity (Gibson and Birkinshaw, 2004)		0.96	NA	NA	NA
Adaptability subscale	0.86		NA	NA	0.80
The management systems in this organisation encourage people to challenge poor practices			0.82	93.67	
The management systems in this organisation are flexible enough to allow us to respond quickly to changes			0.89	165.00	
The management systems in this organisation evolve rapidly in response to shifts in our business priorities			0.85	104.24	
Alignment subscale	0.72		NA	NA	0.89
My workplace works coherently to support the overall objectives of the organisation			0.77	45.37	
My organisation wastes resources on unproductive activities. (r)			0.74	54.96	
The people in my organisation often end up working at cross-purposes because we are given conflicting objectives. (r)			0.78	66.63	
Managers' Perception of Organisational Performance (Gibson and Birkinshaw, 2004)	0.88	0.83			0.93
This organisation is achieving its full potential			0.81	95.26	
People at my level are satisfied with this organisation's performance			0.86	134.89	
This organisation does a good job of satisfying its clients			0.75	59.71	
This organisation gives me the opportunity and encouragement to do the best work I am capable of			0.81	105.06	

Notes: Discriminant validity was determined by computing Fornell and Larcker's (1981) average variance extracted (AVE) index. All of the items had a factor loading of greater than 0.7, which indicated that the underlying construct had discriminant validity (see Hulland, 1999); Manager's rating of ambidexterity was computed following Gibson and Birkinshaw (2004) as a multiplication of alignment by adaptability; [a]These scales were formed within SPSS; hence, there were no factor loadings output in SmartPLS; [b]These scales were formed within SPSS; hence, there were no factor loadings output in SmartPLS v2.0 M2

Table AI.

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