



# The association between the interactive and diagnostic use of financial and non-financial performance measures with individual creativity: The mediating role of perceived fairness

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## Abstract

This study examines the associations between top management's interactive and diagnostic use of financial and non-financial performance measures with individual manager's (i.e. middle and lower level managers) creativity, and the mediating role of middle and lower level manager's perceived fairness of their performance appraisal on such associations. Using data from a survey of 220 middle and lower level managers from manufacturing organisations in Australia, the structural equation model revealed direct positive associations between both the diagnostic use of financial performance measures and the interactive use of non-financial performance measures with individual creativity. Further, the positive effect of the interactive use of financial performance measures on individual creativity is positively and fully mediated by distributive, interpersonal and informational fairness, while the positive effect of the interactive use of non-financial measures is positively and partially mediated by interpersonal and informational fairness. In addition, procedural fairness positively and partially mediates the effect of the diagnostic use of financial performance measures on individual creativity, and interpersonal fairness positively and fully mediates the effect of the diagnostic use of non-financial performance measures on individual creativity. The findings contribute to the performance measurement and appraisal literature examining the interactive and diagnostic use of both financial and non-financial performance measures and extends the sparse literature on the role of perceived fairness in explaining the behavioural effect of performance measurement systems. The findings also provide implications for practice, revealing the importance of the interactive and diagnostic use of financial and non-financial performance measures, and manager's perception of the fairness of performance appraisal processes as a mechanism through which individual manager's creativity can be enhanced.

**Keywords** Performance measures · Interactive use · Diagnostic use · Perceived fairness · Creativity

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## 1 Introduction

Performance measurement systems (PMSs) are an important aspect of management control systems (MCSs) (Merchant & Van der Stede, 2007) with the ability to promote organisational outcomes (Ho et al., 2014; Pollanen et al., 2017; Teerantansirikool et al., 2013), capabilities (Bedford et al., 2019; Henri, 2006; Micheli & Mura, 2017), and employee feelings (Lau & Amirthalingam, 2014; Marginson et al., 2014) and behaviour (Burney et al., 2009; Sholihin & Pike, 2010). Previous studies examining the influence of performance measures on employee behaviour have emphasised the effect of the use of financial and/or non-financial measures with mixed findings reported (Graf et al., 2019).<sup>1</sup> However, Su et al. (2015) posit that it is not sufficient to merely investigate the existence of controls without examining the way in which they are used. Further, Abernethy et al. (2010) argues that what differentiates one control from another is not their technical characteristics but the way in which management use them. Accordingly, given that the “different uses of performance measures (diagnostic versus interactive) may create different, and potentially opposing [outcomes]” (Marginson et al., 2014, 65), grounded in Simons’ (1995) levers of control framework, this study aims to extend the performance measurement literature by considering the relationship between the interactive and diagnostic use of financial and non-financial performance measures<sup>2</sup> with a specific managerial behaviour, creativity.<sup>3</sup>

Relatively few studies have considered the influence of the use of controls on creativity (Moulang, 2015; Speklé et al., 2017a, 2017b) and hence, there are calls for future research on the effect of control systems on creativity (Moulang, 2015). Our focus on creativity, which is defined as the production of novel and useful ideas by individual employees, is pertinent as it represents a form of individual behavioural expression rather than a personality trait (Amabile et al., 1996), and hence, it is considered to be an important managerial behaviour of increasing relevance (Lu et al., 2019; Moulang, 2015). Further, creativity can lead to organisational innovation through facilitating the development of new products and processes (i.e. innovation), thereby enabling the achievement of long-term survival and competitive advantage

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<sup>1</sup> For example, whilst Lau and Sholihin (2005), Tan and Lau (2012) and Bone (2017) found that both financial and non-financial performance measures were favourably associated with job satisfaction, organisational commitment and interpersonal trust respectively, Lau and Roopnarain (2014) found no significant association between financial performance measures with extrinsic employee motivation. Also, while Lau (2011) reported no direct association between both financial and non-financial performance measures with managerial performance, Gamayuni and Dewi (2019) reported a positive association between non-financial performance measures with managerial performance, while Shin et al. (2020) found that the use of non-financial performance measures was negatively associated with short-term oriented behaviour.

<sup>2</sup> While financial performance measures such as profit, capital market returns, unit cost, and return on investment (Banker et al., 2000; Eccles 1991) are referred to as the traditional metrics used by organisations to assess and control their financial results (Milost 2013), non-financial performance measures included in frameworks such as the balanced scorecard are considered to be broader in scope.

<sup>3</sup> N.B. Throughout the paper any reference to creativity refers to individual middle and lower level manager’s creativity.

(Moulang, 2015; Speckbacher, 2017). Hence, organisations are expected to leverage on their human capital (Raffer, 2018; Uddin & Arif, 2016) and encourage managerial creativity in order to cope with the challenges of the contemporary business environment e.g. uncertainty and the disruptions arising due to increasing technological evolution (Belenzon et al., 2018; Maier & Reimer, 2018).

While recent management accounting literature has advocated the role of performance management systems (including PMSs) in enhancing creativity (Adler & Chen, 2011; Brügggen et al., 2018; Davila et al., 2009; Kachelmeier et al., 2019; Klein & Speckbacher, 2020; Speckbacher & Wabnegg, 2020; Speklé et al., 2017a, 2017b), there is limited empirical understanding of the mechanisms through which performance measures promote creativity (Speklé et al., 2017a, 2017b). Two exceptions here are studies by Speklé et al., (2017a, 2017b) and Moulang (2015) who examined the association between Simons' (1995) levers of control, empowerment, and individual level creativity. Moulang (2015, 519) concluded that "interactive performance measurement system use impacts on creativity through .... psychological empowerment" while Speklé et al., (2017a, 2017b, 73) reported that the "intensity of use of a levers of control system of controls is positively associated with both empowerment and creativity". This study aims to extend this research by examining the mediating role of an alternative psychological mechanism, specifically the perceived fairness of performance appraisal,<sup>4</sup> on the association between top management's interactive and diagnostic use of financial and non-financial performance measures with individual managers' (middle and lower level) creativity.

Our focus on the mediating role of the perceived fairness of performance appraisal is pertinent as perceived employee feelings (individuals' psychological state) are recognised as mediators of the effect of organisational systems (i.e. in our study, PMSs) on employee behaviour (i.e. in our study, creativity) (Covaleski et al., 2003; Venkatesh & Blaskovich, 2012), and hence, the perceived fairness of the performance appraisal system is thought to be an important mechanism which can explain the effect of the interactive and diagnostic use of performance measures on creativity. This line of research follows the dominant theoretical perspective informing psychology studies which posits that individuals' psychological states are influenced by stimuli which subsequently affect their behaviour. Specifically, in our study we find that top management's interactive use of financial and non-financial performance measures exhibits a positive effect on middle and lower level manager's perceived fairness of their performance appraisal system, with both types of measures positively associated with interpersonal and informational fairness, and the interactive use of financial performance measures also found to be positively associated with distributive fairness. Alternatively, we find that top management's diagnostic use of financial (non-financial) measures is negatively (positively) associated with manager's perceived fairness of performance appraisal, specifically procedural (distributive and interpersonal) fairness. In turn, drawing on "organisational justice literature [which] suggests that fairness has important effects on many

<sup>4</sup> While the terms 'evaluation' and 'appraisal' are considered identical, we refer to 'appraisal' throughout the study.

aspects of organisational members” including their behaviour and performance (Lau, 2015, 143), we find that manager’s<sup>5</sup> perception of the fairness of their performance appraisal generally exhibits a positive association with creativity, with three of the four dimensions of fairness (distributive, interpersonal and informational) found to be positively associated with creativity.<sup>6</sup> This is consistent with the organisational identification theory which posits that when employees identify with their organisation, they will exhibit behaviour that is in the best interests of their organisation (Foster et al., 2010). Specifically, manager’s perception of the fairness of their performance appraisal will endear them to identify with issues and problems in their organisation and hence, they will be more willing to find creative solutions to organisational problems (Lau & Moser, 2008).

Therefore, the study aims to examine the association between the interactive and diagnostic use of performance measures with creativity and the mediating role of a specific employee psychological state, manager’s perception of the fairness of their performance appraisal, on this association. The remainder of the paper is organised as follows. First, the next section discusses the main constructs of the study, and the plausible relationships between the constructs. The following section then outlines the research method adopted in the study, followed by the analysis and results section, and the final section which discusses and presents the implications of the findings, the limitations and directions for future research.

## 2 Literature review and hypotheses development

### 2.1 Performance measures

Performance measures are an integral part of a management control system, and they are broadly categorised into financial and non-financial measures (Gong & Young, 2016; Lau & Moser, 2008). Financial measures include profit, capital market returns, unit cost, and return on investment (Banker et al., 2000; Eccles, 1991), and are considered to be narrow in focus, and aggregate in nature (Kaplan & Norton, 2001a, 2001b). They are also referred to as lag measures since they measure outcomes as opposed to the drivers of such outcomes. In contrast to financial performance measures, non-financial performance measures are broader in scope, and are more understandable and easier to relate to (Langfield-Smith et al., 2018). The use of non-financial performance measures is considered to promote favourable outcomes, given many of them are leading instead of lagging in nature.

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<sup>5</sup> The literature generally refers to employees’ reactions to performance appraisal systems. However, as we focus on middle and lower manager’s reactions, any reference to ‘employees’ or ‘managers’ reactions should be interpreted as middle and lower level manager’s reactions.

<sup>6</sup> NB The fourth dimensions of fairness, procedural fairness, exhibits a negative association with creativity. A detailed explanation of this effect is provided later in the paper.

This study relies on Simons' (1995) Levers of Control,<sup>7</sup> focusing on how the interactive and diagnostic use of both financial and non-financial performance measures in the performance management process affects creativity. The interactive use of performance measures refers to the extent to which top management use financial performance measures (e.g. profit and standard costs) and non-financial performance measures (e.g. the number of innovations and employee/customer satisfaction ratings) to facilitate discussion and communication in meetings with middle and lower level managers, encourage continual challenge and debate of underlying data, and to help to tie the business unit together (Marginson et al., 2014). Alternatively, the diagnostic use of performance measures refers to the extent to which top management use financial performance measures (e.g. profits and standard costs) and non-financial performance measures (e.g. customer satisfaction rate, number of innovations and number of jobs reworked) to track middle and lower level managers' progress towards goals, monitor results and compare outcomes to expectations (Marginson et al., 2014). The focus on the interactive and diagnostic use of performance measures is considered appropriate as they are mainly imposed on middle and lower level managers by the top management level (Bisbe et al., 2019). Further, the imposition of the levers of control on middle and lower manager levels also enables us to maintain consistency in the level of analysis throughout the study given the study's other variables (i.e. creativity and perceived fairness of performance appraisal) are also applied at these levels.

The study focuses on the influence of the interactive and diagnostic use of performance measures on middle and lower level managers' creativity. In addition, we examine the behavioural mechanism through which this effect transpires. Specifically, we examine the mediating role of the perceived fairness of their performance appraisal on the association between the interactive and diagnostic use of performance measures with creativity (see Sect. 2.3).

## 2.2 The association between the interactive and diagnostic use of performance measures with creativity

The organisational behaviour literature contends that freedom over one's work facilitates creativity while control may hinder creative thought and output (Shalley et al., 2000; Speklé et al., 2017a, b; Zhou & George, 2003). However, PMSs, as an integral component of the MCS, possess the ability to influence employee behaviour (Burney et al., 2009; Sholihin & Pike, 2010) with the manner in which such performance measures are used (i.e. interactively or diagnostically) expected to influence employee behaviour including creativity (Henri, 2006; Journeault et al., 2016; Simons, 1995). In particular, the PMS literature indicates that the way in which

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<sup>7</sup> While Simons' (1995) Levers of Control consists of four levers of controls (i.e. belief system, boundary systems, and the interactive and diagnostic use of controls), belief and boundary systems are mainly concerned with defining the strategic domain for organisational members and creating organisational culture (Bisbe and Otley 2004; Nuhu et al., 2017) and hence, are not considered to directly relate to the use of performance measures.

employees perceive controls determines the effect of such controls on individual creativity (Akerlof & Kranton, 2008; Falk & Kosfeld, 2006; Shalley et al., 2004; Speklé et al., 2017a, 2017b). Accordingly, the following sub-sections discuss the nature of the associations between the interactive and diagnostic use of financial and non-financial performance measures with creativity.

### 2.2.1 The interactive use of performance measures

The interactive use of performance measures “expands opportunity seeking, focuses attention, forces dialogue and encourages creativity” (Moulang, 2015, 521). When financial or non-financial performance measures are used interactively the measures are less restrictive and incorporate employees’ opinions and preferences (Henri, 2006; Simons 1995), thereby positively influencing individual creativity. Specifically, given the interactive use of financial performance measures (such as profit, ROI, standard cost) or non-financial performance measures (such as customer and employee satisfaction rating, product quality) engages employees in discussion that stimulates challenging the existing and underlying assumptions and actions plans (Marginson et al., 2014), this will elicit employees to come up with new ideas and ways of operating. Accordingly, as individual creativity is about experimenting with and devising creative ideas and concepts by employees (Moulang, 2015), the interactive use of performance measures is expected to lead to improved creativity.

Furthermore, the inherent characteristics of the interactive use of financial and/or non-financial performance measures are consistent with the notion of creativity since the interactive use of performance measures emphasises organisational learning and opportunity seeking behaviour (Bisbe et al., 2007; Narayanan & Boyce, 2019; Simons, 1995). Specifically, given creative employees are those that engage in searching for innovative processes and improvements in their organisations (Moulang, 2015), consistent with goal setting theory (Marsh et al., 1995), the interactive use of performance measures will promote a mindset that encourages employees to engage in actions and efforts that will bring new paradigms to their organisations i.e. to be more creative. Hence, through encouraging greater discussion and debate, the interactive use of performance measures will encourage employees to be more proactive in solving problems and implementing action to manage strategic uncertainties (Bisbe et al., 2007; Narayanan & Boyce, 2019; Simons, 1995).

In line with this discussion, we hypothesise that the interactive use of performance measures will be positively directly associated with creativity.

**H1** The interactive use of financial and non-financial performance measures is positively directly associated with creativity.

### 2.2.2 The diagnostic use of performance measures

The diagnostic use of performance measures involves “rule based controls that aim to monitor outcomes and correct significant deviations from expected levels of performance” (Moulang, 2015, 521). As a more formal control, the diagnostic use of controls is generally held to be constraining and hence, incompatible with

creativity (Davila et al., 2009; Davila et al. 2009), although its effect on employee behaviour is expected to differ based on the type of performance measures that are used to promote the achievement of objectives (Marginson et al., 2014). First, given the narrow nature of financial performance measures (e.g. return on investment and profit) (Kaplan & Norton, 2001a, b) the diagnostic use of such measures is expected to limit employees' desire to innovate and be creative. In particular, as creative endeavours entail experimentation and risk taking (Moulang, 2015), such creative endeavours would be constrained in organisations where the priority is the achievement of pre-set financial goals and targets.

Furthermore, as financial performance measures have a short-term orientation, the diagnostic use of financial performance measures will stifle the propensity of employees to be creative, as experimenting with new ideas requires a longer time horizon for the benefits of creative efforts to materialise, while there is no guarantee that such creative efforts will be successful. Finally, the diagnostic use of financial performance measures and the accompanying excessive focus on meeting pre-set goals and targets may result in unattended dysfunctional outcomes such as data manipulation and constrain employees desire to engage in creative endeavours within their organisations. For instance, the creativity and innovation literatures indicate that an organisation "that relies on financial information alone is less innovative" (Yuliansyah & Razimi, 2015, 136) while the use of financial performance measures has the potential to undermine the potential benefits of creativity and hence, decrease the level of team creativity (Klein & Speckbacher, 2020).

Therefore, in line with this discussion, it is expected that the diagnostic use of financial performance measure will constrain individual creativity and we therefore hypothesise a negative direct association between the diagnostic use of financial performance measures and creativity.

**H2a** The diagnostic use of financial performance measures is negatively directly associated with creativity.

While the diagnostic use of performance measures focuses on promoting the achievement of goals and targets and taking corrective actions when the outcomes deviate from the targets, the multidimensional and broad nature of non-financial performance measures (Sauer mann & Cohen, 2010; Speckbacher & Wabnegg, 2020) is expected to promote desirable employee behaviour including creativity. Specifically, given non-financial performance measures include a range of metrics which involve changing or modifying existing work practices (such as the number of new or improved processes, and number of products under development), the diagnostic use of performance measures can contribute to increased creativity.

Similarly, given non-financial performance frameworks such as the balanced scorecard and performance pyramid (Abdel-Maksoud et al., 2010) encapsulate the achievement of employee related targets such as employee training and development, and since more skilled and knowledgeable employees tend to be more proactive and have the mindset and capacity to try and experiment new things,

the diagnostic use of non-financial performance measures is expected to result in increased individual creativity. Finally, non-financial performance measures have a leading effect and focus on both the achievement of and improvements in processes and critical success factors (Marginson et al., 2014), such as the number of innovations, thereby encouraging employees to generate new ideas, improve methods and processes, and engage in other creative activities (Huber, 1998).

Therefore, we hypothesise that there will be a positive direct association between the diagnostic use of non-financial performance measures and creativity.

**H2b** The diagnostic use of non-financial performance measures is positively directly associated with creativity.

### **2.3 The mediating role of the perceived fairness of performance appraisal on the association between the interactive and diagnostic use of performance measures with creativity**

As previously discussed, we argue that the effect of top management's interactive and diagnostic use of financial and non-financial performance measures on middle and lower level managers' creativity is mediated by performance appraisal perceived fairness (as perceived by middle and lower level managers). This is grounded in the psychological perspective which posits that individuals' psychological state (in our study, perceived fairness) intervenes the effect of organisational systems, such as the PMS, on employee behaviour (Covaleski et al., 2003; Venkatesh & Blaskovich, 2012). Specifically, middle and lower level manager's perceived fairness of their performance appraisal mediates the effect of the PMS (i.e. top management's interactive and diagnostic use of performance measures) on middle and lower level manager's behaviour (i.e. creativity).

While we explain the specific nature of the mediating role of perceived fairness in respect to the influence of the interactive and diagnostic use of performance measures (financial and non-financial) on creativity below (see Sects. 2.3.1 and 2.3.2 respectively), the underlying assumption is that managers who perceive that the appraisal of their performance is fair (unfair), will be more (less) likely to be prosocial and reciprocate their organisation's goodwill and hence, more (less) willing to find creative solutions to resolve organisational problems (Lau & Moser, 2008). This effect is grounded in social exchange theory "which highlights that in social systems, such as organisations, individuals develop reciprocity expectancies about what they give and receive, thereby influencing their cognition and behaviour" (Madrid & Patterson, 2016, 410). Hence, when middle and lower level managers perceive that their performance is appraised fairly, they are likely to be more creative. Similarly, organisational identification theory, which maintains "that employees who identify with the organisation will endeavour to accomplish the company's strategic interest" (Foster et al., 2010, 402), suggests that managers that perceive that their performance is appraised fairly are more likely to identify with their organisation, leading them to engage in creative activities.

While the majority of studies have conceptualised perceived fairness (organisational justice) as a construct comprising two dimensions (i.e. procedural and distributive), Colquitt (2001) suggested and empirically validated perceived fairness as comprising four types including procedural, distributive, interpersonal and informational fairness. In the context of performance appraisal, procedural fairness relates to the procedures used to assess managers' performance. To be procedurally fair, the procedures must be applied in a consistent, accurate, free of bias and ethical manner. Managers should be able to express their views and feelings during the procedure and appeal the outcomes arrived at through using such procedures (Colquitt, 2001). Hence, when middle and lower level managers are content that the procedures used to evaluate their performance are applied in a consistent and accurate manner and that their performance appraisal is free of bias and conducted in an ethical manner, they will perceive their performance appraisal system to be procedurally fair and more likely to devote energy towards creativity.

Distributive fairness relates to the outcomes of managers' performance appraisal (e.g. offers of rewards, development recommendations etc.). To achieve distributive fairness, the outcomes of managers' performance appraisal are expected to be appropriate, justified and reflect the effort that managers put into their work and the contributions they have made (Colquitt, 2001). When managers feel that they are rewarded fairly based on merit and their effort expended (i.e. distributive fairness), they are more likely to provide reciprocal services i.e. proactively improve organisational processes (Tan & Lau, 2012) through creative endeavours.

Interpersonal and informational fairness both relate to the top-level management responsible for evaluating managers' performance. Specifically, interpersonal fairness refers to the extent to which middle and lower level managers feel that top management treats them with dignity and respect, and refrain from inappropriate remarks or comments, while informational fairness focuses on the manner in which the performance appraisal procedures are applied (Groen 2018) and is assessed as the extent of communication middle and lower level managers receive from top-level management in respect to the performance appraisal procedures (Colquitt, 2001). Middle and lower level managers will be more likely to identify with organisations that uphold moral and ethical values and treat them with dignity and respect, thereby leading to higher engagement in creative efforts in support of the strategic direction of their organisation. Further, in line with social exchange theory, the feeling that communication in the performance appraisal process is candid and tailored to meet the information needs of managers will inspire managers to reciprocate by being more proactive in addressing organisational problems through seeking creative solutions.

In response to Groen's (2018) call to include the four types of fairness, so as to reduce omitted variable bias, we adopt this multidimensional measure of perceived fairness developed by Colquitt (2001). However, acknowledging that the consideration of the association between the use of performance measures, perceived fairness, and creativity is in its infant stage, we do not develop hypotheses in regard to the mediating effect of each of the four types of perceived fairness. Rather, we develop hypotheses in respect to the general role of perceived fairness in mediating the association between the use of (interactive and diagnostic) performance measures

(financial and non-financial) with creativity and allow the data analysis to inform us of the role of specific types of perceived fairness which is then discussed in the conclusion.

### 2.3.1 The interactive use of performance measures

The interactive use of performance measures enables employees (middle and lower level managers in this study) to engage in discussions and/or debates in respect to the use of performance measures (Simons, 1995), thereby eliciting a positive perception of fairness in respect to the procedures and mechanisms used to evaluate their performance. In particular, the interactive use of performance measures provides middle and lower level managers with a sense of autonomy in respect to how their work is performed and appraised (Moulang, 2015), thereby enhancing their perception of the fairness of their performance appraisal, and subsequently enhancing the likelihood that they will reciprocate the goodwill provided through engaging in activities that benefit their organisation, for example, the exploration of new ideas (i.e. creativity) (Moulang, 2015). Hence, we argue that perceived fairness will positively mediate the association between the interactive use of performance measures (both financial and non-financial) with creativity due to the positive influence of the interactive use of performance measures on manager's perceived fairness of their performance appraisal system.

This relationship can be explained in respect to each of Colquitt's (2001) four dimensions of perceived fairness. For example, through providing middle and lower level managers with the opportunity to discuss and debate the use of specific financial and non-financial measures, and hence, express their views and feelings about the performance appraisal procedures, the interactive use of both financial and non-financial measures (by top management) is expected to enhance middle and lower level managers' perceived feeling of procedural fairness. Further, distributive fairness, i.e. manager's perception of the equity and equality in the distribution of outcomes that commensurate their efforts (Colquitt, 2001; Groen, 2018), is likely to be higher when top management's interactive use of performance measures is higher as middle and lower level managers are given the opportunity to discuss and explain how and why targets are (not) met with their superiors, possibly leading to the revision of target outcomes and/or greater understanding when evaluating and rewarding them. In addition, through encouraging dialogue and discussion (Simons, 1995) and involving employees in decision making processes, the interactive use of performance measures will enable middle and lower level managers to feel more empowered, thereby enhancing their feeling of a sense of dignity and respect, essential traits of interpersonal fairness (Colquitt, 2001). Finally, in considering middle and lower level managers' viewpoints and providing adequate explanations of decisions by top management, the interactive use of performance measures will facilitate the continual exchange of information between different levels of management (Cools et al., 2017), leading to higher perceived informational fairness. For instance, Simons (2000, 304) here refers to interactive control systems as creating "a positive informational environment that encourages information sharing and learning".

Therefore, we expect that the interactive use of performance measures (financial and non-financial) will enhance perceived fairness, which will in turn exhibit a positive influence on creativity. Accordingly, we hypothesise that perceived fairness will positively mediate the association between the interactive use of performance measures and creativity.

**H3** The perceived fairness of performance appraisal will positively mediate the association between the interactive use of financial and non-financial performance measures and creativity.

### 2.3.2 The diagnostic use of performance measures

As the perceived fairness of the performance appraisal system is expected to exhibit a positive association with creativity, the mediating role of perceived fairness on the association between the diagnostic use of performance measures (financial and non-financial) with creativity is inherently dependent upon the effect of the diagnostic use of financial and non-financial performance on the perceived fairness of the appraisal system. As was the case in respect to the direct hypothesised associations between the diagnostic use of performance measures and creativity, the effect of the diagnostic use of performance measures on perceived fairness is expected to differ based on the nature of the types of measures used (i.e. financial or non-financial).

First, since financial performance measures are generally perceived to be constraining in nature (Tan & Lau, 2012), top management's use of financial measures in a diagnostic manner may reinforce this constraining effect, as such measures are limited and narrow in nature, and do not capture nonmonetary metrics (e.g. customer satisfaction rates) (Lau & Moser, 2008) which are more controllable by middle and lower level managers. Further, when such measures are used diagnostically as the basis of monitoring, controlling and rewarding middle and lower level manager's performance, their efforts may not be completely reflected (Tan & Lau, 2012), which is likely to result in feelings of unfairness in respect to how their performance is appraised i.e. distributive fairness.

In addition, as middle and lower level managers are either not involved in setting metrics and/or the measures do not reflect their effort, the diagnostic use of financial performance measures will result in them being more likely to perceive procedural fairness in a negative way. Finally, given financial performance measures are limited in scope (Abdel-Maksoud et al., 2010), the diagnostic use of such measures in a top-down autocratic fashion may have a detrimental effect on middle and lower level managers' perceptions of interpersonal fairness. Specifically, the imposition of a narrow set of financial performance measures could result in middle and lower level managers feeling neglected and undervalued in the performance setting and appraisal process, resulting in an adverse perception of interpersonal fairness (Colquitt, 2001).

Hence, the diagnostic use of financial performance measures is expected to exhibit a negative effect on perceived fairness. In conjunction with the expected positive effect of perceived fairness on creativity, this leads us to hypothesise that perceived fairness will negatively mediate the association between the diagnostic

use of financial measures with creativity i.e. the diagnostic use of financial performance measures will exhibit a negative effect on creativity through perceived fairness as the higher diagnostic use of financial performance measures leads to lower perceived fairness and hence, lower creativity.

**H4a** The perceived fairness of performance appraisal will negatively mediate the association between the diagnostic use of financial performance measures and creativity.

Alternatively, as previously discussed, middle and lower level managers will view the broader coverage involved with the use of non-financial performance measures more favourably, even when they are used diagnostically by top management. This is supported by previous research which provides evidence of the positive effect of the diagnostic use of controls, for example Sakka et al. (2013) who found that the diagnostic use of MCS was positively associated with project performance when task uncertainty was low, and Songini et al. (2013) who found that the diagnostic use of MCSs was positively related with the implementation of a cost leadership strategy. Specifically, top management's diagnostic use of non-financial performance measures will promote middle and lower level managers' feelings of procedural fairness as through focusing on a variety of performance metrics the use of non-financial performance measures is more likely to include measures that are controllable by middle and lower level managers and therefore, more accurately reflect their efforts (Lau & Moser, 2008). Further, since non-financial performance measures comprise internal and external measures, and have a long and short term focus, the use of such measures is more likely to be considered to be unbiased and hence procedurally fair (Colquitt, 2001), even if used diagnostically.

Similarly, as non-financial performance measures are broader and reflect various aspects of manager's responsibilities (Abdel-Maksoud et al., 2010; Lau & Moser, 2008), top management's diagnostic use of such measures may lead to stronger feelings of distributive fairness. Specifically, when middle and lower level managers perceive that their outcomes are determined based on multiple measures, it is more likely that specific measures will be used that reflect the effort they have put into their work, and hence, they will consider the performance appraisal process to be fairer (Burney et al., 2009; Colquitt, 2001). Finally, top management's diagnostic use of non-financial performance measures may also exhibit a positive effect on interpersonal fairness as middle and lower level managers may be more likely to perceive that their supervisors are treating them fairly by considering the various aspects of their performance.

Therefore, we expect that the diagnostic use of non-financial performance measures will exhibit a positive effect on perceived fairness, which in turn will exhibit a positive effect on creativity. Hence, we hypothesise that perceived fairness will positively mediate the association between the diagnostic use of non-financial performance measures with creativity, with the diagnostic use of non-financial performance measures expected to exhibit a positive effect on creativity

through perceived fairness as the higher diagnostic use of non-financial performance measures leads to higher perceived fairness and in turn, higher creativity.

**H4b** The perceived fairness of performance appraisal will positively mediate the association between the diagnostic use of non-financial performance measures and creativity.

## 3 Method

### 3.1 Data collection

The data for this study was collected using the survey research method, due to its ability to assess the variables of interest and generate a representative sample, thereby enabling the generalisation of the study's findings. The questionnaire was administered to middle and lower level managers from the manufacturing industry in Australia. These management levels were chosen given the variables of interest needed to be assessed at the individual level of analysis, and to avoid possible respondent bias that may arise when top-level management assesses organisational systems and processes. The questionnaire was administered by Qualtrics, a global data collection company, due to the ability of the company to target the respondents of interest and generate a high response rate (Wilke et al., 2017). Out of the 656 questionnaires administered, 220<sup>8</sup> usable responses were received, representing a 33.5% response rate.

Non-response bias was tested by splitting the sample in half and using an independent sample t-test to compare the mean scores of the variables, including the control variables (organisational size, educational level and environmental uncertainty), between the early respondents and the late respondents. There were no statistically significant differences, thereby assuring the representativeness of the study sample (Anderson & Young, 1999). To assess common method bias, Harman's (1976) single factor test was utilised, with the results showing that the percentage of the variance explained (34.60%) by the factor with the highest Eigenvalue was less than 50%, thereby indicating that common method bias was not a concern (Podsakoff et al., 2003).

The demographic profile of the respondents (see Table 1) shows that 82.3% of the respondents were middle level managers with the remaining respondents being lower level managers. The respondents had a variety of educational qualifications with the majority holding a postgraduate degree (57.2%) or undergraduate degree (25.5%). The responding organisations were of different sizes with 59.5% of the responding organisations small (less than 100 employees), 26.8% medium (between 100 to 999 employees) and 13.6% large (1000 employees and above).

<sup>8</sup> While respondents may have come from the same organisation, it is extremely unlikely given the sample was randomly selected from Qualtrics' large network of organisations.

**Table 1** Profile of respondents

	#	Percentage %
<b>Management level (n = 220)</b>		
Lower level managers	39	17.7
Middle level managers	181	82.3
Total	220	100
<b>Educational level (n = 220)</b>		
School certificate	1	0.5
Higher certificate or equivalent	11	5.0
Diploma or equivalent	26	11.8
Undergraduate degree	56	25.5
Postgraduate degree	126	57.3
Total	220	100
<b>Organisational size (number of employees) (n = 230)</b>		
Less than 100	131	59.5
Between 100 and 499	26	11.8
Between 500 and 999	33	15.0
Between 1000 and 5000	30	13.6
Total	220	100%

### 3.2 Variable measurement

The measures were adapted from established scales. The construct validity and unidimensionality of the scales were first assessed by estimating the psychometric properties of each scale using exploratory factor analysis in SPSS. The measurement model was then estimated to further assess the validity and reliability of the measures.

#### 3.2.1 The interactive and diagnostic use of performance measures

The interactive and diagnostic use of financial and non-financial performance measures was assessed using an 11-item scale adapted from Marginson et al. (2014). This measure was specifically designed to capture the extent of the interactive and diagnostic use of both financial and non-financial performance measures and hence, has a narrower focus than the interactive and diagnostic use of performance measurement system defined in Simons' (1995) framework. Respondents were asked, on a 5-point scale with anchors of 1 "Not at all" and 5 "To a great extent", to indicate the extent to which they agreed that their business unit (i.e. top management) was using financial and non-financial performance measures interactively (seven items) and diagnostically (four items). Factor loadings from the result of the exploratory factor analysis indicated that all four (seven) items for the diagnostic (interactive) use of performance measures loaded onto distinct factors in respect to both financial and non-financial performance measures, thereby confirming the unidimensionality of

the scales. These items (see Appendix) were subsequently used in conducting confirmatory factor analysis (CFA) for each of the four variables. The goodness-of-fit indices (see Appendix) indicated that the measurement models for all four variables fitted the data well.<sup>9</sup>

### 3.2.2 Perceived fairness of performance appraisal

The four types of perceived fairness (procedural, distributive, interpersonal and informational fairness) were assessed using an established scale developed and validated by Colquitt (2001), using a 5-point scale with anchors of 1 “Not at all” and 5 “To a great extent” (see Appendix). The results of the exploratory factor analysis indicated that all of the items loaded onto the four perceived fairness dimensions. These items were subsequently used in the CFA, with the results showing that the measurement models of distributive, interpersonal and informational fairness fitted the data well. However, based on the CFA result, three items of procedural fairness were removed<sup>10</sup> due to low loadings, with the remaining four items subsequently used to measure procedural fairness. The measurement model of these four items indicated a good model fit (see Appendix).

### 3.2.3 Creativity

Creativity was assessed using an 8-item scale adapted from Moulang (2015) with the respondents asked to indicate, on a 5-point Likert scale with anchors of 1 “Strongly disagree” and 5 “Strongly agree”, the extent to which they agreed with each of the items. The results of the exploratory factor analysis indicated that all of the items loaded onto one factor, indicating the unidimensionality of the scale. Hence, all 8 items (see Appendix) were used in estimating the measurement model, with the goodness-of-fit indices (CMIN/DF 1.238; CFI 0.993; GFI 0.972; AGFI 0.949) indicating that the model was a good fit.

### 3.2.4 Control variables

To control for the effect of industry on the variables of interest, responses were sought from a single industry, the manufacturing industry. Additionally, organisational size, proxied as the natural logarithm of the number of full-time employees, educational level, based on the respondents’ qualifications as shown in Table 1, and environmental uncertainty, were used as control variables. Environmental uncertainty was measured using a 3-item scale, adapted from Su et al. (2015), with

<sup>9</sup> The recommended threshold guidelines are CMIN/DF < 5; CFI > 0.80; GFI > 0.90; AGFI > 0.80 (Hair et al., 2010).

<sup>10</sup> The removed items are: (1) I have had influence over the outcome arrived at by the procedures; (2) the procedures have been based on accurate information; (3) I have been able to appeal the outcome arrived at by the procedures.

**Table 2** Descriptive statistics (n = 220)

	Mean	SD	Theoretical range	Min	Max	VIF
Diagnostic use of financial performance	4.146	0.735	1.00–5.00	1.00	5.00	2.610
Interactive use of financial performance measures	3.945	0.781	1.00–5.00	1.00	5.00	3.643
Diagnostic use of non-financial performance measures	3.988	0.788	1.00–5.00	1.75	5.00	2.561
Interactive use of non-financial performance measures	3.862	0.778	1.00–5.00	1.00	5.00	3.699
Procedural fairness	2.958	0.685	1.00–5.00	1.00	4.00	1.092
Distributive fairness	4.063	0.795	1.00–5.00	1.00	5.00	2.063
Interpersonal fairness	4.149	0.742	1.00–5.00	1.00	5.00	3.245
Informational fairness	4.053	0.767	1.00–5.00	1.20	5.00	3.702
Creativity	4.128	0.620	1.00–5.00	2.13	5.00	NA
*Environmental uncertainty	3.762	0.860	1.00–5.00	1.00	5.00	1.978

\*Control variable

respondents required to indicate the extent to which they agreed with each item relating to their organisation on a 5-point Likert scale with anchors of 1 “Strongly disagree” and 5 “Strongly agree”. The exploratory factor analysis result indicated that all of the items loaded onto a single factor. A measurement model of these items (see Appendix) was assessed, with the goodness-of-fit indices (CMIN/DF 4.902; CFI 0.978; GFI 0.985; AGFI 0.913) indicating a good model fit.

## 4 Results

### 4.1 Descriptive statistics

The descriptive statistics of the variables including the mean, standard deviation, and the maximum and minimum values for the variables are reported in Table 2. The results indicate a high level<sup>11</sup> of agreement in respect to the distributive (4.063), interpersonal (4.149) and informational (4.053) perceived fairness of performance appraisal, while procedural fairness (2.958) was perceived to be low. Regarding the use of performance measures, the results indicate that the responding organisations top management used both financial performance measures and non-financial performance measures more diagnostically. Finally, the mean scores reflected a high extent of creativity (4.128) and a low extent of environmental uncertainty (3.762).

<sup>11</sup> Average scores of above 4 are considered to represent a high extent, average scores below 3 are considered to represent a low extent, and average scores between 3 to 4 are considered to represent a moderate extent.

**Table 3** Results of Cronbach alpha, composite reliability and average variance extracted

	Cronbach's alpha	Composite reliability	(AVE)
Diagnostic use of financial performance measures	0.850	0.899	0.689
Interactive use of financial performance measures	0.897	0.919	0.620
Diagnostic use of non-financial performance measures	0.866	0.909	0.714
Interactive use of non-financial performance measures	0.908	0.927	0.645
Procedural fairness	0.719	0.823	0.538
Distributive fairness	0.878	0.916	0.731
Interpersonal fairness	0.851	0.900	0.692
Informational fairness	0.892	0.921	0.699
Creativity	0.877	0.903	0.538
*Environmental uncertainty	0.769	0.863	0.678

\*Control variable

**Table 4** Correlations and square root of AVE between all the constructs

	D.FPM	I.FPM	I.NFPM	PRO.F	CRE	D.NFPM	DIST.F	INF.F	INT.F
D.FPM	<b>0.830</b>								
I.FPM	0.742**	<b>0.787</b>							
I.NFPM	0.517**	0.665**	<b>0.803</b>						
PRO.F	-0.263**	-0.0214**	-0.129	<b>0.734</b>					
CRE	0.553**	0.584**	0.563**	-0.341**	<b>0.734</b>				
D.NFPM	0.457**	0.435**	0.747**	-0.165*	0.471**	<b>0.845</b>			
DIST.F	0.441**	0.535**	0.506**	-0.100	0.574**	0.406**	<b>0.855</b>		
INF.F	0.326**	0.505**	0.529**	-0.120	0.604**	0.386**	0.647**	<b>0.836</b>	
INT.F	0.398**	0.456**	0.518**	-0.123	0.614**	0.458**	0.590**	0.804**	<b>0.832</b>

Number on the diagonal in bold = square roots of the AVE for each construct

Number below the diagonal = correlation between constructs

D.FPM=diagnostic use of financial performance measures; I.FPM=interactive use of financial performance measures; I.NFPM=interactive use of non-financial performance measures; PRO.F=procedural fairness; CRE=creativity; D.NFPM=diagnostic use of non-financial performance measures; DIST.F=distributive fairness; INF.F=informational fairness; and INT.F=interpersonal fairness

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

### 4.2 Measurement model

As shown in Table 3, the Cronbach alphas for the ten variables ranged from 0.719 to 0.908, thereby exceeding the 0.7 recommended cut-off (Nunnally, 1978). Hence, the reliability of all of the study's variables was assured. Further assurance of the constructs' reliability was provided by the composite reliability scores which all exceeded the 0.7 threshold (Yoon et al., 2013).

In addition, as the average variance extracted (AVE) scores reported in Table 3 exceed the recommended cut-off (0.5), the convergent validity for all of the variables was assured (Fornell & Larcker, 1981). Furthermore, since the standardised factor loadings (see the CFA results in the Appendix) of all of the items exceed 0.5 (Fornell & Larcker, 1981), this provides further assurance of convergent validity. Finally, discriminant validity was assessed using the recommended approach of comparing the square root of the AVE of each latent construct with the correlation between the other constructs (Chin, 1998). As the correlation matrix (see Table 4) shows that the square root of the AVE of each latent construct is greater than the correlations between the other constructs, support is provided for discriminant validity. Additionally, Table 2 shows that the variance inflation factors (VIF) for all of the variables are less than 10, with the highest being 3.702, thereby indicating that there are no problems in respect to multicollinearity (Jou et al., 2014).

### 4.3 Structural equation modelling

A Covariance-based Structural Equation Modelling (CB-SEM) was used to analyse the collected data and to test the associations between top management's interactive and diagnostic use of performance measures, with middle and lower level manager's perceptions of performance appraisal fairness and creativity using AMOS 25 software. CB-SEM has several advantages over other techniques including Partial Least Squares Structural Equation Modelling (PLS-SEM) and hierarchical regression (Cheung & Lau, 2008). First, it provides a better statistical tool to examine variables with multiple indicators. Second, when relationships among variables are examined, measurement errors in the model can be controlled for, thereby providing unbiased estimates of mediation effects (Baron & Kenny, 1986). Finally, it depicts a clear model where all relevant paths can be included and examined, without omitting any variables (Baron & Kenny, 1986). The model was estimated based on the default maximum likelihood estimation technique, given its ability to account for both normality and non-normality of data (Hayashi et al., 2007) in estimating the structural relationships among the study's variables.

Following Anderson and Gerbing's (1988) recommended approach, a revised model was estimated by deleting all of the statistically insignificant paths from the initial model until all of the remaining paths were statistically significant.<sup>12</sup> The final model, reported in Table 5 and depicted in Fig. 1, demonstrated a good fit, with all of the four goodness-of-fit indices (CMIN/DF = 1.427; CFI = 0.995; GFI = 0.980; AGFI = 0.930) exceeding the recommended cut-offs.

<sup>12</sup> Organisational size, educational level and environmental uncertainty were included in the initial model as control variables. Environmental uncertainty was found to be positively associated with both distributive fairness ( $\beta=0.254$ ,  $p=0.000$ ) and informational fairness ( $\beta=0.154$ ,  $p=0.003$ ). However, given organisational size and educational level control variables were not found to be significantly associated with any of the mediating factors (i.e. the four types of fairness) or the dependent variable (creativity), they were not included in the final model.

**Table 5** Results of the structural equation model (SEM)

Regression path	Standardised beta	Standardised error	Critical ratio	P-value
Interactive use of non-financial performance measures → Creativity	0.156	0.045	2.755	0.006***
Diagnostic use of financial performance measures → Creativity	0.219	0.045	4.063	0.000***
Diagnostic use of financial performance measures → Procedural fairness	-0.263	0.061	-4.039	0.000***
Interactive use of financial performance measures → Distributive fairness	0.303	0.072	4.288	0.000***
Interactive use of financial performance measures → Interpersonal fairness	0.240	0.070	3.225	0.001***
Interactive use of financial performance measures → Informational fairness	0.227	0.074	2.978	0.003***
Diagnostic use of non-financial performance measures → Distributive fairness	0.167	0.057	2.954	0.003***
Diagnostic use of non-financial performance measures → Interpersonal fairness	0.181	0.055	3.085	0.002***
Interactive use of non-financial performance measures → interpersonal fairness	0.210	0.081	2.449	0.014**
Interactive use of non-financial performance measures → Informational fairness	0.278	0.069	3.934	0.000***
#Environmental uncertainty → Distributive fairness	0.254	0.060	3.898	0.000***
#Environmental uncertainty → Informational fairness	0.154	0.045	3.020	0.003***
Procedural fairness → Creativity	-0.205	0.041	-4.524	0.000***
Distributive fairness → Creativity	0.155	0.046	2.617	0.009***
Interpersonal fairness → Creativity	0.190	0.062	2.574	0.010**
Informational fairness → Creativity	0.172	0.063	2.207	0.027**
<b>Goodness of fit statistics</b>				
CMIN/DF	1.427			
CFI	0.995			
GFI	0.980			
AGFI	0.930			

\*\*\*, \*\*Statistically significant at 0.01, 0.05 levels respectively (2-tailed)  
 #control paths

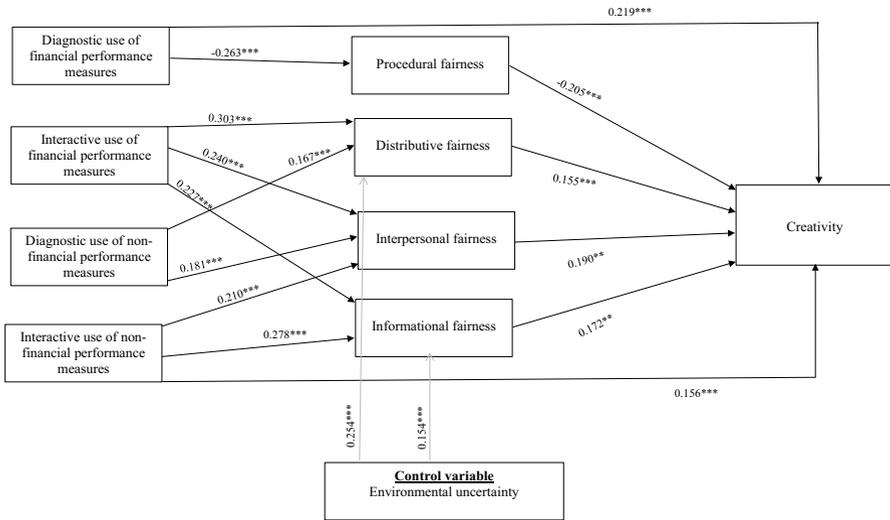


Fig. 1 Results of the mediation structural equation model (SEM)

### 4.3.1 The association between the interactive and diagnostic use of performance measures with creativity

Table 5 and Fig. 1 reveal a significant positive association between the interactive use of non-financial performance measures and creativity ( $\beta=0.156, p=0.006$ ) while no significant association was identified between the interactive use of financial performance measures and creativity. Therefore, H1 is partially supported. In addition, the diagnostic use of financial performance measures was found to be significantly positively associated with creativity ( $\beta=0.219, p=0.000$ ), and hence H2a, which hypothesised a negative association, is not supported. Finally, while H2b is not supported, due to the lack of a significant direct positive association between the diagnostic use of non-financial performance measures and creativity, as discussed in the next section, we find evidence of an indirect effect through perceived fairness.

### 4.3.2 The mediating effect of the perceived fairness of performance appraisal on the association between the interactive and diagnostic use of financial and non-financial performance measures with creativity

Table 5 and Fig. 1 show the results in respect to the associations between the interactive and diagnostic use of performance measures with perceived fairness and between perceived fairness with creativity, with the bootstrapping with bias-corrected Confidence Intervals Method approach<sup>13</sup> used to test the significance of the observed mediating paths (see Table 6).

<sup>13</sup> Under this method, a mediation is confirmed if the confidence interval (CI) between the lower bound (LB) and the upper bound (UB) does not cross zero (MacKinnon et al., 2002).

**Table 6** Bootstrapped regression analysis of mediation effects

	Creativity		
	LB 95% CI	UB 95% CI	P-value
<b>Panel A: mediating effect of procedural fairness</b>			
Diagnostic use of financial performance measures	0.025	0.106	0.003
<b>Panel B: mediating effect of distributive fairness</b>			
Interactive use of financial performance measures	0.044	0.175	0.005
Diagnostic use of non-financial performance measures	-0.09	0.126	0.089(ns)
<b>Panel C: mediating effect of interpersonal fairness</b>			
Interactive use of financial performance measures	0.012	0.209	0.011
Diagnostic use of non-financial performance measures	0.025	0.135	0.010
Interactive use of non-financial performance measures	0.005	0.153	0.038
<b>Panel D: mediating effect of informational fairness</b>			
Interactive use of financial performance measures	0.018	0.181	0.011
Interactive use of non-financial performance measures	0.041	0.196	0.007

CI = confidence interval; LB = lower bound; UB = , upper bound

Table 5 and Fig. 1 show that there was a significant positive association between the interactive use of financial performance measures with three types of perceived fairness [interpersonal fairness ( $\beta=0.240$ ,  $p=0.001$ ); informational fairness ( $\beta=0.227$ ,  $p=0.003$ ); and distributive fairness ( $\beta=0.303$ ,  $p=0.000$ )], each of which subsequently exhibited a significant positive association with creativity [interpersonal fairness ( $\beta=0.190$ ,  $p=0.010$ ); informational fairness ( $\beta=0.172$ ,  $p=0.027$ ); and distributive fairness ( $\beta=0.155$ ,  $p=0.009$ )]. Table 6 shows that each of these mediating paths were significant [interpersonal fairness (CILB=0.012, CIUB=0.209,  $p=0.011$ ), informational fairness (CILB=0.018, CIUB=0.181,  $p=0.011$ ) and distributive fairness (CILB=0.044, CIUB=0.175,  $p=0.005$ )] and since there is no observed direct association between the interactive use of financial performance measures and creativity, we can conclude that these three dimensions of perceived fairness fully mediate this association.

In respect to the interactive use of non-financial performance measures, Table 5 and Fig. 1 show a significant positive association with interpersonal ( $\beta=0.210$ ,  $p=0.014$ ) and informational ( $\beta=0.278$ ,  $p=0.000$ ) fairness, which as indicated both exhibit a significant positive association with creativity. Table 6 indicates that both interpersonal (CILB=0.005, CIUB=0.153,  $p=0.038$ ) and informational fairness (CILB=0.041, CIUB=0.196,  $p=0.007$ ) significantly positively mediate the association between the interactive use of non-financial performance measures and creativity, with such associations representing partial mediations due to the observed direct significant positive association between the interactive use of non-financial performance measures and creativity.

The findings in respect to the interactive use of financial performance measures are stronger, with three dimensions of perceived fairness (distributive, interpersonal and informational) fully mediating the effect on creativity. Alternatively, two dimensions of perceived fairness (interpersonal and informational) partially mediate the

effect of the interactive use of non-financial performance measures on creativity. Overall, these findings provide strong evidence of the mediating role of perceived fairness on the association between the interactive use of both financial and non-financial performance measures with creativity, thereby providing support for H3.

In respect to the diagnostic use of performance measures, Table 5 and Fig. 1 show that top management's diagnostic use of financial performance measures was found to be significantly negatively associated with procedural fairness ( $\beta = -0.263$ ,  $p = 0.000$ ), which in turn was found to be negatively associated with creativity ( $\beta = -0.205$ ,  $p = 0.000$ ). Hence, while the diagnostic use of financial performance measures results in less procedural fairness, given lower procedural fairness leads to higher creativity, the net effect here is positive i.e. the higher diagnostic use of financial performance measures will result in higher creativity through procedural fairness. Table 6 reveals that the positive mediating role of procedural fairness here was significant ( $CI_{LB} = 0.025$ ,  $CI_{UB} = 0.106$ ,  $p = 0.003$ ) with this mediating effect considered to be partial due to the observed significant direct positive association between the diagnostic use of financial performance measures with creativity. While the finding provides evidence in support of the mediating role of procedural fairness, the observed positive mediating role is in contrast to the negative mediating effect predicted in H4a. Furthermore, as the other three types of perceived fairness (i.e. procedural, informational and interpersonal fairness) do not mediate the association between the diagnostic use of financial performance measures and creativity, H4a is rejected.

The diagnostic use of non-financial performance measures was found to be positively associated with two perceived fairness dimensions, distributive fairness ( $\beta = 0.167$ ,  $p = 0.003$ ) and interpersonal fairness ( $\beta = 0.181$ ,  $p = 0.002$ ), which both exhibited a significant positive association with creativity. While Table 6 shows that the mediating effect of distributive fairness was not significant (as the lower bound and the upper bound [lower bound (LB) of  $-0.09$  and upper bound (UB) of  $0.126$ ] cross zero), interpersonal fairness exhibits a significant positive mediating effect on the association between the diagnostic use of non-financial performance measures ( $CI_{LB} = 0.025$ ,  $CI_{UB} = 0.135$ ,  $p = 0.010$ ) with creativity, thereby providing support for H4b. This mediating effect represents full mediation as there is no observed direct association between the diagnostic use of non-financial performance measures with creativity.

## 5 Discussion and conclusion

This study sought to examine the associations between top management's interactive and diagnostic use of financial and non-financial performance measures with middle and lower level managers' creativity, and the mediating role of a specific psychological mechanism, middle and lower level managers' perceived fairness of their performance appraisal, on such associations.

We found evidence of significant direct positive associations between the interactive use of non-financial performance measures with creativity, and between the

diagnostic use of financial performance measures with creativity. The finding in respect to the effect of the diagnostic use of financial performance measures is surprising and inconsistent with the majority of the literature which suggests that the diagnostic use of financial measures stifles creativity. However, this finding provides empirical support for Mundy's (2010, p.501) proposition that "diagnostic use is not simply a constraining influence on managers' behavior, because monitoring processes highlight problems and motivate managers to achieve their goals, sometimes through novel means".

In respect to the mediating role of the perceived fairness of the performance appraisal system, all four types of perceived fairness (as perceived by middle and lower level managers) were found to positively mediate the effect of either top management's interactive or diagnostic use of financial or non-financial performance measures on middle and lower level managers' creativity. Specifically, the positive effect of the interactive use of financial performance measures on creativity is positively fully mediated by distributive, interpersonal and informational fairness, while the positive effect of the interactive use of non-financial measures is positively partially mediated by interpersonal and informational fairness. In addition, interpersonal fairness positively fully mediates the effect of the diagnostic use of non-financial performance measures on creativity.

However, while the use of specific performance measures exhibited significant positive associations with distributive, interpersonal and informational fairness, which in turn exhibited a significant positive association with creativity, the nature of the mediating role of procedural fairness is more complex. Specifically, the diagnostic use of financial performance measures exhibited a significant negative association with procedural fairness which in turn exhibited a significant negative association with creativity, and hence, procedural fairness positively partially mediates the effect of the diagnostic use of financial performance measures on creativity. The negative effect of procedural fairness on creativity is consistent with Baird et al. (2021) who found that procedural fairness was negatively associated with the effectiveness of strategic performance measurement systems (SPMS) and implies that employees act in a way which results in positive organisational outcomes (e.g. creativity) when procedural fairness is low. A potential explanation here is that employees that are disgruntled with the procedures used to evaluate their performance are more likely to express their disdain by engaging in alternative behaviour, and hence, are more likely to experiment with and implement novel ideas (i.e. be more creative). Future research could examine this possibility further and provide a more in-depth examination of how employees react to unfair performance evaluation procedures and the effect of procedural fairness on employee behaviour, including creativity.

Therefore, while perceived fairness (i.e. distributive, interpersonal and informational fairness) is generally perceived to influence creativity positively and hence, managers should endeavour to enhance the interactive use of financial and non-financial performance measures and the diagnostic use of non-financial performance measures in order to enhance employees perceived fairness of performance appraisal, our findings imply that low procedural fairness is desirable due to its influence in making employees more creative. Accordingly, and in line with the

observed significant direct positive association between the diagnostic use of financial performance measures and creativity, despite its negative effect on procedural fairness, organisations should endeavour to enhance their diagnostic use of financial performance measures due to the subsequent positive influence that low procedural fairness has on creativity.

## 5.1 Theoretical implications

The findings make two significant contributions to the literature. First, the findings contribute to the extant performance measurement and performance appraisal literature (for example, Lau & Moser, 2008; Lau & Sholihin, 2005; Marginson et al., 2014; Tan & Lau, 2012) examining the behavioural effects of performance measures. In particular, through examining the influence of top management's interactive and diagnostic use of performance measures on middle and lower level managers' creativity, the findings extend and strengthen the literature that support the positive behavioural effect of controls on employees.

Secondly, the study highlights the important role of manager's individual psychological state, specifically middle and lower level managers' perceptions of the fairness of their performance appraisal system, in mediating the association between top management's interactive and diagnostic use of performance measures and middle and lower level managers' behaviour (i.e. creativity). The results have important theoretical implications for in line with Burney et al., (2009, p. 306) who claims that "employees [tend to] behave based on how they perceive the system", the findings imply that the effectiveness of performance management and specifically PMSs in respect to the effects of such systems on employee behaviour (i.e. creativity), is inherently reliant on how fair the system is perceived to be in appraising manager's performance. The findings also make an important contribution to the literature examining the mechanisms through which performance measures promote creativity (Speklé et al., 2017a, 2017b). In particular, in response to calls to consider employee reactions to performance measurement and appraisal processes (DeNisi & Smith, 2014; Sharma et al., 2016), we provide an empirical insight into the crucial role of manager's perceived fairness of their performance appraisal in enhancing the effective use of PMSs (i.e. assessed as creativity in our study). Consequently, given our findings, from a theoretical perspective, it is recommended that future studies examining the effectiveness of alternative characteristics or traits of performance measurement systems should consider the mediating role of perceived fairness on such relationships.

## 5.2 Practical implications

From a practitioner's perspective, the study's finding in respect to the behavioural effect of the interactive use and diagnostic use of both financial and non-financial performance measures implies that when devising or using performance measures organisations should be cognisant that both types of performance measures (i.e. financial and non-financial) and both the diagnostic and interactive approaches to

using them could be effective. Specifically, while financial performance measures are considered to be constraining and likely to be perceived to be unfair and stifle behaviour (Abdel-Maksoud et al., 2010) if use diagnostically, our findings suggest that organisations do not need to discard the use of traditional financial performance measures, given the positive association between the diagnostic use of financial performance measures and creativity. Additionally, the finding that the interactive use of non-financial performance measures promotes creativity suggests that while organisations do not need to abandon the use of their financial performance measures, they should embrace and invest in the use of non-financial performance measures, especially given their richness and broadness and potential to reflect different aspects of employee responsibilities and organisational priorities.

Further, the finding of the positive mediating role of manager's perceived fairness of performance appraisal on the relationship between the use of performance measures with creativity also provides practitioners with an understanding of the intervening mechanism that can enhance the effect of performance measures in promoting intended behaviour, in particular creativity. Accordingly, through monitoring and adjusting their performance measurement system, top management can attempt to regulate middle and lower level managers' feelings in respect to their perceived fairness of their performance appraisal system, thereby enabling top management to motivate middle and lower level managers to engage in positive behaviour. This may transpire through promoting the interactive use of financial and non-financial performance measures and the diagnostic use of financial and non-financial measures. In addition, in order to enhance the fairness of the performance appraisal system, as perceived by middle and lower level managers, top management should devote more resources to training supervisors in engaging in effective communication and interpersonal relationships, implementing transparent compensation schemes and performance appraisal systems, and emphasising a corporate culture that promotes equity and openness.

### 5.3 Limitations

The study has some limitations, particularly those typical to survey research studies. First, the assessment of top management's use of financial and non-financial performance measures and middle and lower level managers' perceived fairness of their performance appraisal may be subject to common method bias, although Harman's (1976) single factor test (34.60%) suggests that such bias was not a problem. Nevertheless, future studies could consider sourcing data using multiple respondents and collecting the data regarding the use of performance measures and the perceived fairness of performance appraisal from different employees within the same organisation. Secondly, the study is limited to one type of managerial behaviour, creativity, and therefore future studies could consider the effect of the interactive and diagnostic use of performance measures and the perceived fairness of performance appraisal on alternative types of employee behaviour. Thirdly, as is the case in all cross-sectional studies, we can only assert associations and no claims can be made in regard to causality. Consequently, future studies could replicate this study using alternative

approaches such as the experimental method or a longitudinal study. Finally, future studies could rely on the empirical findings provided in this study as a theoretical basis to further explore how the interplay between the interactive and diagnostic use of performance measures affects perceived fairness and the subsequent effect on creativity.

## Appendix: Questionnaire items and CFA statistics

These are the items used for the CFA. The first item of each scale has no t-value and standard error (SE) since it has a fixed parameter in AMOS.

	Factor Loading	t-value	SE
<b>1) The use of performance measures</b>			
Construct and items			
<i>Diagnostic use of financial performance measures</i>			
Track progress towards goals	0.809***	NA	NA
Monitor results	0.828***	12.283	0.078
Compare outcomes to expectations	0.743***	11.131	0.074
Review key measures	0.685***	10.149	0.081
<b>Goodness-of-fit:</b> CMIN/DF 0.594; CFI 1.000; GFI 0.997; AGFI 0.986			
<i>Interactive use of financial performance measures</i>			
Encourage discussions in meetings	0.749***	NA	NA
Encourage continual challenge and debate of underlying data, assumptions and action plans	0.740***	10.867	0.092
Provide a common view of the business unit	0.716***	10.482	0.09
Tie the business unit together	0.763***	11.235	0.088
Enable your area to focus on common issues	0.798***	11.788	0.086
Develop a common vocabulary in your area	0.679***	9.901	0.093
Enable your area to focus on critical success factors	0.775***	11.417	0.085
<b>Goodness-of-fit:</b> CMIN/DF 2.008; CFI 0.981; GFI 0.968; AGFI 0.935			
<i>Diagnostic use of non-financial performance measures</i>			
Track progress towards goals	0.849***	NA	NA
Monitor results	0.833***	13.591	0.071
Compare outcomes to expectations	0.715***	11.34	0.074
Review key measures	0.750***	12.068	0.073
<b>Goodness-of-fit:</b> CMIN/DF 2.272; CFI 0.994; GFI 0.990; AGFI 0.951			
<i>Interactive use of non-financial performance measures</i>			
Encourage discussions in meetings	0.706***	NA	NA
Encourage continual challenge and debate of underlying data, assumptions and action plans	0.760***	10.582	0.107
Provide a common view of the business unit	0.808***	11.218	0.095
Tie the business unit together	0.786***	10.919	0.097
Enable your area to focus on common issues	0.729***	10.158	0.097
Develop a common vocabulary in your area	0.752***	10.472	0.111

	Factor Loading	t-value	SE
Enable your area to focus on critical success factors	0.815***	11.308	0.097
<b>Goodness-of-fit:</b> CMIN/DF 1.694; CFI 0.988; GFI 0.971; AGFI 0.943			
<b>2) Perceived fairness</b>			
<b>Construct and items</b>			
<i>Procedural fairness</i>			
I have been able to express my views and feelings during the procedures	0.600***	NA	NA
The procedures have been applied consistently	0.731***	6.555	0.188
The procedures have been free of bias	0.598***	6.162	0.163
The procedures have upheld ethical and moral standards	0.572***	6.003	0.166
<b>Goodness-of-fit:</b> CMIN/DF 0.811; CFI 1.000; GFI 0.996; AGFI 0.984			
<i>Distributive fairness</i>			
The outcomes of my performance evaluation reflect the effort I have put into my work	0.805***	NA	NA
The outcomes of my performance evaluation are appropriate given the work I have completed	0.817***	12.717	0.081
The outcomes of my performance evaluation reflect what I have contributed to the business unit	0.794***	12.336	0.08
The outcomes of my performance evaluation are justified given my performance	0.790***	12.26	0.083
<b>Goodness-of-fit:</b> CMIN/DF 1.213; CFI 0.999; GFI 0.995; AGFI 0.973			
<i>Interpersonal fairness</i>			
Treated you in a polite manner?	0.729***	NA	NA
Treated you with dignity?	0.810***	11.076	0.099
Treated you with respect?	0.859***	11.468	0.108
Refrained from improper remarks or comments?	0.671***	9.273	0.114
<b>Goodness-of-fit:</b> CMIN/DF 1.141; CFI 0.999; GFI 0.995; AGFI 0.974			
<i>Informational fairness</i>			
Been candid in their communications with you?	0.716*	NA	NA
Explained your performance evaluation procedures thoroughly?	0.823*	11.423	0.1
Provided explanations regarding the procedures?	0.807*	11.215	0.101
Communicated details in a timely manner?	0.809*	11.243	0.101
Tailored their communications to your specific needs?	0.793*	11.032	0.099
<b>Goodness-of-fit:</b> CMIN/DF 2.177; CFI 0.990; GFI 0.981; AGFI 0.942			
<b>3)Employee behaviour</b>			
<b>Construct and items</b>			
<i>Creativity</i>			
I regularly come up with creative ideas	0.657***	NA	NA
I regularly experiment with new concepts and ideas	0.639***	8.245	0.117
I regularly carry out tasks in ways that are resourceful	0.675***	8.631	0.111
I often engage in problem solving in clever and creative ways	0.682***	8.708	0.113
I often search for innovations and potential improvements within your division/department	0.752***	9.431	0.115
I often generate and evaluate multiple alternatives for novel problems within your division/department	0.673***	8.613	0.112

	Factor Loading	t-value	SE
I often generate fresh perspectives on old problems	0.775***	9.652	0.114
I often improvise methods of solving a problem when an answer is not apparent	0.639***	8.244	0.102
<b>Goodness-of-fit:</b> CMIN/DF 1.238; CFI 0.993; GFI 0.972; AGFI 0.949			
<b>4) Control variables</b>			
<b>Construct and items</b>			
<b>Environmental uncertainty</b>			
Dynamism (evidenced by the unpredictability of changes in customer tastes, production technologies)	0.588***	NA	NA
Hostility (evidenced by the intensity of competition and other external influences)	0.562***	7.342	0.59
Heterogeneity (evidenced by the differences in competitive tactics, customer tastes, product lines, channels of distribution)	1.00***	10.746	0.177
<b>Goodness-of-fit:</b> CMIN/DF 4.902; CFI 0.978; GFI 0.985; AGFI 0.913			

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