

## RESEARCH ARTICLE

# Perceived goal importance, knowledge and accessibility of performance information: Testing mediation and moderation effects on medical professionals' achievement of performance targets<sup>1</sup>

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## Abstract

This article contributes to prior accounting and public management research on performance measurement systems' (PMSs) effectiveness in professional organisations, exploring how medical professionals' perception regarding goal importance, knowledge of performance information, and accessibility of performance information affect their achievement of individual-level performance targets. The study draws on primary and secondary data from 128 Italian public healthcare professionals about their perceptions of performance information and their factual performance. The findings show that perceived goal importance is positively related to one's knowledge of individual and peer performance information; that this relation is positively moderated by perceived information accessibility, and that knowledge of individual (but not peer) performance information fully mediates the relation between perceived goal importance and achievement of individual-level performance targets.

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**KEYWORDS**

medical professionals, perceived goal importance, perceptions of performance information, public healthcare, relative performance information

## 1 | INTRODUCTION

Performance measurement systems (PMSs) represent a key challenge for public sector reformers when trying to induce managerialism, economic rationality, and a results orientation (e.g., Cuganesan et al., 2014; Hood, 1991, 1995). Scholars have explored the adoption and implementation of PMSs, with a particular emphasis on both the supply and demand sides of performance information use (Cepiku et al., 2017; Kroll, 2015; Van Doreen, 2005). On the supply side, prior studies have focused on the diffusion patterns and characteristics of measurement systems, seeking to understand which PMS design features drive the use of performance information (for reviews, see: Cepiku et al., 2017; Kroll, 2015). Meanwhile, on the demand side, scholars have explored the characteristics of people who use performance information (hereafter, 'users'), seeking to understand what antecedent factors make people more receptive to performance information (Ammons & Rivenbark, 2008; Askim, 2009; Cepiku et al., 2017; De Lancer & Holzer, 2001; Kroll, 2014; Moynihan & Pandey, 2010).

Prior accounting literature has widely explored individual factors that enable the use of performance information (Hall, 2016; Luft & Shield, 2003), documenting that users' adoption of PMSs is strongly related to how they perceive performance information (Abernethy & Vagnoni, 2004; Ferreira Da Silva et al., 2018). This view challenges the traditional idea of performance information as an objective and neutral support for individual decisions (Belardinelli et al., 2018). Accordingly, accounting scholars have developed a wide range of theoretical models to capture how individual-level variables affect the adoption of performance measurement practices (e.g., budgeting, performance evaluation, incentive schemes, performance measurement systems) and thereby drive on individual-level outcomes (for reviews, see: Hall, 2016; Luft & Shield, 2003).

In the context of the various subfields of public sector where professional work prevails (Vogel & Hattke, 2018), health care organisations are the ideal setting for tracing how individual perceptions of performance information affect the implementation of PMSs (Abernethy & Stoelwinder, 1991, 1995; Oppi et al., 2019; Pettersen & Solstad, 2014; Solstad et al., 2020). Medical professionals are not generally accustomed to such systems since they rely more on the values and norms of their domain for identifying, categorizing and interpreting information and actions (Solstad et al., 2020). Furthermore, they have considerable autonomy and power in light of the control they exert on core production processes (Abernethy & Stoelwinder, 1991). Accordingly, medical professionals are particularly sceptical about introducing and implementing PMSs in their decision-making processes (Jacobs, 2005; Kerpershoek et al., 2016; Lapsley, 2007) because they often see accounting procedures as disconnected from their actual tasks and activities (Lawrence, 1999). These widely recognized issues speak to the need for better knowledge about the perceptions of performance information held by medical professionals (Ferreira Da Silva, Fernandez-Feijoo, & Gago, 2018) as well as by those of other public sectors (Dyhrberg-Noerregaard, 2015; Lewandowski, 2019; Vogel & Hattke, 2018).

It is worth noting here that many public organisations have adopted managerial and performance measurement practices in order to influence the professional autonomy and independence, thereby changing individual behaviours and results (Favero et al., 2016; Webeck & Nicholson-Crotty, 2019). In health care, professionals are increasingly organised into peer-review groups, whereby physicians can periodically meet and discuss their individual behaviours and results (Compagni et al., 2017). The accounting literature emphasises the use of relative performance information (RPI), that is, the information about the performance levels actually achieved by peers with respect to organisational goals, to support collective group efforts (R. Hannan et al., 2013; R. L. Hannan et al., 2019; Hecht et al., 2019).

Accordingly, previous scholars have shown that RPI is important for encouraging social comparison among professionals, which then motivates higher individual effort and performance (Mahlendorf et al., 2014).

We follow the idea that an organisation's performance information does not neutrally influence individual behaviour because each professional differently perceives the implemented performance measurement practices (Dyhrberg-Noerregaard, 2015; Lewandowski, 2019). Thus, we combine the converging insights from accounting and public administration scholars to investigate how medical professionals' perception of performance information affects their achievement of individual-level performance targets. We consider three constructs related to said perceptions. First, we analyse the perceived goal importance, which concerns the importance that professionals ascribe to the goals defined and targeted by their organisation (hereafter referred to as 'organisational goals') (De Lancer & Holzer, 2001; Nielsen, 2014; G. J. Young et al., 2012). While previous accounting research focused on professionals' orientation towards a general system of goals (Abernethy & Stoelwinder, 1991), perceived goal importance deals with how professionals prioritize their organisation's specific goal contents. Second, we investigate professionals' knowledge of the information, distributed by the organisation, regarding individual public performance (i.e., a professional's actual performance level relative to organisational goals) as well as RPI. Prior research has emphasised the learning consequences of PMSs (Franco-Santos et al., 2012; Moynihan, 2005), but there is scant understanding about whether professionals retain the specific performance knowledge offered through PMSs. Third, we recognize that individual users can have variable perceptions about the performance information as supplied by the organisation (Ammons & Rivenbark, 2008; Cepiku et al., 2017; De Lancer & Holzer, 2001; Lewandowski, 2019; Moynihan & Pandey, 2010; Kroll, 2014, 2015; Van Doreen, 2005). Consequently, we analyse professionals' perceptions about the accessibility (Lewandowski, 2019; Moynihan & Pandey, 2010)—rather than the mere presence (or absence)—of performance information in PMSs. Consistent with prior research arguing that PMSs influence self-monitoring, learning and decision-making processes (Franco-Santos et al., 2012), we analyse whether and how medical professionals' perceived goal importance, knowledge of individual and peer performance information and perception of performance information accessibility jointly interact and affect the achievement of individual-level performance targets.

We tested our mediation and moderation hypotheses in a sample of general practitioners (GPs) working in a Local Health Authority (LHA) subordinated to the Italian National Health Service (I-NHS). In order to objectively isolate the individual-level effectiveness of the PMSs implemented by the LHA, we combined primary data collected on GPs' perceptions of performance information and secondary data reporting factual measures of their achievement of individual-level performance targets. Our findings document that perceived goal importance is positively related to knowledge of individual and RPI, that this relation is positively moderated by perceived information accessibility, and that knowledge of individual performance information fully mediates the relation between perceived goal importance and achievement of individual-level performance targets. However, we find that the knowledge of RPI does not yield this mediation effect.

The contribution of this paper is threefold. First, by illustrating how medical professionals' perceptions of performance information affect factual (rather than self-reported) measures of their achievement of individual-level performance targets, we contribute to research on the individual consequences of PMSs (Franco-Santos et al., 2012; Hall, 2016; Luft & Shield, 2003). Our study specifically addresses three perceptions about performance information (i.e., perceived goal importance, knowledge of performance information and perceived accessibility of performance information), thereby complementing previous findings on the individual-level variables underlying the effectiveness of PMSs in professionally dominated organisations (Abernethy & Stoelwinder, 1991, 1995; Oppi et al., 2019; Pettersen & Solstad, 2014; Solstad et al., 2020).

Second, we contribute to prior RPI research by exploring individual perceptions of RPI and its mediating role in the relationship between perceived goal importance and achievement of individual-level performance targets. In doing so, we build on and expand prior accounting literature on the individual benefits of RPI (e.g., R. L. Hannan et al., 2008; R. Hannan et al., 2013; R. L. Hannan et al., 2019; Tafkov, 2013), by studying RPI as individual perceptions of relative performance assessments rather than considering RPI as objectively determined (Mahlendorf et al., 2014). Our paper echoes recent accounting research emphasizing the need to explore how individuals perceive RPI in organisations.

Indeed, it is the first to empirically examine how medical professionals' knowledge of peer performance information can affect their own performance.

Third, this paper contributes to the literature on public sector users of performance information, as it offers further evidence about the individual antecedents of performance information use in the case of GPs working in a public LHA (Askim, 2009; Belardinelli et al., 2018; Cepiku et al., 2017; Kroll, 2014, 2015; Lewandowski, 2019; Van Doreen, 2005). While past studies have considered a wide range of performance information users, including public managers, politicians and citizens/customers, there has been less attention given to professionals working in the public sector and their perceptions (Dyhrberg-Noerregaard, 2015; Ferreira Da Silva et al., 2018; Kerpershoek et al., 2016; Vogel & Hattke, 2018).

## 2 | THEORY AND HYPOTHESES

The accounting literature has explored the impact of PMSs on decision-making, learning and self-monitoring, showing that such systems strongly affect individual cognitive processes in organisations (Franco-Santos et al., 2012). Health care organisations represent a notable context for studying individual impacts of PMSs. Medical professionals have considerable power and autonomy in organisations: they not only control the production process, but also influence the entire decision-making process (Abernethy & Stoelwinder, 1991). Therefore, conflicts between managerialism and profession-based logics make the cognitive impact of PMSs problematic (Pettersen & Solstad, 2014). Accordingly, prior research shows that professionals' characteristics—such as goal orientation (Abernethy & Stoelwinder, 1991), professional orientation (Abernethy & Stoelwinder, 1995), cognitive distance (Solstad, Pettersen, & Robbins, 2020) and education and training (Oppi et al., 2019) – affect how PMSs are used in professionally dominated organisations.

Similarly, public sector scholars have shown that well-designed PMSs may exert a positive impact on organisational and individual performance, but their effectiveness depends on how individuals perceive and use performance information (Ammons & Rivenbark, 2008; Cepiku et al., 2017; De Lancer & Holzer, 2001; Lewandowski, 2019; Moynihan & Pandey, 2010; Kroll, 2014, 2015; Van Doreen, 2005). Public professionals are more likely to respond to professional values rather than managerial authority (Abernethy & Vagnoni, 2004; Hattke et al., 2016; Kerpershoek et al., 2016; Sehested, 2006; Schott et al., 2016; Tummers, 2012). They often consider PMSs as distant from their activities and tasks and do not effectively receive performance information produced by their organisations (Jacobs, 2005; Kerpershoek et al., 2016; Lapsley, 2007; Lawrence, 1999). As a result, their use of performance information is largely related to how they perceive PMSs (Dyhrberg-Noerregaard, 2015; Lewandowski, 2019; Vogel & Hattke, 2018). Previous studies have shown that public professionals' opinions and perceptions tend to diverge substantially from those who design and adopt the PMSs (Cepiku et al., 2017; Van Doreen, 2005). Furthermore, scholars have shown that professionals' use of performance information is related to how impactful it seems for their job (Vogel & Hattke, 2018), and how much they identify with their organisation (Favero et al., 2016).

Public institutions where professional work prevails have adopted new managerial practices to reduce the variance in professionals' behaviours and promote more organisational goal orientation (Favero et al., 2016). To this end, health care institutions have implemented not only arrangements aimed at promoting peer collaboration, but also new PMSs that help medical professionals translate organisational goals into individual priorities (Güven-Uslu & Conrad, 2011; King & Clarkson, 2015). Collaborative organisational structures enhance regular meetings and collective discussions, thereby increasing the degree of communication and knowledge sharing among medical professionals (Compagni et al., 2017). New managerial practices that measure performance at the individual- and group level likely help professionals better analyse processes and make appropriate decisions regarding their (and peers') behaviours (Webeck & Nicholson-Crotty, 2019). Organisations increasingly provide RPI to professionals in order to encourage comparisons with peers and self-evaluations (Mahlendorf et al., 2014). According to the accounting literature, information about peers' performance establishes benchmarks for individuals to judge their own performance (Frederickson, 1992; Hecht et al., 2019; Kramer et al., 2016; Mahlendorf et al., 2014).

## 2.1 Perceived goal importance and knowledge of performance information

Amidst the diffusion of PMSs in organisations dominated by professionals, including health care, scholars have increasingly examined the convergence of individual priorities with organisational goals (e.g., Abernethy & Stoelwinder, 1991; Favero et al., 2016; Nielsen, 2014; G. J. Young et al., 2012). Similarly, previous public management research in the demand-side perspective has directed attention to professionals' perception that their organisational goals are important (Moynihan & Pandey, 2010). The argument goes that, since the perception of goal importance affects the awareness and use of performance information (Abernethy & Stoelwinder, 1991), individuals who believe in the importance of organisational goals will be more prone to use performance information to achieve said goals (Moynihan & Pandey, 2010). Furthermore, when medical professionals believe that assigned goals align with their own values, they will be more likely to check performance information to verify that they are on the right path for achieving the results expected by their organisation (G. J. Young et al., 2012).

In this vein, we argue that medical professionals who have a more accurate understanding of and agree with organisational goals will be more likely to perceive individual performance reports as useful. In turn, they should develop a greater knowledge about their individual performance information. Furthermore, in light of the aforementioned RPI framework (Frederickson, 1992; Kramer et al., 2016; Mahlendorf et al., 2014), we expect a similar process to occur with regard to RPI. We argue that medical professionals' knowledge of their peers' performance will increase in tandem with the importance they ascribe to organisational goals. In line with these arguments, we hypothesize that:

Hypothesis 1a (HP1a): Medical professionals' perceived goal importance is positively related to knowledge of their individual performance information.

Hypothesis 1b (HP1b): Medical professionals' perceived goal importance is positively related to knowledge of peer performance information.

## 2.2 Knowledge of performance information, perceived goal importance and achievement of individual-level performance targets

Performance measurement research argues that the professionals' reception of performance information enables self-learning and self-monitoring mechanisms, thus exerting a positive impact on individual results (Franco-Santos et al., 2012; Moynihan, 2005). As individuals receive information regarding expected goals and actual results from the PMSs, previous research has suggested that PMSs help them learn how to improve their achievement of performance targets (Tuomela, 2005). The receptiveness of performance information enhances feedback processes, thereby permitting individuals to monitor their own progression towards target achievement and assess how they can re-align their efforts (Wiersma, 2009). Consistent with this research about PMSs' feedback mechanisms, we posit that medical professionals' knowledge of performance information allows them to translate expected goals (assuming they are perceived as important) into actions and behaviours that lead to the achievement of individual-level performance targets. Accordingly, we argue that medical professionals with a higher perception of goal importance will be more likely to achieve their performance targets due to developing higher knowledge of individual performance information. This knowledge enables self-monitoring and self-learning mechanisms, and thus acts as an antecedent of improved decision-making and achievement of individual-level performance targets.

Similar issues may arise from the provision of peer performance information. According to the RPI framework (Mahlendorf et al., 2014; Kramer et al., 2016) and in line with social comparison theory (Festinger, 1954), professionals continuously compare their behaviours and performance with those of their peers in order to increase their relative standing and possibly outperform their colleagues. Such social mechanisms likely increase self-reflection and learning, thereby inducing a psychological incentive to produce performance-boosting efforts. In this vein, we argue that medical professionals' knowledge of peer performance information mediates the relationship between perceived goal

importance and achievement of individual-level performance targets; specifically, it enables a social comparison process that directs individual efforts towards the assigned goals, thereby enhancing the achievement of individual-level performance targets. More formally, we advance the following hypotheses:

Hypothesis 2a (HP2a): Medical professionals' knowledge of their individual performance information mediates the relationship between perceived goal importance and achievement of individual-level performance targets.

Hypothesis 2b (HP2b): Medical professionals' knowledge of peer performance information mediates the relationship between perceived goal importance and achievement of individual-level performance targets.

### 2.3 Perceived accessibility of performance information, perceived goal importance and knowledge of performance information

There is an ongoing debate about the accessibility of performance information within public organisations (Cepiku et al., 2017; Eppler, 2006; Jacobs et al., 2004). According to previous studies, simply providing this information is not sufficient to enhance learning, decision-making processes and performance (Jacobs et al., 2004; Moynihan, 2005). Further, professionals' perceptions of the information accessibility are highly variable and cannot be taken for granted after a PMS is adopted (Moynihan & Pandey, 2010). As a result, professionals in the same organisational context may have different perceptions about the accessibility of performance information provided by a given measurement system (Lewandowski, 2019).

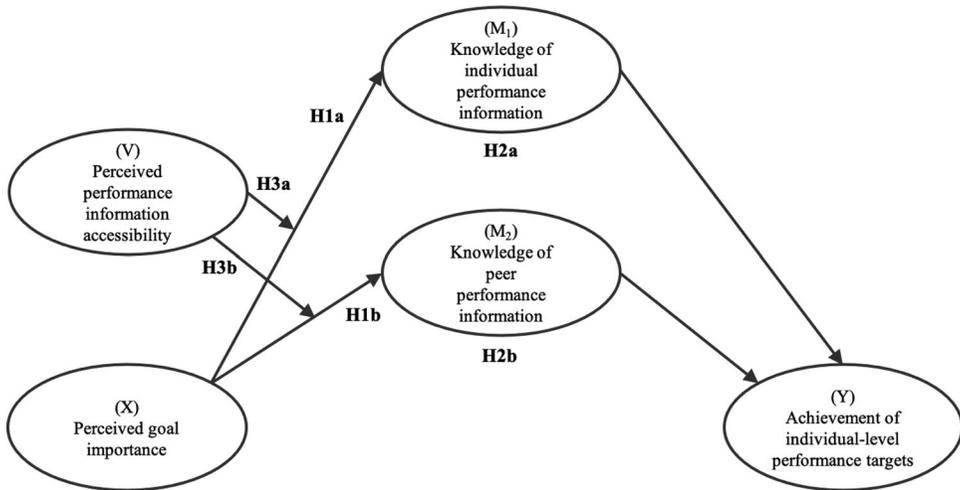
Prior research has also documented that accessibility impacts professionals' knowledge of performance information (Moynihan & Pandey, 2010). Additionally, their individual ability to learn from performance information is influenced by the individual accessibility they have to the necessary information (Taylor, 2011).

Drawing on these insights, we argue that the effect of medical professionals' perceived goal importance on their knowledge of performance information will be contingent on the perceived accessibility of said information. In conditions of high perceived accessibility, medical professionals who believe in the organisational goals will be more likely to find, access and use PMSs, thereby developing a better knowledge of their individual performance information. On the contrary, medical professionals who strongly perceive the importance of organisational goals will be less likely to improve the knowledge of their individual performance information if they perceive that said information is inaccessible. Similarly, medical professionals with a low perception of goal importance will not be interested in using PMSs, which will lessen their knowledge of the performance information, even if their perception of its accessibility is high. Ultimately, both types of mismatch between perceived goal importance and information accessibility will negatively affect individuals' knowledge of their performance information. Furthermore, because RPI encourages medical professionals to compare their behaviours and performance with those of their peers (Mahlendorf et al., 2014), we also suggest that the perception of information accessibility moderates the relationship between perceived goal importance and knowledge of peer performance information. In line with these arguments, we advance the following hypotheses:

Hypothesis 3a (HP3a): Medical professionals' perception of performance information accessibility moderates the relationship between perceived goal importance and knowledge of individual performance information, such that the relationship is stronger when public professionals perceive high accessibility of performance information than when they perceive low accessibility of performance information.

Hypothesis 3b (HP3b): Medical professionals' perception of performance information accessibility moderates the relationship between perceived goal importance and knowledge of peer performance information, such that the relationship is stronger when public professionals perceive high accessibility of peer performance information than when they perceive low accessibility of peer performance information.

Our theoretical model is shown in Figure 1.



**FIGURE 1** Theoretical model

### 3 | DATA AND METHODS

#### 3.1 Context

For this study, we collected data about GPs working for the I-NHS, a public health system funded from general taxation that provides universal coverage, free of charge, at the point of service. The I-NHS is organised according to a multi-level framework: at the national level, the Italian Ministry of Health is responsible for meeting the system's broadest objectives. Regions are responsible for providing services through LHAs: population-based health management organisations that offer primary care to resident citizens through their own facilities. At the local level, each LHA sets its own strategies, priorities and organisational goals on a yearly basis. In the context of LHAs, Italian GPs are autonomous, self-employed physicians who have individual contracts with local authorities to deliver primary care services.

The Italian healthcare sector represents an ideal setting for our study because it has been affected by public sector reforms, many of which are aimed at helping single physicians translate organisational goals into individual priorities through the adoption of PMSs (Anessi Pessina & Cantù, 2006). GPs represent an important category of professionals in public performance management research (Hendriks & Van Gestel, 2017; Kislov et al., 2016). They are independent contracted professionals who work under the control of the same organisation and are distributed over territory in order to be physically closer to patients (King & Clarkson, 2015). As a result of these conditions, GPs tend to work in isolation, their degree of organisational identification tends to be modest and their perceptions of organisational goals and performance information often diverge substantially from their organisation (e.g., Fantini et al., 2012; King & Clarkson, 2015).

In order to capture individual differences among GPs without having to contend with different organisational contexts or PMSs, our data collection was conducted on GPs working in the same LHA. We considered a relevant LHA located in one of the best-performing regions in the I-NHS. This LHA provides health services to more than 432,000 individuals and has a long tradition of innovative managerial and organisational models in primary care.

Italian GPs play the role of gatekeepers in the I-NHS, as they determine who receives access to specialty and hospital care, and are also responsible for prescribing drugs. Their high degree of autonomy and geographical distribution have generally limited their communication and coordination with peers (i.e., professional isolation), as well as their organisational identification. A regional reform introduced in 2007 sought to promote collaboration and integration

among GPs through the formation of primary care units (PCUs). The reform requested primary care physicians to organise themselves into collective peer groups, meeting periodically to share protocols and guidelines for disease management. Accordingly, all GPs were assigned and grouped together into PCUs based on their geographical proximity. In the context of PCUs, GPs meet for training courses and strategic planning and receive periodic reports about goal achievement at both the individual and PCU level. Such reporting activities are adopted to stimulate comparison among GPs belonging to the same PCU. Prior research has shown that collaborative organisational arrangements only partially impacted actual GP clinical behaviour, and that several cultural (e.g., professional indoctrination) and individual (e.g., age, gender) characteristics can limit their propensity to effectively socialize and work in groups (e.g. Hippisley-Cox et al., 2001; Lippi Bruni et al., 2009).

At the time of the study, there were 21 PCUs in the studied LHA. Although PCUs are idiosyncratic to the I-NHS, 'the issue of new organisational forms for the delivery of primary care is relevant outside this specific case in the context of Italy because similar processes are ongoing in several other countries, in both Europe and North America' (Fantini et al., 2012, p. 69).

### 3.2 Data collection and sample

Our data come from a survey questionnaire administered to all GPs belonging to the studied LHA. Before the study commenced, we organised several research meetings with the top management team, the human resource manager and the planning and control manager to ensure that the LHA was willing to join the project. Through these meetings, the research team was able to explore the characteristics of the LHA's context, such as the primary care organisational model, the performance measurement and management system and the GPs' annual goals and targets as set by the LHA. A number of subsequent meetings were organised with GPs' representatives and the human resource manager to discuss issues related to the data collection tools (i.e., the online questionnaire to all GPs and the performance data database) and process (i.e., privacy and confidentiality issues, recall procedure and data management). We first conducted a pilot test to ascertain the questionnaire's clarity, and then administered the full survey in July 2015.

The survey was complemented with secondary data on GPs' achievement of individual-level performance targets. To this end, we accessed an organisational database that routinely collects and stores GPs' individual performance indicators for administrative purposes. The database reports yearly information about targets assigned to individual GPs as well as the level of individual goals achieved at the end of each period.

The data collection lasted until December 2015. After three attempts to solicit physicians' replies, we received 128 complete questionnaires, which resulted in a usable response rate of 55.6%. The respondents were primarily male (76%), had a mean organisational tenure of 32 years ( $SD = 7.2$ ), and represented 20 out of 21 PCUs in the LHA. We assessed non-response bias and found no significant differences in terms of gender, tenure and performance between respondent and non-respondent physicians (the data from LHA records were matched via a confidential code number).

### 3.3 Measures

Consistent with prior public management research exploring the impact of PMSs on actual performance (van Helden et al., 2008; Mauro et al., 2017), we assessed the Achievement of individual-level performance targets in terms of the extent to which GPs accomplished individual performance targets as established by the LHA. We used two distinct variables, reflecting the relevant priorities of both organisational administrators and regional policymakers, to operationalize the degree of individual target achievement. The data for the two indicators were collected from the LHA's administrative database, which was explicitly designed to monitor and report such data to ensure accuracy and continuity. The first variable—called 'cost containment'—captures individual physicians' efficiency in drug prescription. This measure is computed as the difference between the overall pharmaceutical expenditure budget that the LHA

assigns to each contracted GP on a yearly basis and the total pharmaceutical costs prescribed by each GP. The second variable—labelled ‘appropriateness of care’—indicates the appropriateness of drug prescription by capturing the defined daily dosage (DDD) of proton pump inhibitors prescribed by physicians for 1000 weighted patients (written prescriptions). For patients requiring gastric protection, the use of standard doses of proton pump inhibitors is strongly recommended for minimizing gastric comorbidities, which would likely occur in patients who are treated daily with a particular drug or group of drugs. The LHA defines a given level of DDD of proton pump inhibitors for individual GPs so as to avoid under-prescription, thereby preventing the incidence of gastric comorbidities in the patient population. The variable is computed as the difference between the target value assigned by the LHA to individual physicians and the level of DDD/1000 weighed patients achieved by GPs.

Perceived goal importance was measured by asking GPs to report the importance they attribute to each objective defined by the LHA. Following Boswell (2006), we developed a 10-item scale—one item for each objective—that reflects a GP’s belief that the annual goals as defined and settled by the LHA are important (e.g., ‘in your clinical practice, how important is maximizing the following organisational goals?’). All objectives included in our scale were derived from the LHA’s goals, as well as clearly defined and measured in the organisational budgeting documentation. We asked GPs to rate the importance of each goal on a 7-point scale (where 1 = definitely not important, 7 = definitely important). Knowledge of individual performance information and Knowledge of peer performance information were measured by asking respondents to rate their own knowledge of performance information at both the individual and PCU levels (this latter context providing a basis for a peer comparison). While GPs are nested in PCUs, we assume that they might hold different perceptions about aggregate performance at the PCU level. This is because GPs exhibit a different attitude towards teamwork and peer discussion despite the adoption of the new collaborative arrangements. Similarly to the previous scale, each performance information was derived from the information diffused through the reporting documentation as well as defined and settled by the LHA. We derived the items for this scale from Stanton (2000) and then slightly modified them to reflect the specific targets defined by the LHA (e.g., ‘Please rate your knowledge about the following performance information at the individual level’; ‘Please rate your knowledge about the following performance information at the PCU level’). Respondents indicated their knowledge about each performance information on a 7-point scale (where 1 = complete lack of knowledge, 7 = very good knowledge). Perceived performance information accessibility was measured by using the scale developed by Cavalluzzo and Ittner (2004), which was again slightly modified to reflect the specific performance information defined by the LHA (e.g., ‘Please report to what extent you have access to the following performance information for your activities’). Respondents indicated their degree of access to each performance measure on a 7-point scale (where 1 = lack of access, 7 = very high access).

We also considered several control variables in the analysis to isolate the influence of the hypothesized relationships. First, we included Gender, measured as a dichotomous variable taking 1 for female physicians and 0 otherwise, as previous studies have reported that female GPs tend to perform better than their male colleagues (Fantini et al., 2012). Second, we included Managerial training, a dichotomous variable capturing whether individual GPs had ever attended a management course, as performance may be affected by GPs’ managerial knowledge (e.g., Xirasagar et al., 2006). Finally, we added variables related to the three dimensions of the different PCU, which may affect the performance of their affiliated GPs (Armeni et al., 2014). PCU affiliation was coded as a categorical variable that captures GPs’ membership in the different PCUs housed in the LHA. PCU size indicates the number of physicians belonging to each PCU, capturing the extent to which physicians’ exposure to broader knowledge-sharing with colleagues may have beneficial effects on performance. PCU diversity, meanwhile, accounts for the inclusion of other professional categories (e.g., nurses, specialists) in the PCU, thereby measuring whether GPs work in collaboration with other health-care professionals.

**TABLE 1** Internal consistency of measures

Constructs	No. of items	$A$	$\rho_\epsilon$	$\rho_{vc(g)}$	VIF
Perceived goal importance	10	0.94	0.95	0.65	1.36
Perceived performance information accessibility	13	0.93	0.94	0.56	2.56
Knowledge of individual performance information	13	0.92	0.95	0.55	3.52
Knowledge of peer performance information	13	0.93	0.95	0.54	1.93

### 3.4 Statistical analysis

We used different procedures to evaluate the internal consistency of each construct employed in the model. Coefficient  $\alpha$ , composite reliability ( $\rho_\epsilon$ ), and the average variance extracted ( $\rho_{vc(g)}$ ) values were significantly higher than the stipulated criteria (Fornell & Larcker, 1981), thus suggesting good internal consistency (see Table 1). Then, to assess multicollinearity threat, we computed the Variance Inflation Factors (VIF) for each independent variable. The mean VIF was 2.34 and no individual VIF was greater than 3.52; both values were below the recommended ceiling of 10, suggesting that the following findings were not biased by multicollinearity. Table 2 summarizes the means, standard deviations and correlations among the constructs.

To test for convergent and discriminant validity, we conducted a confirmatory factor analysis for the latent variables underlying the hypothesized model using LISREL (Jöreskog & Sörbom, 2003) and following the 'partial disaggregation model' (Bagozzi & Edwards, 1998). Compared to models where every item is a separate indicator, this method yields models with fewer parameters to estimate a reasonable ratio of cases to parameters; this procedure also smooths the measurement error to a certain extent and fits well for relatively small samples (Landis et al., 2000). The goodness-of-fit measures for the measurement model are as follows:  $\chi^2(48) = 82.60$ ,  $p < 0.01$ , RMSEA = 0.07, NNFI = 0.98, CFI = 0.99 and SRMR = 0.04. The hypothesized model fits the data well (Williams et al., 2009), supporting the measures' convergent and discriminant validity. To further verify the goodness of our measures employed in the CFA, we analysed the  $\varphi$  matrix (correlations between constructs, corrected for attenuation). Because none of the confidence intervals of the  $\varphi$ -values ( $\pm$  two standard errors) included the value of one, this test provides evidence of discriminant validity (Bagozzi & Yi, 1988). We also ran competitive measurement models as detailed in Table 3. In most cases, the RMSEA, NNFI, CFI indexes failed to reach the values recommended in the literature. This result provides additional support for the measurement model we propose.

Yet, because the independent variables were cross-sectional, we sought to address common-method variance. We followed the procedure recommended by Podsakoff et al. (2003), which consists of adding a method factor with all indicators loading onto it. This model fits well:  $\chi^2(42) = 78.13$  ( $p < 0.01$ ), RMSEA = 0.08, NNFI = 0.98, CFI = 0.98 and SRMR = 0.04 but did not significantly improve the fit over the hypothesized factor model. Therefore, even after correcting for common method bias, the measures achieved satisfactory convergent and discriminant validity. Furthermore, common method bias was unlikely to explain the hypothesized moderating effect, which should reduce the risk that participants in the study were aware of the framework and responded accordingly (Aiken & West, 1991).

## 4 | RESULTS

We applied the SPSS Process macro Model 7 (Hayes, 2017) to test our hypotheses. In the model, knowledge of individual ( $M_1$ ) and peer ( $M_2$ ) performance information mediates the relation between perceived goal importance (X) and the dependent variables (i.e., appropriateness of care,  $Y_1$ ; and cost containment,  $Y_2$ ). Moreover, the relations between

**TABLE 2** Means, standard deviations and correlation matrix of constructs

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Perceived goal importance	4.85	0.96	1	-	-	-	-	-	-	-	-	-	-
2. Perceived performance information accessibility	4.86	1.19	0.360**	1	-	-	-	-	-	-	-	-	-
3. Knowledge of individual performance information	4.72	1.10	0.486**	0.782**	1	-	-	-	-	-	-	-	-
4. Knowledge of peer performance information	4.33	1.13	0.464**	0.532**	0.662**	1	-	-	-	-	-	-	-
5. Appropriateness of care	-2.15	21.26	0.209*	0.038	0.244**	0.077	1	-	-	-	-	-	-
6. Cost containment	-4.83	26.91	0.097	0.092	0.237**	0.103	0.655**	1	-	-	-	-	-
7. PCU affiliation	10.03	5.55	-0.03	-0.118	-0.108	-0.057	-0.056	-0.062	1	-	-	-	-
8. Gender	0.19	0.39	-0.049	-0.068	-0.173	-0.054	-0.006	-0.076	0.008	1	-	-	-
9. Managerial training	0.17	0.38	0.003	0.246**	0.174	0.049	-0.048	-0.05	-0.095	0.098	1	-	-
10. PCU size	15.02	5.15	-0.076	-0.067	-0.116	-0.117	-0.176*	-0.031	-0.508**	0.053	0.1	1	-
11. PCU diversity	3.05	1.27	-0.044	-0.002	0.009	-0.044	-0.104	0.054	-0.459**	-0.049	0.081	0.784**	1

\*\* $p < 0.01$ \* $p < 0.05$ .

**TABLE 3** Model comparison for confirmatory factor analyses

Model	$\chi^2$	<i>p</i>	<i>df</i>	RMSEA	SRMR	CFI	NNFI
Three-factor model <sup>a</sup>	265.65	< 0.001	51	0.21	0.08	0.91	0.88
Three-factor model <sup>b</sup>	376.96	< 0.001	51	0.23	0.13	0.86	0.82
Two-factor model <sup>c</sup>	556.77	< 0.001	53	0.30	0.15	0.78	0.73
One-factor model	607.94	< 0.001	54	0.30	0.14	0.76	0.71

<sup>a</sup>Knowledge of individual and peer performance information items loading onto the first factor, perceived goal importance items loading onto the second factor and perceived performance information accessibility items loading onto the third factor.

<sup>b</sup>Knowledge of individual performance information items loading onto the first factor, Knowledge of peer performance measures items loading onto the second factor, perceived goal importance and Perceived performance information accessibility items loading onto the third factor.

<sup>c</sup>Knowledge of individual and peer performance measures items loading onto the first factor, and perceived goal importance and perceived performance information accessibility items loading onto the second factor.

perceived goal importance and the mediators are contingent on perceived performance information accessibility (W). We tested the hypotheses by controlling for PCU affiliation ( $C_1$ ), gender ( $C_2$ ), managerial training ( $C_3$ ), PCU size ( $C_4$ ) and PCU diversity ( $C_5$ ).

#### 4.1 The mediating effect of knowledge of performance information

The first left panel in Table 4 presents the findings for the effects of perceived goal importance on knowledge of individual performance information:  $B = 0.20$ ,  $t = 3.02$ ,  $p < 0.01$ , 95% confidence interval (CI) = [0.0693, 0.3353], providing support for Hypothesis 1a. The top right panel in Table 4 reveals that perceived goal importance improves knowledge of peer information:  $B = 0.31$ ,  $t = 3.23$ ,  $p < 0.01$ , 95% confidence interval (CI) = [0.1212, 0.5083], consistent with Hypothesis 1b.

The second panel of Table 4 summarizes the results for the mediated effects, where knowledge of individual and peer performance information are the mediators, while appropriateness of care and cost containment are the dependent variables. The results reveal that perceived goal importance did not have a significant direct effect on either appropriateness of care ( $B = 3.22$ ,  $t = 1.39$ , 95% confidence interval (CI) = [-1.3775, 7.8241]) or on cost containment ( $B = -0.18$ ,  $t = -0.06$ , 95% confidence interval (CI) = [-5.7490, 5.3856]). Meanwhile, knowledge of individual performance information had a significant effect on both appropriateness of care ( $B = 6.93$ ,  $t = 2.52$ ,  $p < 0.05$ , 95% confidence interval (CI) = [1.4716, 12.3899]) and cost containment ( $B = 7.46$ ,  $t = 2.24$ ,  $p < 0.05$ , 95% confidence interval (CI) = [0.8582, 14.0703]). As predicted, knowledge of individual performance information fully mediated the effect of perceived goal importance on the achievement of individual-level performance targets, providing full support for Hypothesis 2a. On the other hand, knowledge of peer performance information did not yield a significant effect on either appropriateness of care ( $B = -4.32$ ,  $t = -1.80$ ,  $p = n.s.$ , 95% confidence interval (CI) = [-9.0946, 0.4530]) or cost containment ( $B = -3.18$ ,  $t = -1.09$ ,  $p = n.s.$ , 95% confidence interval (CI) = [-8.9587, 2.5948]); thus, H2b was not supported.

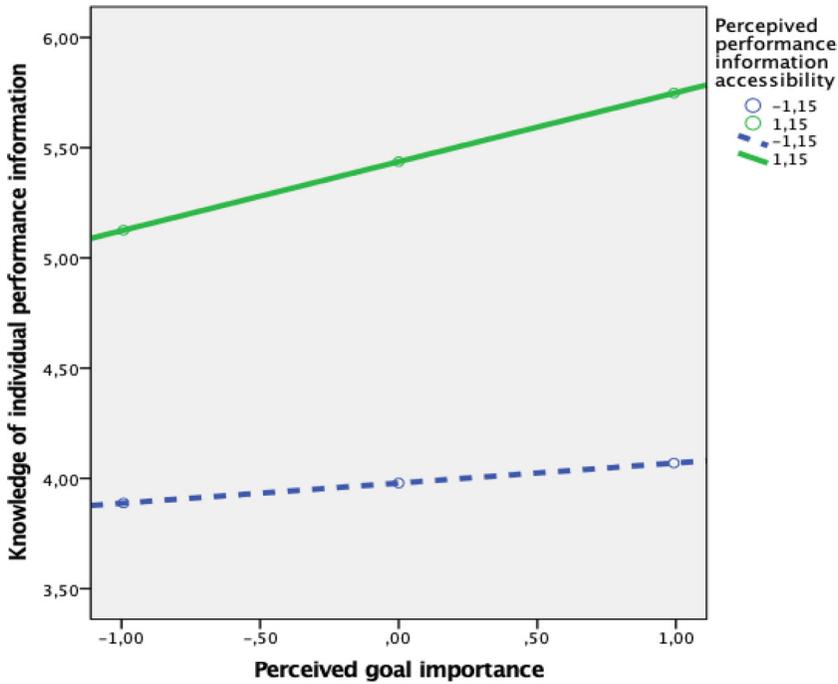
#### 4.2 The moderating effect of perceived performance information accessibility

To test H3, we performed moderated mediation tests using the regression bootstrapping method (Hayes, 2017). As the first panel in Table 4 shows, the interaction terms significantly predicted additional variance in perceived knowledge of both individual performance information,  $B = 0.10$ ,  $t = 2.01$ ,  $p < .05$ , 95% confidence interval (CI) = [0.0013, 0.1909]

TABLE 4 Conditional indirect effects

Independent variable (X), moderator (W), and covariates (C <sub>1</sub> , C <sub>2</sub> , C <sub>3</sub> , C <sub>4</sub> , and C <sub>5</sub> )	Mediator (M <sub>1</sub> ): knowledge of individual performance information (KIPi) (R <sup>2</sup> = 0.67)		Mediator (M <sub>2</sub> ): knowledge of peer performance information (KPPi) (R <sup>2</sup> = 0.41)	
	B	t	B	t
X: Perceived goal importance	0.20**	3.02	0.31**	3.23
W: Perceived performance information accessibility	0.63***	10.33	0.43***	4.83
X x W: Interaction term	0.10*	2.01	0.20**	2.83
C <sub>1</sub> : PCU affiliation	-0.01	-0.76	-0.01	-0.42
C <sub>2</sub> : Gender	-0.24	-1.42	-0.02	-0.09
C <sub>3</sub> : Managerial Training	0.01	0.06	-0.16	-0.69
C <sub>4</sub> : PCU size	-0.03	-1.43	-0.03	-1.10
C <sub>5</sub> : PCU diversity	0.12	1.52	0.08	0.72
Independent variable (X), mediators (M <sub>1</sub> and M <sub>2</sub> ), and covariates (C <sub>1</sub> , C <sub>2</sub> , C <sub>3</sub> , C <sub>4</sub> , and C <sub>5</sub> )	Outcome (Y <sub>1</sub> ): appropriateness of care (R <sup>2</sup> = 0.13)		Outcome (Y <sub>2</sub> ): cost containment (R <sup>2</sup> = 0.07)	
	B	t	B	t
X: Perceived goal importance	3.22	1.39	-0.18	-0.06
M <sub>1</sub> : Knowledge of individual performance information	6.93*	2.52	7.46*	2.24
M <sub>2</sub> : Knowledge of peer performance information	-4.32	-1.80	-3.18	-1.09
C <sub>1</sub> : PCU affiliation	-0.33	-0.76	0.06	0.12
C <sub>2</sub> : Gender	3.05	0.56	-3.10	-0.47
C <sub>3</sub> : Managerial training	-3.72	-0.71	-2.37	-0.38
C <sub>4</sub> : PCU size	-0.92	-1.39	-0.32	-0.40
C <sub>5</sub> : PCU diversity	1.44	0.57	1.62	0.53

\*  $p < 0.05$ \*\*  $p < 0.01$ \*\*\*  $p < 0.001$ .



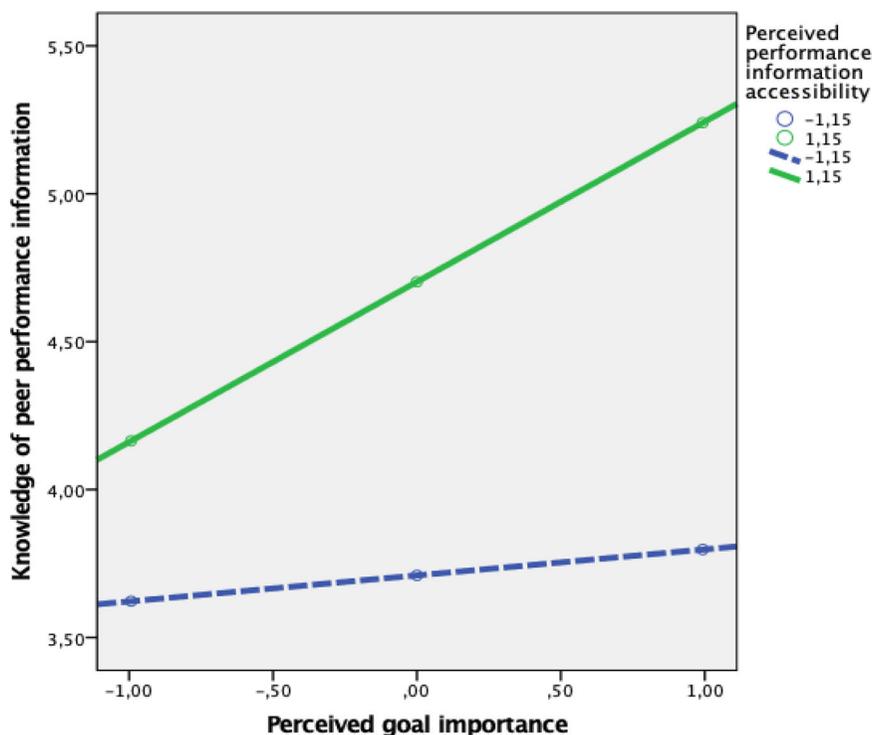
**FIGURE 2** Moderating effect of perceived performance information accessibility on knowledge of individual performance information [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

and peer performance information,  $B = 0.20$ ,  $t = 2.83$ ,  $p < 0.01$ , 95% confidence interval (CI) = [0.0586, 0.3345], indicating initial support for both H3a and H3b. Following Cohen et al. (2003), we plotted the interactions to confirm that their form supported the hypotheses. The interactions presented a supporting pattern, showing—as graphically illustrated in Figure 2 and Figure 3—that perceived performance information accessibility moderates the relationships between perceived goal importance and knowledge of individual/peer performance information in such a way that, under conditions of high accessibility, such relationships become stronger.

## 5 | DISCUSSION

The impact of PMSs on individual-level outcomes through cognitive processes (Franco-Santos et al., 2012) presents peculiar challenges in professional organisations. A growing body of accounting research indicates that the effectiveness of PMSs in health care organisations is related to individual-level variables affecting the adoption of performance information (Abernethy & Stoelwinder, 1991, 1995; Oppi et al., 2019; Pettersen & Solstad, 2014; Solstad, Pettersen, & Robbins, 2020). In a similar vein, previous studies show that public organisations need to consider individuals' attitudes, beliefs and perceptions towards performance information to increase people's adoption of PMSs (Abernethy & Vagnoni, 2004; Ammons & Rivenbark, 2008; Belardinelli et al., 2018; Cepiku et al., 2017; De Lancer & Holzer, 2001; Dyhrberg-Noerregaard, 2015; Ferreira Da Silva et al., 2018; Moynihan & Pandey, 2010; Kroll, 2014).

By drawing on these converging insights from accounting and public administration research, this article investigated how medical professionals' achievement of individual-level performance targets is related to their perceived goal importance, as well as their knowledge of performance information and its perceived accessibility. The article developed and tested hypotheses about three topics: the positive relation between perceived goal importance and knowledge of performance information, the mediating role of performance information knowledge in the relation



**FIGURE 3** Moderating effect of perceived performance information accessibility on knowledge of peer performance information [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

between perceived goal importance and achievement of individual-level performance targets, and the moderating role of perceived performance information accessibility between perceived goal importance and knowledge of performance information. Given health care organisations' increasing tendency to rely on new collaborative arrangements (Compagni et al., 2017), coupled with the availability of performance information about peers (Webeck & Nicholson-Crotty, 2019), we also investigated professionals' knowledge of individual- versus group-level performance information. We tested our research hypotheses with individual-level data from 128 GPs located in a LHA in the I-NHS.

Our findings highlight that GPs' perceived goal importance was positively related to their knowledge of both individual and peer performance information. This suggests that when medical professionals perceive organisational goals as important, they are more likely to review performance information for both themselves and their organisational peers. This finding is consistent with prior accounting studies on the convergence of individual priorities with organisational goals (e.g., Abernethy & Stoelwinder, 1991; Favero et al., 2016; Nielsen, 2014; G. J. Young et al., 2012).

Importantly, our results demonstrate that the relationship between perceived goal importance and achievement of individual-level performance targets is mediated by one's knowledge of performance information. In line with our theoretical conjectures, more knowledge about performance empowers GPs to continuously refine and adjust their behaviours, hence improving the alignment between achieved results and organisational targets. This finding is consistent with prior studies underscoring the self-learning and self-monitoring consequences of PMSs in public organisations (Franco-Santos et al., 2012; Moynihan, 2005). Contrary to our expectations, however, GPs' knowledge of peer performance information did not have a similar mediation effect. As explained earlier, the creation of PCUs was intended to foster knowledge-sharing among individual GPs, while the release of periodic information about individual and PCU-level performance was designed to solicit a debate among organisational peers. However, this finding seems to suggest that knowing the performance information of one's peers does not increase the achievement of

individual-level performance targets, at least in the context of PCUs. One way to interpret this result is that PCUs may be viewed as formal entities rather than social contexts in which GPs can learn from their colleagues. In this regard, prior studies have noted that “despite a strong political commitment and a mandatory membership by GPs, PCUs do not have a specific link with clinical practice” (Fantini et al., 2012, p. 74). Thus, PCUs meetings likely represent mere formal assemblies rather than actual opportunities for GPs to exchange individual knowledge and experience. In other words, PCU meetings may not incline GPs to engage in knowledge-sharing with other PCU members, thereby lessening the opportunities to learn from peers, adjust their behaviours and ultimately improve their achievement of individual-level performance targets. This seems coherent with the characteristic of our sample, composed of GPs having an extensive organisational tenure. Physicians working in solo for a long time are more likely to reiterate individual routines accumulated over time instead of engaging in discussion with peers (Fantini et al., 2012).

Finally, our results suggest that the perceived accessibility of performance information positively moderates the relation between perceived goal importance and one's knowledge of individual/peer performance. While the public management literature has often considered the accessibility of PMSs as a characteristic that organisations can objectively design (Cepiku et al., 2017; Kroll, 2015), our results highlight that GPs (despite belonging to the same organisation) may hold different perceptions about the accessibility of performance information. Moreover, we observe that physicians who perceive both individual and peer performance information as more accessible are also more likely to exhibit greater knowledge of performance information, as well as demonstrate a stronger relation between said knowledge and perceived goal importance.

## 5.1 Theoretical implications

This study contributes to accounting research on the individual consequences of PMSs (Luft & Shield, 2003) in several ways. First, we examined how medical professionals' perceptions regarding goal importance, knowledge of individual and peer performance information and accessibility of performance information affect their achievement of individual-level performance targets. Thus, we complement previous findings on the individual-level variables underlying the effectiveness of PMSs in professionally dominated organisations (Abernethy & Stoelwinder, 1991, 1995; Oppi et al., 2019; Pettersen & Solstad, 2014; Solstad et al., 2020). More specifically, we expand prior research on the impact of PMSs on individual-level outcomes, which has so far analysed perceived goal importance (De Lancer & Holzer, 2001; Nielsen, 2014; G. J. Young et al., 2012) and accessibility (Lewandowski, 2019; Moynihan & Pandey, 2010), although separately. Furthermore, we explore how medical professionals retain knowledge of specific individual (and peer) performance information. This paper is the first to study how medical professionals' perceptions of performance information affect their achievement of individual-level performance targets, considering the joint effect of such three important behavioural constructs.

We highlight that medical professionals' knowledge of performance information plays an important role in explaining how the convergence between individual priorities and organisational goals affects the achievement of individual-level performance targets. We propose that medical professionals' knowledge of performance information likely triggers self-monitoring and social comparison among peers, which in turn affect self-reflection, behavioural change and learning at the individual level. We also argue that the provision of performance information does not enhance medical professionals' knowledge of performance information per se. Rather, we document that the effect of medical professionals' perceived goal importance on their knowledge of performance information is contingent upon their perception of performance information accessibility. All in all, our analysis of such behavioural constructs seems to corroborate the view that performance information is an important learning mechanism, rather than a mechanical steering tool in professional organisations (Moynihan, 2005).

In this study, we also build on and expand prior accounting literature on the individual benefits of RPI (e.g., R. L. Hannan et al., 2008; R. Hannan et al., 2013; R. L. Hannan et al., 2019; Tafkov, 2013). We consider how medical professionals perceive RPI in the context of new collaborative arrangements that increase communication and knowledge-sharing

among peers. Medical professionals possess idiosyncratic characteristics (e.g., high autonomy and responsibility) and work under specific contingences (e.g., distribution over the territory and isolation) that jointly explain their unique perspectives on PMS use. While prior studies have considered RPI as objectively determined (Mahlendorf et al., 2014), we explore how medical professionals' perception of peer performance information may impact their achievement of individual-level performance targets.

Finally, this paper advances the literature around users of performance information in the public sector (Askim, 2009; Belardinelli et al., 2018; Cepiku et al., 2017; Kroll, 2014, 2015; Lewandowski, 2019) by focusing on the perceptions of professionals, who often represent a neglected category of users working in public contexts. Furthermore, this is one of the few studies to adopt factual measures of individual performance in order to investigate the relationship between users' perception of PMSs and individual-level outcomes. By contrast, most prior studies in this domain have used self-reported perception measures to study individuals' performance (Ittner & Larcker, 2001).

## 5.2 Managerial implications

Our research findings offer a number of managerial implications. First, managers of public organisations should carefully assess how individual workers perceive organisational goals and performance measurement systems. A seemingly well-defined PMS will not guarantee the adoption of appropriate behaviours or the achievement of desired targets. Thus, in order to enhance the effective use of performance management, managers should focus on a number of initiatives aimed at improving self-monitoring and self-learning processes. For instance, organisations could transform formal meetings and groups into collaborative environments where public professionals could actually share knowledge, thereby creating favourable conditions for vicarious learning, as well as social comparison and contagion. Additionally, organisations should strive to reduce the perceived social distance between public workers belonging to professional groups, especially among those characterized by high levels of autonomy like medical doctors. A cultural change would provide a more compelling basis for utilizing PMSs in ways that align with expected behaviours and targets.

## 5.3 Limitations, future research and conclusion

The present study naturally features both strengths and weaknesses, the latter of which may warrant some caution in interpreting the results. First, our research was conducted among GPs in a single organisation located in one of the best performing regions in Italy. We are aware that both the organisation and the territory feature several cultural, political and performance idiosyncrasies, which may limit the generalizability of the results. However, by limiting ourselves to a single LHA, we were able to capture individual differences among GPs while keeping macro-level variables constant. On the other side, given the increasing importance of PMSs in the context of medical profession (Abernethy & Stoelwinder, 1995; Pettersen & Solstad, 2014), we believe it would be worth testing our framework in other health care settings. Future studies should assess whether similar findings arise in other organisations in the same region, as well as in other regions and national health services.

A second weakness is our operationalization of individual-level performance targets, which does not fully capture the multidimensional nature of GP's performance through a balanced use of both output and outcome measures. The factual performance measures used in this study are output related. As health outcomes are often beyond the control of GPs and are related to their patients' overall long-term conditions (R. A. Young et al., 2017), we considered two factual measures of output that GPs can better influence through their actions and decision-making. Accordingly, we have interpreted the individual achievement of such targets as an intended consequence of PMSs through the activation of cognitive and learning processes. However, prior studies have shown that PMSs measuring limited output targets likely generate unintended consequences, especially as far as health care organisations are concerned (Nuti et al., 2017).

The achievement of output targets can be influenced by opportunistic gaming when individuals alter their behaviour to fulfill performance expectations, as well as by selective attention, that is, individuals become fixated on targets formally included in PMSs but tend to overlook dimensions of organisational goals that are not measured. These unintended consequences often lead to synecdoche, that is, taking a part to stand for a whole and performance paradox, that is, a weak correlation between performance measures and performance (Bevan & Hood, 2006; Franco-Santos & Otley, 2018; Nuti et al., 2017). While the analysis of these factors goes beyond the scope of the present research, they might offer an alternative explanation of the mechanisms leading to performance target achievement (Franco-Santos & Otley, 2018). Future research should disentangle to what extent the unintended individual-level consequences of PMSs occur in the domain of medical professionals, thereby attesting whether our findings are robust in light of other relevant performance indicators.

A third limitation involves the psychological processes and behaviours (i.e., self-monitoring and self-learning) that we assumed would be activated with more knowledge of individual and group performance. Although theoretically driven, these mechanisms were not directly measured. This aspect may constitute a focus of future research. In this vein, a multilevel study would be especially fruitful for exploring how PMSs facilitate group-level processes, such as vicarious learning and social comparison, and how these in turn affect performance. Moreover, we acknowledge that perceived goal importance can be interrelated with other relevant factors, such as organisational commitment and identity (Wright et al., 2013). Furthermore, we note that other important professional dimensions, such as trust among peers, should be taken into account. Previous studies have shown that accounting practices may often produce distrust and conflict, especially as far as GPs are concerned (Jacobs, 1998). While such factors are beyond the scope of the present research, we encourage future studies to explore the relation between goal importance, organisational commitment and trust and, in turn, their relationship with public professionals' perceptions of PMSs and their own performance.

A further limitation is linked to whether and how perceived performance information can actually capture the high degree of ambiguity affecting the use of PMSs in professional organisations (Englund et al., 2013). Our study shows that performance information use and effectiveness depend on how individuals perceive performance information, which is an implicit recognition of the ambiguity of PMSs. However, we are not in a position to fully examine the complex ambiguity of PMSs in professionally dominated organisations. Future studies should focus more explicitly on this issue by adopting more appropriate measures of ambiguity in professional organisations.

Finally, because our empirical analysis was cross-sectional, we could not make inferences about the causal relationships between the different concepts and variables examined in our study. We believe that future longitudinal studies are necessary to better ascertain the hypothesized relations.

Despite these weaknesses, the present study contributes to the prior literature on PMSs and performance information by showing, for the first time, how perceived goal importance interacts with the perceived accessibility and individual awareness of performance information to influence medical professionals' achievement of individual-level performance targets.

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