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Personality Traits and the Use of Performance Information:

Enthusiastic and Diligent Public Managers

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Abstract

Drawing on a survey of 385 municipal public managers in Italy, this article investigates the potential association between managers' personality traits and their use of performance information. Using partial least squares structural equation modeling (PLS-SEM), the results show that conscientiousness, extraversion, and openness emerge as relevant personality traits that help explain public managers' use of performance information. Moreover, the study points to the presence of two distinct groups of users of performance information, which we label "enthusiastic" and "diligent" managers. For "enthusiastic managers", performance information use is mainly associated with extraversion and openness, while for "diligent managers", conscientiousness and agreeableness drive its use. Implications for the theory and practice of performance management are discussed.

Keywords: Performance Information Use, Personality Traits, Big Five, Survey, PLS-SEM

Running head: Enthusiastic and Diligent Public Managers

INTRODUCTION

Personality traits have been shown to explain behaviors, processes, and decision-making in organizations (Barrick, Mount, and Judge 2001; Erez et al. 2015; Judge, Heller, and Mount 2002; Malhotra, Morgan, and Zhu 2017). A growing body of literature suggests that certain personality traits are more associated with individual performance (Anderson and Viswesvaran 1998; Barrick and Mount 1991; Salgado 1997; Tett, Jackson, and Rothstein 1991) and creativity (Sung and Choi 2009) than others, and may make managers more or less effective in various tasks (Ames 2008; Ames and Flynn 2007; Cooper et al. 2013; Malhotra, Morgan, and Zhu 2017). Along similar lines, the "manager effect" literature (Abernethy and Wallis 2019) increasingly recognizes that individual managers do not necessarily respond to external or organizational stimuli in a homogeneous and predictable way. These differences in managerial responses and behaviors may depend on psychological factors, such as personality or cognition styles.

In the public administration literature, the effect of personality on behaviors has attracted limited attention (Aarøe et al. 2021), although there is growing interest. Studies mostly address the relationships between personality traits and work-related attitudes and behaviors of managers and employees (Schönherr and Thaler 2023), finding that personality traits contribute to job satisfaction (Cooper et al. 2013; Cooper et al. 2014), public service motivation (Hamidullah, Van Ryzin, and Li 2016; Liu et al. 2015; Piatak and Holt 2020; Van Witteloostuijn, Esteve, and Boyne 2017), and job performance (Eshet and Harpaz 2021), as well as budget manipulation (Anessi-Pessina and Sicilia 2020). Moreover, for politicians, Aarøe et al. (2021) find that personality traits are associated with a willingness to take on an administrative burden. These findings suggest that personality traits are a valuable lens through which to understand managerial and political behaviors and that further attention should be given to their micro-foundations.

Among managerial behaviors and tasks, the use of performance information has

attracted increasing scholarly attention in the last few decades (Kroll 2014; Melkers and Willoughby 2005; Moynihan and Hawes 2012; Moynihan and Lavertu 2012; Moynihan, Pandey, and Wright 2012a, 2012b; Saliterer and Korac 2013; Taylor 2011; Speklé and Verbeeten 2014). Yet, few studies connect managers' psychological characteristics with performance information use. More specifically, while environmental and organizational factors affecting use have been extensively explored (Kroll 2014; Dimitrijevska-Markoski and French 2019), studies focusing on individual antecedents are scant and have only focused on background and demographic characteristics, such as gender, age, experience, and education, as explanatory of performance information use, often with inconclusive results (Kroll 2014). So far, no studies have examined how psychological variables, such as personality traits (including extraversion, openness, conscientiousness, neuroticism, and agreeableness), may influence the use of performance information.

Thus, this article explores whether and how managers' personality traits are associated with the use of performance information, and for which purposes, based on a survey of 385 municipal public managers in Italy. Performance measures have been used in Italian municipalities since managerial reforms in the late 1990s (Pollitt and Bouckaert 2011). Our findings confirm that personality traits matter in explaining the extent of different types of performance information use. They also identify two groups of managers, "enthusiastic" and "diligent", whose use of information is driven by distinct personality traits. Overall, these findings contribute to a better understanding of the potential for personality traits to explain managerial attitudes and behaviors, adding to this nascent stream of literature, and paving the way for further studies in this area. Discovering that managerial personality traits affect performance information use, moreover, also has practical implications for the design and implementation of performance measurement systems.

THEORETICAL BACKGROUND

Use of Performance Information

The use of performance information in public sector organizations has become widespread globally in the wake of managerial reforms (Steccolini, Saliterer, and Guthrie 2020; Hammerschmid, Van de Walle, and Stimac 2013), and is increasingly seen as a typical "managerial" task. There are many classifications of performance information uses, reflecting the range of potential purposes of performance measurement systems (Behn 2003; Van Dooren, Bouckaert, and Halligan 2015). A classification widely used in survey research (Korac et al. 2020; Nitzl, Sicilia, and Steccolini 2019; Verbeeten and Speklé 2015) is that proposed by Henri (2006), which identifies four types of performance measurement system uses: monitoring, attention-focusing, strategic decision-making, and legitimizing. Monitoring use is based on a cybernetic logic, which requires goal-setting, measurement of achievement, comparison of actual and expected results, and feedback on results, to identify corrections and adjustments (Henri 2006). Monitoring suggests performance information is used as a feedback system, based on routines, and focused on rectifying variances and exceptions or unexpected results.

Attention-focusing use is based on discussion, debate, and exchanges of information and contributes to providing the organization with a common direction. It thus signals to managers and employees important aspects, critical issues, and main success factors, ultimately focusing their attention (Henri 2006).

Strategic decision-making use occurs when information facilitates managerial decision-making processes, in non-routine situations. In these cases, performance information is used by managers to evaluate different courses of actions, cope with unexpected and strategic issues, and to make decisions that may have strategic, radical consequences for the organization (Henri 2006).

Legitimizing takes place to justify and validate past actions. Performance information has been recognized as playing a relevant role in justifying already made decisions and more generally in legitimizing actions (Feldman and March 1981). Here, performance information

is used for rationalizing ex-post, legitimizing decisions and actions, or to seek external approval and legitimacy (Markus and Pfeffer 1983; Nitzl, Sicilia, and Steccolini 2019; Korac et al. 2020). This specific use appears to parallel the "political" use described by Moynihan (2009), where information is used to communicate effectively about plans and results and to advocate for resources, thus seeking legitimacy.

Previous studies have explored some of the antecedents of performance information uses in the public sector, often focusing on their contextual and organizational drivers (Kroll 2014; Melkers and Willoughby 2005; Moynihan and Hawes 2012; Moynihan and Lavertu 2012; Moynihan, Pandey, and Wright 2012a, 2012b; Saliterer and Korac 2013; Speklé and Verbeeten 2014; Taylor 2011).

Interestingly, comparatively less attention appears to have been devoted to exploring the role of individual drivers of performance information use. Most studies looking at individual antecedents focus on demographic and background features. Some of these variables are generally found to be not significant in explaining use (e.g., job experience, education). Others are found as being mostly significant, but with inconclusive results (e.g., age, gender, familiarity with performance measures, attitude to performance management, position in the organization) (Kroll 2014; Dimitrijevska-Markoski and French 2019). Among the psychological variables, public service motivation has been shown to have a positive association with performance information use (Kroll 2014; Moynihan and Pandey 2010; Moynihan, Pandey, and Wright 2012a) as managers with stronger pro-social motivation are more willing to use data in a purposeful way (i.e., with the aim of improving performance). In spite of these encouraging results, the role of personality traits in shaping performance information use remains largely unexplored.

The next section discusses how personality traits may affect the use of performance information by public managers.

Personality Traits and Performance Information Use

In the literature on individual psychological variables, the Five Factor Model (FFM, or "big five" model) of personality (Costa and McCrae 1992) is considered a robust and valid framework for assessing human personality traits. It includes five dimensions, referred to as extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. It is considered probably the most useful model in personality research (Barrick, Mount, and Judge 2001), with evidence supporting its validity and reliability (Hogan 2005; Hough and Oswald 2008; Ones 2005; Ones et al. 2007), and demonstrating its stability over the life-span and its replicability across theoretical frameworks and cultures.

In the management literature, personality traits have been shown to explain several individuals' behaviors and attitudes within organizations, including job performance (Anderson and Viswesvaran 1998; Barrick and Mount 1991; Salgado 1997; Tett, Jackson, and Rothstein 1991), job satisfaction (Judge, Heller, and Mount 2002), performance appraisal (Erez et al. 2015), status allocation (Bendersky and Shah 2013), and organizational citizenship behaviors (Chiaburu et al. 2011). In relation to public administration research, personality traits and their impact on behaviors and attitudes are attracting increasing attention (Aarøe et al. 2021). Cooper et al. (2013) examine the relationship between personality and job satisfaction and organizational citizenship behaviors among public managers in three US states, finding that only conscientiousness is statistically significant. Focusing on job satisfaction of street-level bureaucrats, Cooper et al. (2014) find that teachers who score higher on extraversion and agreeableness, and who score lower on neuroticism, are more likely to be satisfied with their jobs. A few studies investigate the relationship between personality traits and public service motivation, producing some mixed results. Schönherr and Thaler (2023) find that extraversion, agreeableness, and conscientiousness correlate positively with public sector motivation, echoing similar findings by Hamidullah, Van Ryzin, and Li (2016) and providing further support for the positive association between conscientiousness

and public service motivations reported by Liu et al. (2015). Anessi-Pessina and Sicilia (2020) show that manipulation of budgets in Italian municipalities is explained by demographic characteristics and personality traits, being less likely in conscientious chief financial officers. Eshet and Harpaz (2021) find that outstanding performance is positively related to extraversion and emotional stability, and negatively associated with openness to experience, while normative employees' performance is positively associated with agreeableness. Among politicians, tolerance of administrative burden (Aarøe et al. 2021) is higher in the presence of high conscientiousness, and lower when openness to experience is higher.

These studies show that personality traits have an interesting explanatory potential in studying organizational phenomena, particularly in relation to certain behaviors in public sector organizations, suggesting we can expect personality traits to explain other managerial behaviors, such as the use of performance information. However, to the best of our knowledge, no previous studies have investigated the relationship between personal traits and the use of performance information. To fill this gap, this paper discusses possible relationships between personality traits and the use of performance information, grounded in the extant literature. Our study represents a first, exploratory, attempt at gaining a better understanding of whether and how personality traits are associated with the different uses of performance information, which may pave the way to future studies in this area of research. According to the personality trait literature, each personality trait is characterized by aspects and features, which, in turn translate into people's interpretations of the specific circumstances of their personal and professional lives, and in related behaviors, for example in terms of goal orientation, sense-making, and personal strategies (DeYoung 2015). For these reasons, we hypothesize that personality traits can help explain both the level of intensity and the type of performance information use.

Below we provide a description of the main aspects and features of the five personality traits, and, in the absence of extant empirical evidence, a preliminary reflection on how they may relate to performance information uses.

Conscientiousness. Conscientiousness refers to the degree to which individuals are purposeful, hardworking, persistent, and strive for achievement (Goldberg 1990). Conscientious people have been described as conservative, deadline-oriented, methodical, and meticulous (Organ and Lingl 1995). They tend to show signs of dependability, thoroughness, and responsibility, a propensity to be self-controlled and abide by the rules, and to be organized and reliable, as well as technically very effective (Kiker and Motowidlo 1999). Therefore, conscientiousness favors engagement in task-related endeavors. In social interactions, conscientious people draw satisfaction from receiving recognition and respect from people they admire (Organ and Lingl 1995). Conscientiousness is characterized by two aspects, industriousness and orderliness. Industriousness is described as a focus on long-term goals and adopting appropriate strategies to meet those goals (DeYoung 2015). In the specific circumstances of performance information use, conscientious people are more likely to use performance information to set goals and long terms strategies, organize the work needed to achieve them, and keep track of such achievements. In addition, orderliness aligns with conformity with rules in everyday activities. Conscientious managers may see the use of performance information as part of their duties and as a means to legitimize their actions and decisions by showing how they conform to rules and expectations. Hence, conscientiousness may lead to comprehensive and more intense performance information use, consistent with the engaged nature of consciousness individuals who conform to external expectations, as well as are characterized by order and industriousness.

Openness. Openness to experience encompasses traits such as curiosity, creativity, imagination, and enjoyment of variety in sensory and cognitive experiences (Costa and McCrae 1995). Individuals who score high in openness have been described as imaginative,

broad-minded, and curious (Mount and Barrick 1995), and as having a strong ability to offer interpretations of the information they receive from the surrounding context. They are characterized by "adaptability, ability to cope with change, and tolerance for ambiguity" (Chiaburu et al., 2011, p. 1149). In the specific circumstances of performance information use, these individuals are driven by their curiosity and enjoyment of novelty and by their adaptability, which may translate into stronger engagement with the use of performance information to develop strategies and courses of action, to monitor their achievements, and to explain cause–effect relationships. Moreover, their propensity to make sense of phenomena drawing on complex interpretations may encourage a use of performance information to explain and justify patterns in data and information (DeYoung 2015). Overall, as people open to experience are broad-minded, flexible, curious, and enjoy exposure to different stimuli and a variety of perspectives, they may rely to a greater extent on performance information and also be interested in exploring and experimenting with different types of uses of performance information to make sense of their context and of organizational performance.

Extraversion. Extraversion favors engagement in social endeavors and reflects a tendency to experience positive affect, to show assertive behavior and decisive thinking (Wilt and Revelle 2009), to exhibit high levels of intense emotions and energy (Watson and Clark 1997), and to be ambitious (Ames and Bianchi 2008; Ames and Flynn 2007). Extraverted people tend to be sociable and talkative and are more likely to draw pleasure from interactions with others (Costa and McCrae 1995); they may thus pursue gains of a social nature (i.e., access to friends, allies, and mates) and tend to be optimistic, active, and assertive. They also tend to be ambitious and impetuous, energetic and enthusiastic (Raja, Johns, and Ntalianis 2004), even about routine tasks (Sung and Choi 2009). Managers with high levels of extraversion have been reported to be more creative (Sung and Choi 2009) and over-confident (Schaefer et al. 2004). Moreover, extraverted people have been shown to face inner conflicts between their ambition and their attention to social and relational aspects (Ames and Bianchi

2008; Ames and Flynn 2007), whereby they may have to sacrifice one for the other. These inner conflicts may also be reflected in their use of performance information. On the one hand, extraverts' ambition and focus on goal achievement may translate into stronger performance information use with the purpose of setting up strategic goals, monitoring their achievement, focusing the attention of collaborators, and justifying choices and strategies. On the other hand, being impulsive and over-confident may lead them to disregard performance information as they may feel already in control of situations and thus able to manage and attain goals without the need to rely on further managerial tools. Similarly, their sociability, inclination to favor social interactions and discussions, and emphasis on emotions, may divert them from a detailed and reflective reading of, and reliance on, performance data as they may tend to rely on relational skills and tools to perform their managerial work.

Agreeableness. Agreeable people are trusting, helpful, cooperative, sympathetic, and altruistic. They are also good-natured, forgiving, courteous, generous, and cooperative (Barrick and Mount 1991; Liao and Chuang 2004). Managers depicted as agreeable tend to be more collaborative and accommodating (Van Witteloostuijn, Esteve, and Boyne 2017), and to downplay conflicts and emphasize common goals (Digman 1990). Agreeable people tend to care about others' feelings and avoid conflicts with others, have difficulty in expressing disagreement with others and in embarking on new ways of doing things, and struggle with ways that are different from expectations (DeYoung 2015). Their tendency to be cooperative and altruistic, and their emphasis on pleasing others may encourage agreeable people to resort to legitimizing uses of performance information, in order to avoid criticisms and justify actions without challenging how things traditionally take place so as to avoid conflict and disagreement. In other words, legitimizing may allow these individuals to justify and support the maintenance of the status quo, reducing the potential for tensions within the organization. Conversely, types of uses that may be seen as challenging the status quo and potentially leading to conflict may be used by agreeable managers to a lesser extent. This is because their

cooperative and altruistic nature, and their emphasis on pleasing others, may make them less willing to monitor colleagues, performance, and activities. Their preference for conflict avoidance may discourage them from using information to focus attention on specific issues because doing so may privilege certain interests and particular views. Finally, their attachment to agreed-upon situations may make them averse to challenging the status quo by using performance information to provide strategic directions and bring about strategic change.

Neuroticism. Neuroticism is associated with anxiety, depression, vulnerability, and insecurity (Barrick and Mount 1991). Neurotic people tend to be inherently dissatisfied with their relationships, themselves, and their jobs. They also tend to experience fear, sadness, embarrassment, disgust, anger, and guilt. People who score low on neuroticism are emotionally stable, calmer, more relaxed, self-confident, and even-tempered (Goldberg 1990). Neurotic people are less rational, focusing more on negative than positive information (Chan, Goodwin, and Harmer 2007) and experiencing negative emotions when goals are not achieved. Rather than being positively motivated by goals, they are afraid of sanctions for not attaining them (DeYoung 2015). They also show an external locus of control, identifying external forces outside their control as the likely causes of what happens in their lives, including their work context and the organizational events in which they are involved. Irrationality and external locus of control, as well as fatalism, lack of energy and confidence, and feelings of anxiety and fear may translate into a reluctance to make decisions and use performance information, as this may bring about further negative emotions, and be seen as useless due to a sense of lack of control over the environment and organizational performance. Conversely, these features may be related to legitimizing uses of performance information, which allow neurotic managers to justify their choices and actions and give them the appearance of rationality, while hiding negative emotions. Neurotic managers may thus rely to a greater extent on legitimizing uses of performance information, which may

contribute to reducing their sense of insecurity, feelings of guilt, and embarrassment, reassuring them and making them feel less vulnerable. At the same time, they may be less keen on using performance information for monitoring, attention focusing, and strategic decision-making.

METHODS

The data for this study were collected through an online survey administered to municipal public managers in Italy between December 2014 and April 2015. Italian municipalities have been required by law to adopt performance measurement systems over the last few decades. However, while the law has defined the overall framework for performance measurement systems, it places no pressure on managers on how they should use them. Hence, this context does not inhibit the influence of personality traits on behaviors (Cooper et al. 2013; Mischel 1977), providing a relevant setting for the study.

In Italy, municipalities have jurisdiction over a large and diverse range of services, including social care, education, local transport, urban planning and security, and waste disposal. Each municipality has a mayor, a municipal executive board, a city council, and a professional bureaucracy. Both the mayor and the council are elected every five years, while the municipal executive board is appointed by the mayor. The professional bureaucracy is not elected and includes public managers and employees. Municipalities raise local taxes and charge fees for the services that they provide, but they rely heavily on current and capital transfers from higher levels of government. They are allowed to sell assets and borrow money within some limits set by national legislation and with the purpose of funding investments.

The survey was addressed to 2,841 public managers[1] in municipalities with at least 15,000 inhabitants located in three Italian Northern Regions (Lombardia, Piemonte, and

[1] Our respondents were informed about the content of this research, that their participation is voluntary, and that all information will remain confidential. Ethical approval was not required by the universities of the members of the research team.

Veneto) to ensure sufficient variety in contextual institutional, social, and economic variables (Anessi-Pessina and Steccolini 2007; Putnam, Leonardi, and Nanetti 1993). The total response rate was 18% (with 514 participants). This is a similar response rate to other survey studies in European countries in this research field (Harzing 1997; Hiebl and Richter 2018). In line with previous studies, to focus on those managers who are in charge of providing public services, responses from managers responsible for generic staff units, such as HR or finance departments, were excluded from the dataset. Moreover, respondents who showed 'straight-lining' in their responses were deleted. There were 385 final usable responses. Intra-class correlation coefficients (ICC) were estimated and found to be close to zero, showing that data within the same municipality are no more similar than data from different municipalities. Moreover, to check for non-response bias, a two-sided *t*-test was run, comparing early with late responses. This test conventionally assumes that late respondents behave like non-respondents in answering the survey questions (Armstrong and Overton 1977). All differences were non-significant. This indicates that response bias should not strongly affect the results of our analyses. Most of the participants were aged between 50 and 59 (52%) and had degree-level education (73%). They had worked in the public sector for an average of 26 years. These features are in line with the demographics of Italian municipalities' public managers (www.contoannuale.mef.gov.it). Conversely, women were overrepresented as they accounted for about 50% of participants, while representing only about 35% of Italian local public managers; however, the analysis shows that gender does not affect the results.

The questionnaire is based on already validated construct measurements and was additionally pre-tested. The constructs were estimated with multiple items and with seven-point Likert scales. Negatively formulated questions were reverse coded for the data analysis. The items used in the questionnaire are listed in appendix 1.

To mitigate possible problems with common method bias, which may influence the path relationships between the construct measurements because data are self-reported

(Podsakoff et al. 2003), several remedies were adopted (Chang, Van Witteloostuijn, and Eden 2010). First, the respondents were anonymous. Second, the questions used in our questionnaire were as specific as possible, as recommended by Meier and O'Toole (2013). Third, the variance inflation factors (VIF) for each construct measurement were calculated. VIF simulated each construct as a dependent variable and indicated the amount explained by the remaining constructs. The range of the VIF values is between 1.060 and 1.236. This range is below the critical threshold of 3.3, indicating that common method bias in the data should not be a serious concern (Kock 2015). However, it is important to point out that the above remedies, taken to mitigate and test for common method bias, cannot completely rule out its possibility.

All construct measurements are defined reflectively and are operationalized as follows. To measure the *uses of performance information* Henri's (2006) operationalization was used. Participants were asked to indicate how often they used the performance measurement system for monitoring, attention-focusing, strategic decision-making, and legitimizing purposes. To measure the *Big Five* personality traits the short form assessment of Lang et al. (2011) was used. This is a self-reporting instrument to capture the structure of core personality traits, which has already found a wide application in different research fields, including psychology, medicine, and economics. The Big Five Inventory (BFI–S) is a robust instrument that is well suited for applications in large-scale multidisciplinary surveys.

Further factors recognized in the literature as influencing performance information uses, that is, *goal clarity, knowledge of transformation processes*, and *measurability of goals,* were also measured for the ex-post analysis to explain the latent segment structure (Chun and Rainey 2005; Rainey 2008; Speklé and Verbeeten 2014). Goal clarity, measurability measures, and knowledge of the transformation process are based on Speklé and Verbeeten (2014). In addition, *age, gender, experience,* and *education* were included in the ex-post analysis.

Partial least squares structural equation modeling (PLS-SEM) was used to analyze the data with the software SmartPLS 3. PLS-SEM was chosen for data analysis because it allows analyses that are both exploratory and confirmatory in nature (Hair et al. 2017). Estimates for the construct measures, as well as the estimates for path relationships, are made simultaneously. Like regression analysis, PLS-SEM optimizes the explanatory power of independent variables, which in our case means identifying the driving personality factors for the use of performance information. For detecting a possible relevant unobserved heterogeneity, finite mixture PLS (FIMIX-PLS) was used in combination with the prediction-oriented segmentation in PLS (PLS-POS) (Becker et al. 2013; Sarstedt et al. 2011). In contrast to cluster analysis, FIMIX-PLS and PLS-POS also consider the relationship between constructs in order to identify possible hidden segments. Sarstedt and Ringle (2010) show that FIMIX-PLS can reliably detect the existence of a possible heterogeneity. The sample size of 385 is above the necessary sample size of 92 for detecting relevant effects in the present PLS-SEM model (Nitzl 2016).

RESULTS

The data were analyzed following a multi-stage process as suggested by Hair et al. (2018). In a first step, the construct measurements were assessed based on a confirmatory composite analysis (CCA) (Hair, Howard, and Nitzl 2020) (see Appendix 2 for details). In a second step, the path model was assessed to explore the relationship between personality traits and performance information uses, using the complete dataset. In a third step, a robustness test was conducted running a FIMIX-PLS and PLS-POS procedure. This allowed the identification of two groups of survey respondents with distinct personality traits driving information uses. In the final step, models were estimated for each segment. These steps and the related analyses are described in the subsections below.

The Complete Path Model

Table 1 reports the relationships between personality traits and information uses. Overall, the results confirm that different personality traits are associated with more or less intense use of performance information. In particular, conscientiousness and openness are found to be positively associated with all the performance information uses analyzed. For conscientiousness, the coefficients show a significant association between conscientiousness and monitoring (0.294), followed by attention-focusing (0.218), and strategic decision-making (0.176) uses. The weakest association found is with legitimizing (0.098). For openness, the strongest significant association is with attention-focusing (0.258) and strategic uses (0.249). Its association with monitoring and legitimizing are slightly weaker, respectively with coefficients of 0.144 and 0.161.

[Insert Table 1 about here]

Extraversion is found to be associated with monitoring (0.104) and attention-focusing (0.154) uses of performance information. However, no association is found between extraversion and strategic uses of performance information.

Finally, agreeableness and neuroticism were found to have no association with any of the uses of performance information.

In looking at these results, it is worth highlighting the modest magnitude of the path coefficients (<|0.30|) and R^2 (<0.20) in the complete model (see Table 2 in Appendix 3), pointing to the possible presence of an unobserved heterogeneity in the data (Hair et al. 2016). Unobserved heterogeneity in data indicates that the respondents may include sub-groups behaving differently. This is further discussed in the next section.

The Identification of Segments

In light of the indicated heterogeneity in the sample, FIMIX-PLS was applied to identify possible sub-groups or segments. If there is a relevant heterogeneity, an appropriate number of segments can be obtained with the help of information criteria. PLS-POS was then applied to determine which cases can be assigned to a segment (Hair et al. 2018). Appendix 3 provides further details about this procedure.

Having identified the segments, their structure was analyzed to explain the segmentation. First, the values of the constructs were compared across the identified segments. Second, several additional variables were used to explain the differences between the two segments, including gender, age, experience and education, goal clarity, measurability of goals, and knowledge of the transformation process. The latter variables were not taken into account in the initial identification of the two-segment solution. Instead, they were used afterwards to find possible explanatory variables for the segmentation. However, none of these variables is suitable to explain the segmentation found (Ringle, Sarstedt, and Mooi 2010). Table 2 reports the construct and mean values per segment.

[Insert Table 2 about here]

In the first segment, all performance information uses (except monitoring) and the knowledge of the transformation process are higher than for the second segment. Looking at personality traits, in the first segment, extraversion is significantly higher than in the second, whereas in the latter segment agreeableness, conscientiousness, neurosis, and openness are significantly higher.

The Segment-specific Path Models

The segment-specific path models were estimated and compared for each segment. A multigroup analysis with 5,000 bias-corrected and accelerated bootstraps was used to test the

differences between the path relationships. Table 3 provides an overview of the complete sample model and the segment-specific relationships in the path model. This allows exploration of the potential relationships between personality traits and performance information uses in the two segments.

[Insert Table 3 about here]

Looking at the path relationships for segment 1, conscientiousness is negatively associated with attention-focusing, legitimizing, and strategic uses of performance information, and has no statistically significant association with monitoring. Extraversion and openness are positively associated with all the performance information uses. Agreeableness is negatively associated (with a statistical significance of $p<0.1$) with legitimizing and monitoring uses, while neuroticism has no association with any performance information use.

In the second segment, conscientiousness is positively related to all performance information uses. Extraversion is negatively related to attention-focusing, strategic, and legitimizing uses and there is no association with monitoring uses. No statistically significant associations are found for openness. Agreeableness is positively associated with legitimizing and strategic uses of performance information. Finally, neuroticism has a positive association with legitimizing uses and does not have a statistically significant association with any of the other types of uses. The main emerging features of the two segments are further discussed in detail in the next section.

DISCUSSION AND CONCLUSIONS

Personal Traits and Performance Information Use

This study aimed to investigate if and how public managers' personality traits are associated with performance information uses. It identifies that the main personality traits driving

performance information use are conscientiousness and openness, with extraversion significantly influencing monitoring and attention-focusing uses of performance information. These results confirm the relevance of personality traits in explaining the level of intensity of different performance information uses, and further support or clarify preliminary reflections on their relationships developed in the literature review section. Managers who are more methodical, meticulous, and task- and deadline-oriented will be more likely to engage in the use of performance information. Similarly, managers who are more broad-minded, curious, creative, willing to embark on new experiences, and who enjoy novelty, will rely more extensively on performance information use. Managers with higher levels of extraversion seem to be more likely to engage in uses aimed at providing continuous feedback and orienting employees' attention, probably because of their focus on relationships combined with goal-orientation.

"Enthusiastic" and "Diligent" Public Managers

This article shows that managers using performance information can be grouped into two segments, based on their behavior, according to the association between their performance information uses and personality traits. These two segments are labelled respectively "enthusiastic" and "diligent".

Managers in the first segment ("enthusiastic") have significantly higher extraversion and score higher on almost all the types of uses (except for monitoring) compared to the users in the alternative segment. The label "enthusiastic" originates from the observation that use of performance information in this segment is positively associated with openness and extraversion, and negatively associated with conscientiousness and agreeableness. In the psychology literature, both extraversion and openness have been found to show a tendency towards "plasticity", defined as a disposition towards exploration, flexibility, adapting to novel situations, seeking out stimulating experiences, and tending to experience positive

emotions (Feist 2019; DeYoung 2015). These features suggest an enthusiastic approach to managerial tasks, involving intense and eager enjoyment and interest, which may explain a more intense reliance on performance information use. More specifically, in enthusiastic public managers, higher extraversion, encompassing stronger ambition and an energetic nature, is likely to encourage them to embark with passion even on routine tasks and remain strongly focused on their goals, translating into higher performance information use. Similarly, higher openness, characterized by curiosity, enjoyment of novelty, willingness to engage and adaptability, is associated with a more extensive use of performance information.

Managers who are "diligent" have higher scores on all the other personality traits, except for extraversion and show lower levels of all types of performance information uses, except for monitoring. These managers could be labelled as "diligent" because their performance information use is driven mostly by conscientiousness, agreeableness (though to a smaller extent), and neuroticism (for legitimizing). Public managers who fall into this segment seem to interpret the use of performance information as a part of their duties, a reflection of their higher level of conscientiousness; and also as a way to please, to be cooperative and to be accepted within their organizations and teams, which are concrete translations of their agreeableness. In particular, public managers in this segment that show higher agreeableness are more likely to rely on legitimizing uses, which may allow them to gain legitimacy with colleagues. They will also be more likely to rely on strategic uses, which may support the adoption of decisions, but also facilitate relationships, avoid conflicts, and more generally promote positive feelings in the organization. In addition, those managers in this segment who show higher neuroticism, characterized by strongly relevant emotions, including insecurity and guilt, may be more likely to resort to legitimizing uses of performance information, probably to justify decisions and behaviors and to give them the appearance of rationality.

Implications for Public Administration Research and Practice

This article provides three main contributions. First, it adds new knowledge of the individual factors explaining performance information use. In particular, it confirms the relevance of manager-related explanations of performance information use, supplementing those studies focusing mostly on demographic and background characteristics and having inconclusive results for individual factors (position, gender, age, familiarity with performance measures) or not significant results for others (job experience, educational level) (Kroll 2014). Second, the results of this study provide new evidence of the role played by personal traits in shaping managerial and organizational behaviors in the public sector (Anessi-Pessina and Sicilia 2020; Cooper et al. 2014; Cooper et al. 2013). Third, the study also points to the presence of two different groups of users of performance information, "enthusiastic" and "diligent" managers.

These results also have relevant implications for practice. First, they suggest that the design of performance measurement systems should take into consideration that each manager may have different preferences and behaviors in the use of performance information, and that these may be explained, among other factors, by their personality traits. Certain managers may use performance information because of their "enthusiasm", whereas others may use performance information because they are diligently following orders, expectations, and social stability. This suggests that diversity of personalities may need to be taken into consideration when implementing performance information systems and ensuring their effectiveness. In particular, personality traits are stable and not easily changed. Raising awareness that they shape performance information use behaviors in different ways for different people allows for a more tailored approach in the design of performance measurement systems. Moreover, to strengthen the use of performance information, multiple ways to promote, explain, and make sense of them to reflect different personality traits may be needed at the organizational level. The results of this study also suggest that reform implementation within organizations may be influenced not only by contextual and

organizational factors, but also filtered through managers' personalities, pointing to the need for awareness if performance information is to be used to its full potential.

Limitations and Further Research Avenues

This study, like any, is subject to some limitations. First, the results may reflect the context of the analysis and further studies may replicate the study in different countries and organizational contexts. Second, the study focuses on the use of performance information by managers, yet its non-use and the reasons for this are equally deserving of attention. Third, although efforts have been made to reduce the risks of common source bias, this study may suffer limitations related to reliance on self-reported responses. Finally, the response rate is in line with the (low) levels usually registered in Southern Europe and may cause a non-response bias (Ditillo et al. 2015; Liguori, Sicilia, and Steccolini 2012; Belardinelli et al. 2018).

Along with other recent contributions, this study has the potential to pave the way for further studies looking at how psychological variables, including personality traits, interact with other individual as well as organizational and contextual variables to explain behaviors in the public sector arena. Further investigations may look at the conditions affecting the sign and strength of the relationship between personality traits and performance uses. Moreover, as the results point to the existence of two segments of users, additional analyses are needed to investigate whether the segmentation identified in this context holds elsewhere, and what the relevant explanatory variables may be.

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TABLES

TABLE 1 Path Coefficients and Significances for the Complete Model

	Complete
Conscientiousness	
-> Attention	0.218***
-> Legitimizing	0.098**
-> Monitoring	0.294***
-> Strategic	0.176***
Openness	
-> Attention	0.258***
-> Legitimizing	0.161***
-> Monitoring	0.144***
-> Strategic	0.249***
Extraversion	
-> Attention	0.154**
-> Legitimizing	0.100
-> Monitoring	0.104*
-> Strategic	0.004
Agreeableness	
-> Attention	-0.060
-> Legitimizing	0.048
-> Monitoring	-0.043
-> Strategic	0.036
Neuroticism	
-> Attention	-0.031
-> Legitimizing	0.037
-> Monitoring	-0.084
-> Strategic	-0.003

TABLE 2 Ex Post Analysis to Explain Latent Segment Structure

	Segment 1 "Enthusiast"	Segment 2 "Diligent"	Difference[1]
Attention focusing	5.143	4.962	0.181*
Legitimizing	4.892	4.638	0.254**
Monitoring	5.533	5.439	0.094
Strategic	5.134	4.786	0.348***
Conscientiousness	5.813	5.936	-0.123*
Openness	5.259	6.126	-0.867***
Extraversion	5.134	4.825	0.309**
Agreeableness	5.236	5.569	-0.333**
Neuroticism	2.442	2.988	-0.546***
Gender	0.516	0.508	0.085
Age	51.940	51.420	0.520
Experience	26.630	25.780	0.850
Education	0.723	0.748	-0.025
Goal Clarity	5.389	5.256	0.133
Output Measurability	4.846	4.694	0.102
Transf Proc Know	5.021	4.705	0.315***

1 = The significance of the differences is tested through of a two-sided *t*-test apart from gender and age. For the latter a chi-square test was used because of the binary coding.
* significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 3 Path Coefficients and Significances for the Complete Model, Segments, and Segments Differences

	Complete	Segment 1 "Enthusiast"	Segment 2 "Diligent"	|Segment 1 - Segment 2|
Conscientiousness				
-> Attention	0.218***	-0.101**	0.473***	0.589***
-> Legitimizing	0.098**	-0.144**	0.254***	0.402***
-> Monitoring	0.294***	0.043	0.434***	0.406***
-> Strategic	0.176***	-0.169***	0.401***	0.577***
Openness				
-> Attention	0.258***	0.477***	0.136	0.341***
-> Legitimizing	0.161***	0.337***	-0.038	0.371***
-> Monitoring	0.144***	0.415***	0.185	0.233
-> Strategic	0.249***	0.512***	0.164	0.348***
Extraversion				
-> Attention	0.154**	0.561***	-0.207***	0.765***
-> Legitimizing	0.100	0.559***	-0.313***	0.871***
-> Monitoring	0.104*	0.368***	-0.043	0.413***
-> Strategic	0.004	0.486***	-0.342***	0.830***
Agreeableness				
-> Attention	-0.060	-0.091	0.069	0.144
-> Legitimizing	0.048	-0.095*	0.231***	0.335***
-> Monitoring	-0.043	-0.095*	0.077	0.182*
-> Strategic	0.036	-0.062	0.146**	0.206**
Neuroticism				
-> Attention	-0.031	-0.007	0.088	0.095
-> Legitimizing	0.037	-0.008	0.197**	0.212**
-> Monitoring	-0.084	-0.111	0.007	0.128
-> Strategic	-0.003	0.032	0.096	0.059

* significant at 10%; ** significant at 5%; *** significant at 1%

APPENDIX 1: SURVEY QUESTIONS AND ITEM-LEVEL DESCRIPTIVE

Performance information uses (drawn from Henri 2006)

Please indicate to what extent the following uses reflect how you use the performance measurement system (1 = strongly disagree, 7 = strongly agree):

	mean	s.d.
Monitoring		
To track progress towards goals	5.391	1.015
To review key measures	5.282	1.035
To monitor results	5.665	0.910
To compare outcomes to expectations	5.630	0.926
Attention-focusing		
To tie the organizational unit together	5.060	1.199
To enable the organizational unit to focus on common issues	5.104	1.148
To enable the organizational unit to focus on your critical success factors	5.003	1.151
To develop a common vocabulary in the organizational unit	5.000	1.188
To provide a common view of the organizational unit	5.195	1.153
To enable discussion in meetings of superiors, subordinates, and peers	5.145	1.179
To enable continual challenge and debate underlying results, assumptions, and action plans	4.898	1.270
Strategic decision-making		
To make strategic decisions once the need for a decision is identified, and an immediate response is required	5.104	1.188
To make strategic decisions once the need for a decision is identified, and an immediate response is not required	5.146	1.237
To make decisions when it is difficult to differentiate among plausible solutions to a problem (i.e., they cannot be easily rank ordered by preference) because each has good arguments	4.885	1.211
To make decisions when encountering a problem that is unstructured and has not been encountered before	4.917	1.235
To make decisions when you have been recently faced with a similar decision	4.604	1.282
To anticipate the future direction of the unit, as opposed to responding to an identifiable problem	4.893	1.308
To make a final decision on a strategic issue of major importance	5.161	1.267
Legitimation		
To confirm your understanding of the activities	5.208	1.123
To justify decisions	4.846	1.313
To verify assumptions	5.073	1.168
To maintain your perspectives	4.810	1.367
To support your actions	5.060	1.260
To reinforce your beliefs	4.623	1.341
To stay close to the business	4.664	1.328
To increase your focus	4.611	1.276
To validate your point of view.	4.525	1.346

Short assessment of the Big Five (drawn from Lang et al. 2011)

I see myself as someone who… (1 = strongly disagree, 7 = strongly agree):

	mean	s.d.
Neuroticism		
Worries a lot	4.893	1.446
Gets nervous easily	3.339	1.474
Remains calm in tense situations	2.530	1.047
Extraversion		
Is talkative	5.042	1.270
Is outgoing, sociable	5.304	1.066
Is reserved	3.456	1.464
Openness to experience		
Is original, comes up with new idea	5.265	1.053
Values artistic, aesthetic experiences	4.773	1.445
Has an active imagination	5.402	1.067
Agreeableness		
Is sometimes rude to others	5.156	1.478
Has a forgiving nature	4.849	1.346
Is considerate and kind to almost everyone	5.756	0.936
Conscientiousness		
Does a thorough job	6.018	0.804
Tends to be lazy	5.695	1.280
Does things efficiently	5.735	0.851

Goal clarity (drawn from Speklé and Verbeeten 2014)

Please indicate the extent to which you agree with the following statements (1 = strongly disagree, 7 = strongly agree):

	mean	s.d.
My unit's mission is unequivocal	5.715	1.150
My unit's mission is written on paper and is communicated internally and externally	5.164	1.473
My unit's goals are unambiguously related to the mission	5.464	1.363
The set of goals of my unit is internally consistent	5.418	1.235
My unit's goals are specific and detailed	5.432	1.323
My unit's goals keep changing because of political development (reverse coded)	3.206	1.577

Measurability of goals (drawn from Speklé and Verbeeten 2014)

Please indicate the extent to which you agree with the following statements (1 = strongly disagree, 7 = strongly agree):

	mean	s.d.
The goals of my unit are expressed in a wholly quantitative way (e.g., budget, productivity, numbers)	4.825	1.399
The goals of my unit are expressed in no more than 5 performance indicators	4.671	1.624
The set of performance metrics provides a complete picture of the results to be achieved	4.699	1474
The performance measures of the unit are unambiguously related to the goals of the organizations	4.997	1.468
The attainment of our goals depends significantly on external factors	4.832	1.459
The causal relation between resource allocation and goal achievement is absolutely clear	4.537	1.539
The effect of our efforts become visible within a year	4.607	1.478

Knowledge of the transformation process (drawn from Speklé and Verbeeten 2014)

Please indicate the extent to which you agree with the following statements (1 = strongly disagree, 7 = strongly agree):

	mean	**s.d.**
In performing our tasks, there is a logical way to proceed	5.053	1.387
The unit's primary processes can only be performed in one specific and documented way.	4.535	1.491
Within the unit, it is entirely clear how to perform our tasks.	5.410	1.204
In performing their tasks, unit employees rely on standard procedures and rules.	4.505	1.524

APPENDIX 2: CONSTRUCT MEASUREMENTS

Step 1 assesses the reliability and validity of the reflective construct measurements based on a confirmatory composite analysis (CCA) (Hair, Howard, & Nitzl, 2020). Table 1 reports the results of the evaluation of the construct measurements, showing the loadings for each item. There are different recommendations for loadings and their minimum value. Values of 0.5 for loadings or higher are acceptable, with higher than 0.7 being the ideal level. Composite reliability should be higher than 0.6, and the average explained variance (AVE) should be higher than 0.5.

[Insert Table 1 here]

[Insert Table 2 here]

In line with these recommendations, the three items in Table 1 with lower loadings than 0.5 were deleted (AGREABLENESS_2, EXTRAVERSION_3, NEUROSIS_1). All other items were kept for the construct measurements, as the critical thresholds for all composite reliability values are higher than 0.6 and the average extracted variance values are higher than 0.5. Table 2 shows that three items for the reflective control measurements with lower loadings than 0.5 (GOAL CLARITY_6, MEASURABILITY OF GOALS_2, MEASURABILITY OF GOALS_5) were deleted.

Moreover, the discriminant validity was evaluated through the heterotrait-monotrait (HTMT) criteria. The HTMT criterion is a more reliable testing discriminant validity than the Fornell-Larcker criterion (Henseler, Ringle, & Sarstedt, 2015). Table 3 shows that all values are below the conservative critical value of 0.85. Additionally, Table 4 reports the cross loadings of each indicator.

[Insert Table 3 here]

[Insert Table 4 here]

TABLE 1 Evaluation of Reflective Construct Measurements

	Loadings	Composite Reliability	Average Variance Extracted (AVE)
Construct/Critical Values	**>0.700**	**>0.600**	**>0.500**
CONSCIENTIOUSNESS		0.770	0.531
CONSCIENTIOUSNESS_1	0.786		
CONSCIENTIOUSNESS_2	0.586		
CONSCIENTIOUSNESS_3	0.795		
OPENNESS		0.858	0.668
OPENNESS_1	0.838		
OPENNESS_2	0.737		
OPENNESS_3	0.871		
EXTRAVERSION		0.909	0.833
EXTRAVERSION_1	0.883		
EXTRAVERSION_2	0.941		
EXTRAVERSION_3	(0.108)		
AGREEABLENESS		0.804	0.675
AGREEABLENESS_1	0.739		
AGREEABLENESS_2	(-0.149)		
AGREEABLENESS_3	0.896		
NEUROTICISM		0.774	0.641
NEUROTICISM_1	(0.203)		
NEUROTICISM_2	0.627		
NEUROTICISM_3	0.943		
ATTENTION FOCSUING		0.935	0.673
ATTENTION_FOCUSING_1	0.803		
ATTENTION_FOCUSING_2	0.841		
ATTENTION_FOCUSING_3	0.845		
ATTENTION_FOCUSING_4	0.841		
ATTENTION_FOCUSING_5	0.861		
ATTENTION_FOCUSING_6	0.776		
ATTENTION_FOCUSING_7	0.770		
LEGITIMIZATION		0.945	0.683
LEGITIMIZATION_1	0.720		
LEGITIMIZATION_2	0.779		
LEGITIMIZATION_3	0.863		
LEGITIMIZATION_4	0.868		
LEGITIMIZATION_5	0.867		
LEGITIMIZATION_6	0.811		
LEGITIMIZATION_7	0.841		
LEGITIMIZATION_8	0.848		
MONITORING		0.936	0.785
MONITORING_1	0.879		
MONITORING_2	0.873		
MONITORING_3	0.896		
MONITORING_4	0.895		
STRATEGIC_		0.933	0.666
STRATEGIC _1	0.874		
STRATEGIC _2	0.851		
STRATEGIC _3	0.819		
STRATEGIC_ 4	0.806		
STRATEGIC_ 5	0.701		
STRATEGIC_ 6	0.812		
STRATEGIC_ 7	0.839		

(…) = items purification

TABLE 2 Evaluation of Reflective Control Measurements

	Loadings	Composite Reliability	Average Variance Extracted (AVE)
Construct/Critical Values	**>0.700**	**>0.600**	**>0.500**
GOAL CLARITY		0.924	0.710
GOAL CLARITY _1	0.785		
GOAL CLARITY_2	0.808		
GOAL CLARITY_3	0.904		
GOAL CLARITY_4	0.866		
GOAL CLARITY_5	0.845		
GOAL CLARITY_6	(-0.006)		
KNOWLEDGE OF TRANSFORMATION PROCESSES		0.857	0.601
KNOWLEDGE OF TRANSFORMATION PROCESSES_1	0.765		
KNOWLEDGE OF TRANSFORMATION PROCESSES_2	0.728		
KNOWLEDGE OF TRANSFORMATION PROCESSES_3	0.791		
KNOWLEDGE OF TRANSFORMATION PROCESSES_4	0.814		
MEASURABILITY OF GOALS		0.839	0.515
MEASURABILITY OF GOALS_1	0.587		
MEASURABILITY OF GOALS_2	(0.448)		
MEASURABILITY OF GOALS_3	0.815		
MEASURABILITY OF GOALS_4	0.836		
MEASURABILITY OF GOALS_5	(0.128)		
MEASURABILITY OF GOALS_6	0.658		
MEASURABILITY OF GOALS_7	0.660		

(…) = items purification

TABLE 3 Discriminant Validity (HTMT)

	Conscientiousness	Openness	Agreeableness	Extraversion	Neuroticism	Attention focusing	Legitimization	Monitoring	Strategic
Conscientiousness									
Openness	0.311								
Extraversion	0.245	0.216							
Agreeableness	0.625	0.180	0.115						
Neuroticism	0.558	0.167	0.819	0.215					
Attention focusing	0.431	0.386	0.073	0.261	0.18				
Legitimization	0.242	0.239	0.109	0.142	0.116	0.618			
Monitoring	0.502	0.252	0.130	0.212	0.249	0.684	0.414		
Strategic	0.364	0.320	0.154	0.073	0.136	0.817	0.686	0.630	

TABLE 4 Cross loadings

	Conscientiousness	Openness	Extraversion	Agreeableness	Neurosis	Attention	Legitimization	Monitoring	Strategic
CONSCIENTIOUSNESS_1	**0.786**	0.173	0.100	0.280	-0.278	0.206	0.137	0.251	0.163
CONSCIENTIOUSNESS_2	**0.586**	0.107	0.100	0.186	-0.159	0.196	0.131	0.193	0.193
CONSCIENTIOUSNESS_3	**0.795**	0.149	0.164	0.283	-0.204	0.270	0.124	0.335	0.231
OPENNESS_1	0.241	**0.838**	0.111	0.024	-0.096	0.311	0.151	0.254	0.261
OPENNESS_2	0.056	**0.737**	0.135	0.012	-0.051	0.201	0.201	0.068	0.157
OPENNESS_3	0.150	**0.871**	0.184	0.066	-0.125	0.281	0.150	0.200	0.260
EXTRAVERSION_1	0.127	0.113	**0.883**	-0.047	-0.070	0.173	0.102	0.145	0.028
EXTRAVERSION_2	0.179	0.193	**0.941**	0.081	-0.114	0.241	0.135	0.189	0.087
AGREEABLENESS_1	0.244	-0.073	-0.045	**0.739**	-0.352	0.039	0.055	0.060	0.059
AGREEABLENESS_3	0.319	0.109	0.072	**0.896**	-0.251	0.029	0.073	0.090	0.109
NEUROSIS_2	-0.202	-0.063	0.043	-0.400	**0.627**	-0.047	0.052	-0.102	-0.030
NEUROSIS_3	-0.268	-0.113	-0.145	-0.252	**0.943**	-0.125	-0.068	-0.174	-0.101
ATTENTION_FOCUSING_1	0.286	0.220	0.168	0.040	-0.094	**0.803**	0.473	0.534	0.603
ATTENTION_FOCUSING_2	0.293	0.242	0.167	0.014	-0.117	**0.841**	0.422	0.518	0.605
ATTENTION_FOCUSING_3	0.297	0.301	0.253	0.061	-0.101	**0.845**	0.439	0.627	0.600
ATTENTION_FOCUSING_4	0.234	0.321	0.134	-0.011	-0.108	**0.841**	0.457	0.497	0.664
ATTENTION_FOCUSING_5	0.253	0.283	0.217	0.019	-0.117	**0.861**	0.495	0.564	0.640
ATTENTION_FOCUSING_6	0.229	0.237	0.222	0.085	-0.069	**0.776**	0.483	0.425	0.597
ATTENTION_FOCUSING_7	0.195	0.290	0.162	0.023	-0.077	**0.770**	0.531	0.449	0.626
LEGITIMIZATION_2	0.096	0.102	0.000	0.067	-0.033	0.386	**0.720**	0.290	0.508
LEGITIMIZATION_3	0.115	0.236	0.042	0.073	-0.060	0.509	**0.779**	0.418	0.595
LEGITIMIZATION_4	0.126	0.175	0.095	0.071	-0.039	0.420	**0.863**	0.258	0.500
LEGITIMIZATION_5	0.232	0.173	0.129	0.106	-0.066	0.444	**0.868**	0.329	0.527
LEGITIMIZATION_6	0.137	0.132	0.146	0.076	-0.014	0.504	**0.867**	0.315	0.525
LEGITIMIZATION_7	0.122	0.148	0.111	0.044	-0.029	0.463	**0.811**	0.249	0.478
LEGITIMIZATION_8	0.141	0.166	0.160	0.023	-0.003	0.524	**0.841**	0.352	0.509
LEGITIMIZATION_9	0.166	0.151	0.140	0.055	0.001	0.513	**0.848**	0.323	0.505
MONITORING_1	0.317	0.197	0.151	0.021	-0.134	0.511	0.315	**0.879**	0.494
MONITORING_2	0.344	0.245	0.183	0.097	-0.175	0.634	0.381	**0.873**	0.559
MONITORING_3	0.307	0.151	0.132	0.073	-0.126	0.522	0.325	**0.896**	0.509
MONITORING_4	0.325	0.206	0.188	0.136	-0.195	0.565	0.336	**0.895**	0.518
STRATEGIC_DECISION_MAKING_2	0.255	0.277	0.040	0.089	-0.074	0.678	0.549	0.549	**0.874**
STRATEGIC_DECISION_MAKING_3	0.243	0.305	0.079	0.078	-0.076	0.658	0.505	0.540	**0.851**
STRATEGIC_DECISION_MAKING_4	0.228	0.204	0.108	0.119	-0.101	0.619	0.493	0.465	**0.819**
STRATEGIC_DECISION_MAKING_5	0.266	0.230	0.052	0.159	-0.093	0.566	0.477	0.463	**0.806**
STRATEGIC_DECISION_MAKING_6	0.093	0.151	0.042	-0.006	0.033	0.490	0.510	0.335	**0.701**
STRATEGIC_DECISION_MAKING_7	0.199	0.183	0.029	0.079	-0.081	0.608	0.555	0.422	**0.812**
STRATEGIC_DECISION_MAKING_8	0.206	0.222	0.034	0.047	-0.100	0.657	0.518	0.526	**0.839**

APPENDIX 3: IDENTIFICATION OF SEGMENTS

This appendix describes in detail the procedure and criteria used to identify the segments, to account for the heterogeneity in the sample. First, FIMIX-PLS was applied to identify an appropriate number of segments. Subsequently, PLS-POS was run to define the segments (Hair, Sarstedt, Ringle, & Gudergan, 2018).

Table 1 illustrates the criteria used under FIMIX-PLS to identify the best number of segment solutions.

[Insert Table 1 here]

To this aim, the following information criteria were used: Akaike's information criteria (AIC), the modified Akaike's information criterion with factor 3 (AIC3), and factor 4 (AIC4), the Bayesian information criterion (BIC), the consistent Akaike's information criterion (CAIC), the Hanan-Quinn (HQ) criterion, and the minimum description length 5 (MDL5) (Sarstedt, Becker, Ringle, & Schwaiger, 2011)[2]. An important complementary criterion to evaluate a segment solution is the normed entropy statistic (EN)[3]. Finally, segment sizes (S) were taken into consideration. According to the above criteria, the most reasonable solution includes two segments, which, also in the light of the EN being at 0.54, indicates a clear-cut classification[4].

After identifying the number of segment solutions through FIMIX-PLS, it is possible to run PLS-POS with this predefined number (Hair, Sarstedt, Ringle, & Gudergan, 2018). Table 2 shows the PLS-POS results for the two-segment solution.

The average weighted coefficient of determination (R^2) for each dependent construct is higher in the two segments than in the complete model. This indicates a considerably high degree of

[2] The choice to use several criteria in combination to define the right number of segments is driven by the fact that some criteria (e.g., AIC and AIC3) have the tendency to overestimate the number of segments, whereas others tend to underestimate them (e.g., MDL5).

[3] EN indicates whether a segmentation is reliable based on the segment membership probabilities of observations.

[4] This choice can be further explained as follows. AIC, AIC3, and AIC4 indicate five segments, whereas MDL5 indicates a 2 segments solution. In this latter solution the data are distributed relatively evenly across the two segments with 51.6% in the first segment and 48.4% in the second segment. When increasing the number of segments from two to three (or higher) the last segment includes only 7.4% of the data, which corresponds to a group size of 29. This is below the recommended value of 7.5% data per segment (Sarstedt, Becker, Ringle, & Schwaiger, 2011). Additionally, with 29 observations, segment 3 is much too small for a segment-specific analysis in PLS-SEM.

exploration made possible by the segmentation of the data (Hair, Sarstedt, Ringle, & Gudergan, 2018). For the first segment, a high degree of R^2 can be observed (e.g., 0.605 for the dependent variable attention-focusing). Furthermore, the correlation between the FIMIX-PLS and PLS-POS segmentation is 0.9[5].

[Insert Table 2 here]

[5] It is worth noticing that the segment sizes in PLS-POS changed slightly as compared to the FIMIX-PLS solution. The first segment includes 54.8% (n=211) of the observations and the second segment includes 45.2% (n=174).

TABLE 1 Evaluation Criteria and Relative Segment Sizes for FIMIX-PLS

	Evaluation Criteria								Relative Segment Sizes				
	AIC	**AIC3**	**AIC4**	**BIC**	**CAIC**	**HQ**	**MDL5**	**EN**	**S = 1**	**S = 2**	**S = 3**	**S = 4**	**S = 5**
S = 2	3,949.398	3,998.398	4,047.398	4,143.107	4,192.107	4,026.223	**5,309.942**	0.546	0.516	0.484			
S = 3	3,767.701	3,841.701	3,915.701	**4,060.241**	**4,134.241**	3,883.723	5,822.401	0.655	0.498	0.428	0.074		
S = 4	3,693.915	3,792.915	3,891.915	4,085.286	4,184.286	3,849.134	6,442.770	0.661	0.423	0.265	0.243	0.068	
S = 5	**3,613.773**	**3,737.773**	**3,861.773**	4,103.975	4,227.975	**3,808.189**	7,056.784	0.704	0.353	0.203	0.183	0.172	0.088

TABLE 2 PLS-POS Segmentation Solution

	R^2 values			Weighted Average R^2 Values
	Complete	**Segment 1**	**Segment 2**	
Attention focusing	0.187	0.605	0.303	0.454
Legitimization	0.064	0.470	0.227	0.348
Monitoring	0.167	0.445	0.264	0.355
Strategic	0.118	0.536	0.360	0.488