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Leseman, Daniel

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DANIEL LESEMAN

PUTTING PERFORMANCE INFORMATION TO GOOD USE?

Examining middle managers' reasons for performance information use in public organizations

LEIDEN UNIVERSITY
MSC PUBLIC ADMINISTRATION
PUBLIC MANAGEMENT AND LEADERSHIP
FIRST READER: DR. J. VAN DER VOET
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Abbreviations

C&S - Unit for Customer and Services within the CO.

CHL - Directory of Communication, HRM and Legal Affairs within the CO.

CO - Corporate Office of the Directorate-General for Public Works and Water Management.

DGPW - Dutch Directorate-General for Public Works and Water Management.

DiFF - Directory of Information, Facility Management and Finance within the CO.

HR – Human Resources.

HRM – Human Resource Management

I&W – Dutch Ministry for Infrastructure and Water Management.

OM&P - Directory of Operational Management and Procurement within the CO.

MC – Management contract between head of CO and head of DGPW.

PI - Performance information.

SSO – Shared Service Organization.

1. Introduction

1.1. Introduction

In the last days of the Trump administration, Trump's acting director of the Office of Management and Budget (OMB) dismissed several requirements for other federal agencies to report on their budget related performance to the OMB (White House, 2021). It was argued by the director that this collection of performance information was too burdensome for the workforce at the agencies and that the public was not interested in the information aggregated by the agencies (White House, 2021). However, the Biden administration likely has different thoughts on the matter and will reinstall the requirements, arguing that this information is needed for the President and his cabinet members to steer effectively and to provide input for data-driven improvement of public programs and services (Feldman and Stack, 2021). This case and discussion on reporting requirements within the U.S. government is exemplary of discussions on performance management and performance information use in public sector organizations across the globe.

As a part of New Public Management (NPM) inspired reforms starting in the 1980s, the focus on the performance of public organizations and subsequently on performance information has increased (Moynihan and Pandey, 2010; Van Dooren and Van de Walle, 2008). In these management reforms, it is believed that performance measurement allows for efficient and effective management. By using the information that flows from this measurement, the organization and their stakeholders are given insight into the efficiency, effectiveness, and economy of organizational activities (Hoontis and Kim, 2012).

Performance information can take forms such as customer service ratings, reports on the number of goods delivered, information on the costs of certain products, and financial budgets. Politicians and managers need this information on multiple levels to fulfill their steering functions, which can be expressed in actions such as evaluating, controlling, and motivating (Behn, 2003). Furthermore, performance information might be used to learn from past projects, steer ongoing activities and provide information in the context of accountability to external stakeholders, such as citizens and auditors (Van Dooren, Bouckaert, and Halligan, 2015).

The use of performance information by management can therefore be seen as an essential part of public management (Van Dooren and Van de Walle, 2008). However, the mere presence of performance information within an organization does not automatically mean that managers will use this information effectively. Various studies indicate that performance management reforms, and subsequently, the aggregation of data into information, is not enough for management to use said information. In other words, management often only partly uses the performance information that is generated by the organization (Pollit, 2006; Ammons, 2013; Lee and Clerklin, 2017; Bandy, 2015, Chapter 6). This phenomenon is a problem for public organizations, as the non-use of performance information by management would indicate a failure of performance management and an inability to steer public programs or services (Van Dooren and Van de Walle, 2008). Therefore, some have argued that the actual use of performance information by management would be: "*the ultimate test for performance management"* (Zients, 2009, p. 1) and that *"if we want to study the successes and failures of performance movements, we have to study the use of performance information"* (Van Dooren, 2008, p. 22).

1.2. Academic relevance and research question

Academically, up until the last two decades, the question as to why, and under which circumstances managers in public organizations use performance information was unaddressed (Nielsen, Moynihan, and Kroll, 2017, p. 244-245). Subsequently, this question has been characterized as *'a big question'* for performance management studies within the public sector (Moynihan and Pandey, 2010). Over the last two decades, serious progress has been made on this question (Nielsen et al., 2017). Most research into this question has focused on organizational level characteristics, such as higher management support, innovative culture, and the institutionalization of management information systems as explanatory factors regarding performance information use (Kroll, 2015). Relatively less research has been conducted into the individual (also referred to as managerial level) and information level explanations of performance information use (Kroll, 2014; Moynihan and Hawes, 2012). Studies that took a closer examination of individual-level (Kroll, 2012, 2014; Moynihan and Hawes, 2012) or information level factors (Moynihan, 2015; Ammons and Rivenbank, 2005) however found that these factors had a considerable impact on performance information use.

Moreover, studies into the use of performance information often focus on elected officials and citizens as recipients and users of performance information (see Nielsen and Baekgaard, 2015; Van Dooren, 2008, Weback and Nicholson-Crotty, 2019), instead of public middle managers, which is the scope of this research. This research aims to further investigate which manager level and information level factors affect the use of performance information among middle managers.

The research question this thesis will aim to answer is:

"*Which managerial level and information level factors explain the use of performance information by middle managers in the public sector?"*

1.3. Societal relevance

Societally, this research is relevant because it contributes to the effectiveness of performance management in the public sector. Managers play an important role in shaping organizational performance (O'Toole and Meier, 2002), and under certain circumstances, the effective use of performance information by managers is shown to have a positive impact on the performance of organizations (Lee, 2019; Andersen and Nielsen, 2019). This way, a sound understanding of the use of performance information can contribute to better policies and services for citizens. Therefore, an increased understanding on how performance information is used in the public sector could aid the ultimate service level performance of public organizations. Which, as a result, is expected to increase citizen satisfaction with government services. Second, this knowledge on the explanations for performance information use is needed as a response to the data-driven government trend. Governments are increasingly collecting data on their services and the living environment of citizens, which could be used to steer these services (OECD, 2015).

Best practice examples of effective data aggregation and information use are the cases of the city's New York (New York, U.S.) and Baltimore (Maryland, U.S.). In these cases, local bureaucracy improved the outcomes of public policy by aggregating, transforming, and using data to steer their policies and programs (O'Malley, 2019; Johansen, Zhu, and Kim, 2018, p. 131). In these cases, the information was used effectively.

However, as mentioned, the mere presence of this data does not mean that public managers will use this newly developed data. The findings of this study can be used to foster the use of performance information within public organizations.

1.4. Data collection and analysis

This study will take a qualitative approach to the data collection. Performance information use will be investigated by conducting in-depth interviews with middle-level managers at the central government level. More specifically, within the Directorate-General for Public Works and Water Management, which is the main executive agency of the Dutch Ministry of Infrastructure and Water Management. The agency has been chosen as the case of research because of the configuration and maturity of the management information system, especially in terms of information regarding human resources (HR) and finance. This would allow for a sound analysis of the dependent variable and the factors influencing this variable. The data gathered from the interviews were coded and subsequently analyzed in the framework of thematic analysis in order to answer the research question.

1.5. Framework of the thesis

This thesis will be presented as follows. Chapter two will give an overview of the existing literature on performance information use within public organizations. Following this discussion of the literature, gaps in the literature will be identified, which will be followed by several hypotheses on performance information use. In chapter three, the methodology of this paper will be discussed. This chapter includes the description and justification of the case selection, data collection, data analysis, and reflections on the validity, reliability, and ethical considerations of this research.

Chapter four will feature both the descriptive results on performance information use and analysis of the results in light of the hypotheses. Last, this study will end with the concluding remarks, reflections on the limitations of the research, discuss several implications for practitioners, and provide suggestions for further research.

2. Theoretical framework

This theoretical framework will give an oversight of the definitions, concepts, and existing explanations on performance information and the use hereof by managers in the public sector. Despite the studies being done on this topic over the last two decades, there is no common or overarching theory on performance information use in public organizations. Instead, studies on performance information use often rely on theories from different disciplines. This theoretical framework will start with a general introduction to performance information and the hereof. Subsequently, the literature that provides explanations for the use of performance information will be subdivided into three levels of analysis. These are the organizational level, individual level, and information level. Thereafter, a number of gaps in the knowledge on performance information use will be discussed. These gaps are the basis for the hypotheses of this study.

2.1.Performance information and the use hereof

Performance information and its use are multidimensional concepts. Subsequently, there are various definitions used in the literature (Kroll, 2012; Moynihan, 2008; Lee and Clerklin, 2017; Lee, 2019). A common demeanor is that performance information use is conceptualized as social behavior. This interpretation is seen as most fitting as managers in public organizations have discretion to the degree they engage in performance information use, and this behavior is influenced by the social context (Moynihan and Pandey, 2010, p. 852). Performance information can be used in various ways, Moynihan (2009) proposes four uses, which are purposeful, passive, political, and perverse.

Purposeful performance information use refers to scenarios in which a manager uses the information to steer towards delivering better services for stakeholders. Passive performance information use refers to scenarios in which managers only use data because it is required by law or regulations, without effectively using the information to steer organizational programs. Furthermore, political performance information use refers to cases in which the information is used in the political environment (outside of the direct managerial environment) and perverse use of performance information refers to cases in which information is falsified to meet targets or satisfy stakeholders (Moynihan, 2009, p. 592-594). In another classification, Behn (2003) distinguishes between eight different actions related to performance information use: to evaluate, to control, to budget, to motivate, to promote, to celebrate, to learn, and to improve. Within this framework, Behn concedes that the ultimate purpose of performance management and therefore the use of performance management is to improve, and the other seven uses of performance information are means to achieving this purpose (2003, p. 588). Moynihan (2009) did not explicitly elaborate on the classification made by Behn (2003), but the classification of the latter could all be interpreted as purposeful use of performance information.

This thesis will focus on the purposeful use of performance information. Recent work by Johansen et al. (2018) defines purposeful performance information use as *"the deliberate and instrumental use of performance information in decision-making in order to improve organizational operations"* (Johansen, Kim, and Zhu, 2018, p. 134). This definition is however only focused on the use of performance information in concrete decision making, which could be interpreted as limiting with regard to the daily operations of managers.

Another definition is provided by Kroll and Vogel (2014), in which they elaborate on the work of Moynihan (2009). In this work, purposeful performance information use is described as: *"using performance information to improve services through better informed decision making, goal-based learning, or sanctioning and rewarding."* (Kroll and Vogel, 2014, p. 463).

Performance information can be subdivided into routine performance information and non-routine performance information. Routine performance information is often systematically collected, based on ex-ante agreements, and measured regularly (Kroll, 2013b). Examples of routine performance information are financial forecasts, reports on internal key performance indicators (KPIs), and customer satisfaction ratings. These results are often generated from management information systems, which aim to give managers insight into precise and often numerical information (Mintzberg, 1972; Mckinnon and Bruns, 1992). Non-routine performance information can be identified by the information that is shared with managers in social interactions on an infrequent basis (Mintzberg, 1979; Kroll, 2013b). Examples of non-routine performance information are often more tacit by nature, such as information on employee support of certain programs or the feedback from front-line workers, which is shared personally.

This research will only focus on the purposeful use of routine performance information. This demarcation has been chosen because purposeful information use can be seen as the most desirable for organizations as opposed to passive, political, and perverse use. The insights on purposeful information use would thus be most beneficial for practitioners in the field. A similar argument can be made for routine information versus non-routine information. A focus on routine performance information has been chosen because this is easier to influence by practitioners than non-routine information, which has a nature that is opposed to control and predictability. Thereby, this study could provide greater value for practitioners in the field.

2.2.Factors influencing the degree of performance information use

The use of performance information can be explained by variables at different levels. Generally, a distinction in the literature is made between organizational, individual, and information level characteristics and their impact on performance information use (see Dimitrijevska-Markoski and French, 2019, p. 699). Factors outside of the organization which were found to have an impact on performance information use are also categorized as organizational variables. Tables 1, 2, and 3 give an overview of the variables that previous research found to have an impact on performance information use. These levels will be discussed separately.

2.2.1. Organizational level variables and performance information use

Most of the research on performance information use in the last two decades has focused on organizational level characteristics (Kroll, 2015), these factors will be discussed separately. First, research finds that the support of higher leadership (Kroll and Vogel, 2014; Moynihan and Ingraham, 2004; Moynihan and Pandey, 2010) has a positive impact on performance information use. The reasoning behind this effect is that lower-level managers are more likely to use performance information if upper management shows commitment to the use of performance information and likewise has clear expectations on this use regarding lower-level managers. Moreover, research indicates that an innovative organizational culture has a positive effect on performance information use (Van Dooren, Bouckeart and Halligan 2015; Moynihan and Pandey, 2010). An innovative culture is positively related to performance information use because people within an innovative organizational culture are relatively more willing to take risks and learn from their mistakes.

In such a setting, performance information is needed to facilitate these tendencies (Van Dooren and Van de Walle, 2010); Moynihan and Pandey, 2010; Lee, 2019). Similar reasoning can be used in the cases of performance-oriented cultures, in which performance information is needed to continuously improve performance (Van Dooren and Van de Walle, 2008; Moynihan and Pandey, 2010; Pandey, 2015). The institutionalization or maturity of the performance management system (Ho, 2006; Taylor, 2009) has a positive effect on performance information use. This refers to how long a certain information system has been in place and how well developed this system is in terms of technical capabilities. Information coming from systems with more technical capabilities is shown to be used more by management than relatively simpler management systems (Ho, 2006; Taylor, 2009).

Learning forums are also found to positively impact the use of performance information. Learning forums are regular meetings in which members of an organization discuss the progress on a certain topic. Similar to the reasoning of the concept of innovative culture, performance information is needed to have a ground for discussion. An explanatory factor closely related to these learning forums is administrative routines, which refers to the governance in which the information is discussed within the organization (Moynihan and Landuyt, 2009; Moynihan 2005). Other organizational factors which have been found to have an impact on performance information are the configuration of information sources, support capacity, and goal clarity. The configuration of information sources refers to the question from whom management receives the information. This could, for example, be from a staff member or people falling under their direct line. In contrast to the other factors on this level, findings on this variable are limited (see Petersen, 2019) and are therefor categorized as inconclusive.

Support capacity refers to the number of resources that staff has available to gather the information, this includes administrative flexibility, which refers to the degree that staff is able to provide more information on a specific set of organizational variables upon request (Johansen, Kim, and Zhu, 2018; Kwon and Jang, 2011; Moynihan and Pandey, 2010).

Goal clarity refers to the degree to which the goals of an organization are clear to employees within an organization (Moynihan, Pandey, and Wright, 2012; Van Helden et al., 2012). In an extension of this finding, other studies indicate that having organizational tasks which are easy to measure increases the likelihood of performance information use (Van Dooren, 2006; Moynihan and Lavertu, 2012). Last, actors in the direct environment of an organization also impact the degree of performance information used by management. The involvement of stakeholders outside of the organization has been shown to have a positive impact on performance information use (De Lancer and Holzer, 2001; Ho 2006; Melkers and Willoughby 2005; Yang and Hsieh, 2006; Lee, 2019). Similarly, a substantial amount of support from political leadership is associated with greater managerial use of performance information (Ammons and Rivenbank, 2005).

Table 1: *Organizational level impact factors on performance information use*

Variable	**Effect on PI use**	**Level of analysis**	**Sources**
Innovative organizational culture	Positive relationship	Organizational	Van Dooren and Van de Walle (2010); Moynihan and Pandey (2010); Lee (2019).
Goal clarity	Positive relationship	Organizational	Moynihan, Pandey, and Wright, (2012); Van Helden et al. (2012).
Support of higher management	Positive relationship	Organizational	Kroll and Vogel (2014); Moynihan and Ingraham (2004); Moynihan and Pandey, (2010); Yang and Hsieh (2006); Akbar, Pilcher, and Perrin (2012).
Result-oriented culture	Positive relationship	Organizational	Van Dooren, Bouckeart and Halligan (2015); Moynihan and Pandey (2010); Pandey (2015).
Management information system maturity	Positive relationship	Organizational	Berman and Wang (2000); Ho (2006); Taylor (2009).
Configuration of information sources	Inconclusive	Organizational	Petersen (2019).
Learning forums (incl. administrative routines)	Positive relationship	Organizational	Moynihan and Landuyt (2009); Moynihan (2005).
Staff support capacity (incl. administrative flexibility)	Positive relationship	Organizational	Johansen, Kim, and Zhu (2018); Kwon and Jang, (2011); Moynihan and Pandey (2010).
Involvement of external stakeholders in performance management setup	Positive relationship	Organizational	De Lancer and Holzer (2001); Ho (2006); Melkers and Willoughby (2005); Yang and Hsieh (2006); Moynihan and Pandey (2010); Lee, (2019).
Support from political leadership	Positive relationship	Organizational	Ammons and Rivenbank (2005).
Measurability of organizational tasks	Positive relationship	Organizational	Van Dooren (2006); Moynihan and Lavertu (2012).

2.2.2. Individual-level variables and performance information use

A second, less researched, stream of literature focuses on the impact of manager-level variables on the use of performance information, in the literature also referred to as individual-level factors. Though less impactful than organizational level factors, multiple authors argue that managerial level factors substantially impact performance information use, as managers have the implicit discretion regarding if and how they choose to use the information at hand (Van Dooren et al., 2015; Kroll, 2015).

First, managerial competency (Bourdeaux and Chikoto, 2008; Moynihan and Pandey, 2010). Managerial competency refers to the degree to which a manager is capable of understanding and interpreting the information presented. In essence, this refers to the often numerical and logical capabilities of a manager to understand the presented information. Second, expectations of the usefulness or self-efficacy are found to have a positive impact on performance information use (Kroll, 2014; Johansen et al., 2018). If a manager expects that performance information would be beneficial in the attainment of their goals, they would be more likely to use performance information. Third, the degree of public service motivation of the manager (Moynihan and Pandey, 2010; Kroll and Vogel, 2014). Research also finds that managers who have a relatively high sense of altruism, or 'other orientation', are also more likely to use performance information (Kroll and Vogel, 2014). The reasoning behind this relationship is that these managers would need performance information to track their social impact, and therefore be more likely to use it (Kroll and Vogel, 2014; Moynihan and Hawes, 2012). Fourthly, receptivity to feedback (Johansen et al., 2018), receptivity to feedback can be characterized by the degree to which someone engages in seeking, processing, owning, and using feedback (London and Smither, 2002).

Research by Johansen et al. (2018) finds that managers with higher scores on receptivity to feedback are more inclined to use performance information, because they view feedback as instrumental in reaching their goals. Moreover, managerial attitudes towards performance management (Kroll, 2014; Taylor, 2011) are found to affect performance information used by managers. If a manager has negative views on performance management, regardless of the characteristics of the information or the environment, this will negatively impact performance information use (Kroll, 2014; Taylor, 2011).

Furthermore, networking behavior refers to the degree to which a manager engages with stakeholders outside of the organization. Managers who are more actively engaged in networks outside an organization are more likely to use performance information (Moynihan and Hawes, 2012). Last, discretion level or flexibility refers to the degree to which managers have the 'space' to effectively manage. Research finds that managers who have more discretion or flexibility in their position are more likely to use performance information (Moynihan, 2015; Nielsen, 2014b). Information ownership refers to the degree to which a manager understands performance information to be of their 'own'. The relationship between managerial information ownership and performance information use was found to be statistically significant in the research of Kroll (2014). However, only Kroll (2014) performed empirical research into the relationship between performance information use. A further explanation of the concept and the relationship between this concept and performance information use will be given under hypotheses 4 and 5, in paragraph 2.6.

Other factors which are found to have an impact on performance information are more demographic or descriptive of nature, such as years of experience, position within the organization and educational level. It must be noted that these factors are less impactful than the other managerial factors (Kroll, 2014, p. 474). Furthermore, the findings on these demographic are often inconclusive or wielded insignificant results (also see Kroll, 2015 for discussion).

Table 2: *Individual-level impact factors on performance information use*

Variables	**Effect on PI use**	**Level of analysis**	**Sources**
Technical knowledge on management information system	Positive relationship	Individual	Moynihan and Pandey (2010); Akbar, Pilcher, and Perrin (2012); Yang and Hsieh (2007).
Public service motivation of manager	Positive relationship	Individual	Moynihan and Pandey, (2010); Kroll, (2014); Kroll and Vogel (2014).
Information ownership	Inconclusive	Individual	Kroll (2012).
General attitudes towards performance management	Positive relationship	Individual	Kroll (2014); Taylor (2011).
Self-efficacy	Positive relationship	Individual	Van Dooren (2008); Johansen et al., (2018).
Feedback receptivity	Positive relationship	Individual	Johansen et al. (2018).
Discretion level of manager	Positive relationship	Individual	Moynihan and Pandey (2010); Moynihan and Lavertu (2012); Moynihan and Landuyt (2009); Nielsen (2014b).
Networking behavior	Positive relationship	Individual	Kroll (2013); Moynihan and Hawes (2012).
Job Experience	Inconclusive	Individual	Positive relationship: Moynihan and Pandey (2010); Taylor (2011). No relationship: Dull (2009); Moynihan and Hawes (2012).
Hierarchical position	Inconclusive	Individual	Higher position has negative relationship in Taylor (2011). Positive relationship in Moynihan and Hawes, (2012); De Lancer et al., (2001).
Educational level	Inconclusive	Individual	Higher education positive in Moynihan and Hawes (2012); Lee (2019). No effect in Askim, Johnsen and Christophersen (2008).

2.2.3. Information level variables and performance information use

The third level of analysis is on the level of the information itself and the effect hereof on performance information use. In general, the research on this level compared to the other levels of analysis is limited. However, this does not mean that information level factors do not have an impact on performance information use. The method in which performance information is presented matters for purposeful use of the information (Moynihan, 2015, p. 55).

First, the positive relationship between information availability and the degree of performance information use has been established in the research of Moynihan and Pandey (2010). Building on the findings of Ammons and Rivenbank (2008), they find a robust relationship between the presence of performance information, in this case in the form of benchmarks and customer satisfaction ratings, and managers performance information use. Results on data quality, validity, and reliability are similar; performance information needs to be valid and reliable in order to be used by management (Behn, 2003; Ammons and Rivenbank, 2008).

Another robust finding from the literature is that information that is framed negatively tends to get more attention than information that is framed positively. This phenomenon is known as negativity bias (first introduced by Kahneman and Tversky, 1979). In public administration research, this proposition has been tested on public managers and has been found to be valid (Olsen et al., 2020). In other words, managers in public organizations are more likely to use performance information if this information is framed negatively as opposed to framing positively (Nielsen, 2014a; Olsen, et al., 2020).

A more contemporary stream of research has focused on the historical and social reference points which could be accompanied in the presentation of performance information. In the case of performance information, historical reference points would give insight into the score of a specific program in the past. Social reference points would give insight into the performance of peers regarding a similar service at the same point in time. Within this stream of literature, it is argued these reference points impact the likelihood of management of the use the performance information. Empirical results on this topic suggest that managers in public sector organizations are especially sensitive to information indicating social performance gaps. This is less the case for historical performance gaps. For both of the reference points, results indicate that the larger the gap, the likelier the recipient would be to use the information (Nielsen, 2014a; Zhu and Rutherford, 2019).

Little research has been conducted into the effect of different kinds of information measures on performance information use. The literature on organizational management distinguishes between input, efficiency, output, and outcome measures. Some research on this topic has been descriptive, for example, Julnes and Holzer (2001) concluded that efficiency and outcome measures were underdeveloped and less often in public organizations than output measures. Research that directly investigates the relationship between different types of measurement and subsequently purposeful information use by managers is scarce and indecisive. The literature and the contradictions in the literature will be further discussed with regard to hypotheses 1 and 2 in paragraph 2.4. Similar arguments can be made with regard to information richness. This element has been found to be impactful in the studies into politicians by Ter Bogt (2004) and Buylen and Christiaens (2015), however has not yet been tested with regard to managers.

Table 3: *Information level impact factors on performance information use*

Variables	**Effect on PI use**	**Level of analysis**	**Sources**
Data quality, reliability, and validity	Positive relationship.	Information	Behn (2003); Ammons and Rivenbark (2008); Van Dooren et al. (2010); Kroll (2013).
Information availability	Positive relationship.	Information	Henderson and Bromberg (2015); Moynihan and Pandey (2010); Ammons and Rivenbank (2008).
Negative framing of information	Positive relationship.	Information	Nielsen (2014a); Olsen et al. (2020).
Historical performance information gaps	Positive relationship (e.g., a larger gap related to the greater likeliness of use).	Information	Rutherford and Zhu, (2019); Webeck and Nicholson-Crotty (2019).
Social performance information gaps	Positive relationship (e.g., a larger gap related to the greater likeliness of use).	Information	Rutherford and Zhu (2019); Webeck and Nicholson-Crotty (2019).
Various information measures (e.g., input, efficiency, output, outcome)	Inconclusive.	Information	Moynihan (2015); Rajala et al. (2017); Wang (2007); Sejati (2017); Talbot (2007).
Information richness	Inconclusive	Information	Ter Bogt (2004); Daft and Lengel (1986, 1990)[1].

[1] The works of Daft and Lengel (1986. 1990) are included in the sources given the contribution to the development of the concept. However, compared to the other sources in this literature review, they did not validate this concept in public organizations.

2.3. Gaps in the literature

Based on this literature review, several gaps in the literature can be identified. First, it can be argued from the review that there is no research needed on organizational level factors, as these factors are already well researched and verified (Kroll, 2015). In contrast, as mentioned in the introduction, more academic attention would be needed on managerial and especially information level factors to advance the knowledge on managers' reasons for performance information use. These levels were also explicitly noted as suggestions for further research in the literature review by Kroll (2015), whereby noted that the domain of managerial level factors is further developed than the domain of information level factors. Hypotheses 1 to 3 will be focused on information level factors, whereas hypotheses 4 and 5 are concerned with managerial level factors. In general, this thesis will focus on the concepts which are both presumed to have a substantial impact on performance information use and whereof the findings are inconclusive. Factors that are inconclusive but were also found to have no substantial impact on performance information use, such as job experience and educational level, will not be further examined in this research.

First, this literature review found that the least academic research thus far has been conducted into information-level variables. While information level concepts such as data quality and negativity bias are already well researched, other concepts under this level have not yet received enough scholarly attention. As mentioned in the literature review, research on the effects of different types of measures on the use of performance information is inconclusive. The literature and expectations on this concept will be further discussed under hypotheses 1 and 2.

Second, this research will focus on the variable of information richness as an explanatory factor for performance information use. This variable originates from studies in private sector organizations (Daft and Lengel, 1986, 1990). As for public organizations, this concept has only been studied with regard to politicians (Ter Bogt, 2004; Buylen and Christiaens, 2015), but has not been tested with regard to middle managers. This research will contribute to the development of knowledge on this topic by verifying the impact of this factor in the case of middle managers. This relationship will be further discussed under hypothesis 3.

Last, within the domain of managerial level factors, this research will focus on factor *information ownership*. This variable has been chosen because it was found to be a *promising impact factor* in the literature review by Kroll (2015). This means that the variable was empirically found to have a substantial impact on performance information use by managers in the public sector, as well as being relatively understudied academically. Despite this categorization, this concept has not received scholarly attention since the original publication, while other managerial factors such as self-efficacy and receptivity to feedback have (see Johansen et al., 2018). Building on this literature review, this is the only factor within the domain of manager-level impact factors which is both impactful and not yet fully researched. Hypotheses 4 and 5 give a further discussion on the theoretical expectations with regard to the concept of information ownership.

2.4. Information measures

The literature on organizational control and performance information, as well general management literature, generally distinguishes between input, process, output, and outcome measures (Bandy, 2015, chapter 7). Input measures refer to the resources that are used to produce certain services or products. This information is generally easy to assemble and is often reported in terms of financial budgets or full-time equivalents (FTE's), (Bandy, 2015, p. 257). Second, process, or efficiency measures, refer to the information that is provided to give insight into how and with which efficiency input resources are turned into output. These measures could refer to a metric covering the whole transformation process, or only a subdomain. Examples of efficiency measures are production time or average queueing time (Bandy, 2015, p. 257-258).

Third, output measures refer to the services or products that are delivered by the organization. In contrast to the two kinds of measures named before, output measures are more diverse and dependent on the task of an organization. For example, in the case of hospitals, the total number of operations within a month could be measured. Comparably, street lighting services might want to have insight into the total number of working streetlights. In general, output measures in the public sector are measured in non-financial terms (Bandy, 2015, p. 258). Last, outcome measures refer to the effect of the service of the organization on citizens. Therefore, it could be argued that outcome measures refer to the ultimate organizational goals of the organization (OECD, 2009, p.10). For example, a public health organization would be interested in the total life expectancy of citizens as an outcome measurement. Comparably, a public safety organization would be interested in the subjective feeling of safety by citizens (Bandy, 2015, p. 260).

Overall, organizations have no issue in the coupling between input factors and output factors. For example, an increase in the financial budget for a service would, *ceteris paribus*, naturally result in a higher output of said service. However, the relationship between output measures and outcome measures is more complicated. For example, there might be a time delay between the improvement of the output factors and the score on the outcome measures. Moreover, outcome measures are generally more difficult to influence. For example, in the case of general public health, changes in the output by a public health organization might have little effect on the outcome due to the great number of factors that influence the outcome (OECD, 2009). As mentioned, the research on the impact of these different types of measures on performance information use is inconclusive. Generally, there is a distinction made between input, efficiency, and output measures on the one hand, and outcome measures on the other.

Studies by Talbot (2007), Rajala, Laihonen and Vakkuri (2017), Sejati (2017), and Wang (2007) found that input, efficiency, and output measures are more often used than outcome measures in government organizations. The study by Sejati (2017) found that managers mainly used information on output measures, in this research the completion of tasks, for monitoring and evaluating purposes as opposed to information on the outcome measures (Sejati, 2017, p. 2). According to the studies by Rajala et al. (2017) and Norman (2007) a core reason for the prevalence of the use of these measures over outcome measures could lie within the issue of controllability of the measures. Input, efficiency, and output measures are generally well influenceable by managers in public organizations. For example, a manager could ask for a higher financial budget (input) or implement process improvements (efficiency), which would change the score of the measure.

As mentioned, the quantity and quality of the output of an organization (or organizational sub-department) are only dependent on input and efficiency factors. This is not the case for outcome measures, which are often influenced by more factors than solely the output of an organization (Irwin, 1996). In conclusion, this line of research argues that managers tend to use information on input, efficiency, or output measures over information on outcome measures, as these measures are controllable as compared to outcome measures. Based on this logic, the following hypothesis can be derived.

Hypothesis 1: Middle managers are more likely to use performance information if this contains information on input, process, or output measures as opposed to outcome measures.

In contrast, in an experimental study, Moynihan (2015) found that practitioners were more likely to purposefully use performance information when it contained information on outcome measures as compared to output measures. Moreover, Ammons and Rivenbank (2008) argue that outcome indicators are favored by public managers as the information on the effect of public services would be more 'inspirational' as compared to raw information on input or output measures (2008, p. 307-308). This argument is further supported by the empirical work of Wang (2007), in this work, it is found that public managers favor outcome measures over output measures. According to Wang (2007, p. 815-817), public managers value outcome measures because it gives insight into the ultimate organizational goals and the effects of service delivery, which is compared to input, efficiency, and output measures, that do not have this characteristic. In conclusion, it can be stated that public managers prefer performance information on outcome measures as these give insight into the effect of the services being delivered for the customers and the greater society. Based on this logic the following hypothesis is formulated.

Hypothesis 2: Middle managers are more likely to use performance information if this contains information on outcome measures as opposed to input, efficiency, or output measures.

2.5. Information richness

The second information level factor that will be investigated is *information richness*. The concept of information richness was firstly introduced in the work of Daft and Lengel (1986). In their primary work, this concept was defined as: *"the ability of information to change understanding within a time interval."* (Daft and Lengel, 1986, p. 560). In later work by Daft and Lengel, the term information richness was used to describe the *"potential information-carrying capacity of data"* (Daft and Lengel, 1990, p. 248). In conclusion, it can be stated that information richness refers to the degree to which new insights are generated for the recipients of the information.

Few studies in the public sector directly focus on the concept of information richness. A study on the use of performance information by Dutch Alderman (Ter Bogt, 2004), found that they were more likely to use performance information when this information was provided to them in a rich and interpreted manner as opposed to only receiving the raw data. The reason for this greater use of rich information was due to the dynamic and uncertain political context the aldermen operated in (Ter Bogt, 2004). In the Flemish context, Buylen and Christiaens (2015) f ound that local councilors were more likely to use financial information if this included a verbal explanation by either the responsible alderman or a senior financial manager as compared to only the numerical information.

Similarly, Hatry (2008) argues that the inclusion of *"basic analysis (...) of data to put it into meaningful form"* (Hatry, 2008, p. 228) and an understandable presentation of this analysis in the performance information is a prerequisite of performance information use in public organizations. (2008, p. 228-229). Although the reason for this greater use is not explicitly mentioned in the work of Hatry (2008) it is implied that a plausible reason for the greater use of information which contains in-depth commentary is that this information is needed for managerial decision making. Managers operate in an environment which requires them to make quick decisions and implement timely actions (Kirk, 2002). In order to do so, managers are in need of rich information, in other words, information that includes in-depth commentary and explanation to make the decisions. This reasoning by Hatry (2008) is however not empirically substantiated. Therefore, this research will empirically investigate this proposition.

In conclusion, it can be stated that previous research found that in-depth information in the form of commentary or explanation is positively impacting performance information use by politicians. It is expected that this is also the case for public middle-managers. Based on this logic, the following hypothesis can be derived.

Hypothesis 3: Middle managers are more likely to use performance information when this includes in-depth commentary or explanation.

2.6. Information ownership

Studies that were undertaken by Kroll (2012 and 2015) conclude on the argument that *information ownership* is a promising and relatively understudied impact factor regarding performance information use.

Although there is no clear definition given of information ownership in the original work of Kroll (2012), it can best be understood as the identification of a manager *vis-a-vis* certain information, meaning that they see the information in question as their own. It must be noted that this concept should not be mistaken with taking responsibility for the content of the information, e.g., as in a manager taking responsibility for low performance, which is indicated by the information (Kroll, 2012, p. 26). Despite this empirically demonstrated importance of ownership in explaining performance information use, the antecedents of information ownership for middle managers are not fully uncovered through academic research, as put by Alexander Kroll: *"we do not know yet why some managers show more ownership than others"* (Kroll, 2012, p. 103).

There are, however, studies into concepts similar to information ownership regarding other groups within public organizations. Research by Petersen (2019) found that the origin of the information, either vertically or horizontally, mattered for street-level bureaucrats regarding their purposeful use of performance information. It was found that information which was received vertically, i.e., from hierarchical superiors, was less likely to be used than information, which was received horizontally, i.e., from colleagues in learning forums or information which is self-sourced. (Petersen, 2019, p. 287).

The logic behind the process can, according to Petersen, be partly explained by group identification. This means that the front-line employees identify more with their own group, i.e., their direct peers, than with upper management which is seen as an entity outside of their group (Petersen, 2019).

In this research, it is hypothesized that this logic also applies to middle managers in public organizations. More specifically, it is expected that middle-managers are more likely to use performance information if this information is self-sourced, developed and provided by employees from their own department. As opposed to information that is developed and provided outside of their own department. Hypothesis 4 reflects this logic.

Hypothesis 4: The degree to which a middle manager recognizes the information's origin as one of their own, or their departments will, through ownership, have a positive effect on the use of performance information.

Building on his earlier research, Kroll (2015, p. 478) provides the possibility that the early involvement of managers in the performance measurement set up would have a positive impact on their use of performance information. In other words, if managers involved themselves in the performance measurement process, they would be more inclined to take ownership of the information and, as a result, they would be more likely to use the performance information when it comes to their desk at the end of the process. Specific examples of early managerial involvement would include actions such as participation in KPI selection process, the data measurement selection, data validation process and so forth. Based on this logic, the following hypothesis is derived.

Hypothesis 5: The degree to which a middle manager was involved with the set-up of performance management will, through information ownership, have a positive effect on the use of performance information.

3. Methodology

This chapter will discuss and justify the case selection and research methods of this study. First, the case of the Corporate Office of the DG of Public Works and Water Management will be introduced. This paragraph will also include the scope of analysis. Following, the methods of data collection and analysis will be discussed. The paragraph on data collection includes remarks on the use of in-depth interviews as the main data collection method. The paragraph on data analysis contains a discussion of the coding process and methods of analysis. This chapter will conclude with remarks on the reliability, validity, and ethical considerations of this study.

3.1. General research design and case selection

This study takes a deductive approach over an inductive approach because there is already a considerable amount of theoretical work on performance information use. Although it is argued that the theoretical work on managerial and information level factors is relatively more limited than organizational level factors, there is no plausible ground to take an inductive research approach. Moreover, the research approach of this thesis is explanatory, as opposed to a descriptive or exploratory. This approach was chosen because a solely descriptive study would not contribute to the development of academic knowledge on the topic. Similarly, given the state of knowledge on performance information use, a purely exploratory research design would also not be justifiable. Concluding, a deductive and explanatory approach is most suited, given the research question of this paper.

The research will be performed with managers within the Corporate Office of the DG of Public Works and Water Management. As such, this study forms a single case study. Babbie (2009) and Blatter and Haverland (2012) argue that this research design is best suited to research the motives and behavior of specific actors, which is fitting for the research goals of this study. Moreover, Toshkov (2016, Chapter 10) argues that a single case design advances the possibility of a deep understanding between variables, which is needed for this research in the light of the discussed hypotheses.

3.1.1. Qualitative methodology

Given the aims of the study to understand the motives for the use of performance information by middle managers, a qualitative approach is most suited. A quantitative approach, for example through a survey among managers, is more common in studies on performance information use (see Kroll, 2015, p. 145 for discussion). However, this would not allow the researcher to make an in-depth analysis of the data, which is the goal of this research. As quantitative studies are the majority in research on performance information use, this study could provide new insights into the topic by collecting data from interviews. This line of reasoning was also explicitly noted in the work of Frank and D'Souza (2004, p. 713) in which they argue that surveys executed via email are more likely to induce an overestimation of the degree of performance information used by the manager. Therefore, it is argued that open-ended questionnaires and interviews would be more suitable to get a rich understanding of performance information use (Frank and D'Souza, 2004, p. 713).

3.1.2. Case selection and justification

This study will be performed within the Dutch Department of Infrastructure and Water Management (I&W). I&W is responsible for the maintenance and improvement of the infrastructure and the environment of the Netherlands. As such, the department delivers services aimed at the maintenance of the quality of the roads, waterways, rail works, and airways. I&W consists of three main sections: policy, implementation, and inspection (Ministerie van Infrastructuur en Waterstaat, 2019).

At the basic level, the policy departments are responsible for the development of policy on topics such as air quality, road safety, and flood risk management. The Directorate General of Public Works and Water Management (Dutch: *Rijkswaterstaat*, hereafter: DGPW) is the main executive agency of I&W and is responsible for the actual maintenance of the networks of the national roads, waterway networks, and water systems. Lastly, several departments within I&W are focused on inspection of the roads, waterways, rail works, and airways (Ministerie van Infrastructuur en Waterstaat, 2019). The policy designing departments and inspection departments are not included in the scope of this research.

The DGPW can be subdivided into regional and national sub-departments. The regional units are responsible for the monitoring of the development and maintenance of the roads, waterway networks, and water systems within their region. The national sub-departments have more general tasks, ranging from the actual execution of the highway maintenance to the national information provision. This study will be performed within the Corporate Office (CO) of the DGPW, which is one of the national sub-departments. The CO is the Shared Service Organization (SSO), and in essence, the business operations department of DGPW.

Moreover, as an SSO, the CO does deliver some services to public organizations outside of DGPW. However, these services are marginal in comparison to the magnitude of services being delivered to the DGPW.

The CO can be subdivided into three directories and two units. The Directorate of Information, Facility Management and Finance (DiFF), the directorate of Communication, Human Resources Management, and Legal Affairs (CHL), the directorate of Operational Management and Procurement (OM&P), the unit for Customer and Services (C&S), and lastly, the research and development department of the DGPW, NOVA, which also is part of the CO. However, this department rather operates as a separate unit within the CO in terms of reporting structure and the chain of command.

The DGPW, and more specifically the CO, was chosen because performance information is well established within the organization (Rijkswaterstaat, 2019). With exception of the head of the staff department, all middle managers receive and are ought to use the information on their financial budget and the state of the human resources within their department. Middle managers can receive HR and financial information from multiple sources. Managers can (1) look up the information themselves in the systems (P-Direkt for HR, SAP for finance), (2) receive this information from people within their own department, or (3) receive this information from staff members outside of their own department. Other than information on HR and finance, the information managers receive is dependable on the programs within their department. For example, the head of the procurement office will receive information on procurement-related issues. For coordinators, one level of management beneath middle managers, this configuration is different. In their case, it is not self-evident that they receive HR and financial information. However, they do in general have more information on the programs at their disposal.

The scope of this study includes both middle-managers and coordinators. In essence, anyone who holds a coordinating position over a certain team or multiple teams is considered eligible for this research. Considering the differences in programs, certain managers might work with a large financial budget and a low number of employees, and vice versa. This configuration of information provision within the organization allows for a sound analysis of the dependent variable. The qualitative and single case character of study allows for investigation of the causal mechanisms between the variables.

3.2. Data collection

The sole method of data collection for this study is through in-depth, one-on-one interviews. For the reasons stated above, this approach was preferred to a quantitative approach. In depth interviews are seen as most fitting since the aim of the research is to gain insight into the motives of middle managers to use performance information. More specifically, this study used semi-structured interviews, which allows the interviewer to ask follow-up questions if needed. Semi-structured interviews are seen as beneficial over completely structured interviews as the latter does not provide the freedom to ask follow-up questions (Heldens and Reysoo, 2005, p. 112). Although the latter does increase the replicability of the research, a semi-structured interview is chosen because the benefits of asking follow-up are thought to prevail, given the presumed richness of the answers to these follow-up questions.

Furthermore, semi-structured interviews are also chosen over completely open interviews, as these do not provide a framework for topics, and thus would be more suited for inductive research (Gall, Gall, and Borg, 2007), which is not the case for this research.

The design of the interview guide followed the prescriptions on this matter as provided in the academic work by Heldens and Reysoo (2005). As for the interviewing process, this research followed the guidelines as prescribed by McNamara (1999) which include guidelines such as explaining the purpose of the interview, explaining the format, and addressing the terms of confidentiality (McNamara, 1999, Chapter 1).

Due to the COVID-19 pandemic, virtually every Dutch civil servant received the request to work from home. As an effect, other qualitative data collection methods, such as focus-group discussion sessions or observations, were not possible. The implication this has on the internal validity of the research will be discussed in paragraph 3.4.

Interviews were held until the point of theoretical saturation, in other words, the point where no additional information or themes were introduced by the respondents in the interviews. After the seventh interview, it became apparent that no additional themes were gathered relative to the previous interviews. This number of seven is slightly above the minimum number of six interviews which, according to the meta-analysis of Guest, Bunce, and Johnson (2006) into theoretical saturation from interviews, is needed in qualitative research.

3.2.1. Selection of the respondents

Given the robust findings of previous studies that demographic factors such as gender and age have an insignificant effect on performance information use (Kroll, 2015; Lee, 2019), no selection based on these criteria was made. The only sampling criteria used for this research were: (1) the position of the interviewee as a middle manager and (2) the presence of performance information linked to this role.

No interviews were made with employees from the department NOVA (research and development) within the CO because this department, from a statutory point of view, has no middle managers. Furthermore, the head and coordinators within the operations management department were left out of consideration. This was done because the operations management department is a staff department and thus has no financial and program-related routine performance information, making it ineligible given selection criteria two. Based on this list of middle managers (excluding NOVA and operations management), participants were selected at random via the random function in Excel. The invitation to cooperate in the research was sent via email to multiple managers in the organization. Based on these responses, interviews were planned. The interview guide which was used is presented in appendix A. Given the national background of the interviewer and the interviewees, all interviews were held in Dutch. Logically, the transcripts of the interviews are also in Dutch. For anonymity purposes, the transcripts of the interviews will not be published.

The interviews were scheduled to last between 45 minutes and one hour. In reality, the interviews lasted from 30 minutes at the minimum to 50 minutes at the maximum. Due to the restrictions related to the COVID-19 pandemic, in-person interviews were not allowed. Microsoft (MS) Teams software was used to conduct the interviews, as this is the standard within I&W and the DGPW. With the permission of the managers, all the audio from the interviews was recorded. Table 4 gives descriptive information on the interviews. This research aimed to provide anonymity with regard to the results, therefore the names of the interviewees are not given, only their position as either a coordinator or head of department.

Table 4: *Descriptive information on the interviews*

Interview number	**Functional title of interviewee**	**Duration of the interview**	**Location**
1.	Head of department 1	30 minutes	MS Teams
2.	Coordinator of sub-domain 1	50 minutes	MS Teams
3.	Head of department 2	45 minutes	MS Teams
4.	Head of department 3	40 minutes	MS Teams
5.	Head of department 4	35 minutes	MS Teams
6.	Head of department 5	35 minutes	MS Teams
7.	Head of department 6	40 minutes	MS Teams

3.3. Methods of analysis

All of the interviews were transcribed *verbatim*. Using the transcriptions of the interviews, the data was analyzed deductively. That is, in the transcript, codes were given to the main variables based on the literature. Subsequently, relationships between these codes were identified. That is, in the transcript codes were given to the main variables based on the literature. Subsequently, relationships between these codes were identified. Given the deductive design of this study, the main variables of interest are operationalized, as seen in table 5. Some of the operationalizations are based on literature such as those mentioned in the review, other operationalizations are the work of the author of this study. In general, the concepts are broadly operationalized, especially in the case of the various information types. This is done because of the variety of examples within each of the information measures, which would be too extensive to address in this paragraph.

Table 5: *Concepts and indicators used in the study.*

Concept		Indicator
Purposeful information use		- Using information deliberately to steer organizational programs, services, or products (based on Johansen et al., 2018; Moynihan, 2009).
Information Types	Input information	- Any information that refers to the resources that an organization uses (Bandy, 2015, p. 257-258).
	Efficiency information	- Any information that refers to the activities and productivity within an organization or organizational sub-unit (Bandy, 2015, p. 257-258).
	Output information	- Any information regarding the products or services being delivered by an organization or organizational sub-unit (Bandy, 2015, p. 257-258).
	Outcome information	- Any information that is linked to the effect of organizational outputs (Bandy, 2015, p. 257-258).
	Controllability of metrics within the information	- Statements regarding the direct influence or influenceability regarding the metrics (Rajala et al., 2017).
	Inspirationally of the information	- Statements regarding the linking of the metrics to the ultimate organizational goals (Wang, 2017).
Information richness		- The degree to which performance information provides deep understanding (based on Daft and Lengel, 1986, 1990).
	Analysis	- Verbal or written explanation or analysis accompanying the information (based on Hatry, 2008).
Information ownership		- The identification of a manager regarding the information as something of their own (Kroll, 2013, 2014).
	Information origin	- Obtaining information through people from their own department or themselves (based on Petersen, 2019). - Obtaining information from staff members outside of their own department (based on Petersen, 2019).
	Early involvement	- Participation of the manager in the data selection process (based on Kroll, 2012. - Participation of the manager in data verification process (based on Kroll, 2012).

This study heeled the thematic analysis guidelines as provided by Braun and Clarke (2006, p. 87), see table 6. The process as prescribed by Braun and Clarke (2006) allows for deductive analysis.

Table 6: *Prescription for coding and thematic analysis (Braun and Clarke 2006, p. 87).*

Name of the phase	**Description of the actions**
Familiarizing yourself with the data	Transcribing the data collected through semi-structured interviews. Reading and re-reading the data. noting down initial ideas
Generating initial codes	Generating initial codes: Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
Searching for themes	Searching for themes: Collating codes into potential themes, gathering all data relevant to each potential theme.
Reviewing themes	Reviewing themes: Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
Defining and naming themes	Defining and naming themes: Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
Producing the report	Producing the report: The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

3.4.Reliability, validity, and ethical considerations

This paragraph will discuss the reliability, internal and external validity, and ethical considerations of this research, as these are often seen as the most important quality factors in qualitative research (Patton, 2001). As for reliability, the following considerations were made. First, this research used a semi-structured interview approach over a completely open interview approach, which increases the replicability of the research. Based on this reasoning, it could be argued that a completely structured interview method would be better, however, this would come at a loss for the richness of the data.

Second, this chapter was transparent about the data collection, data analysis, and the coding strategy, specifically referring to the work of Braun and Clarke (2006). This also increases the replicability of the research. Last, the transcripts were made *verbatim*, the systematic coding of these transcripts is beneficial to the explicitness of the study and thereby the replicability.

As for the validity of the results, there are the following considerations. First, when designing a qualitative study, there would ideally be the use of triangulation, in other words, the use of multiple methods of data collection (Patton, 2001). Other commonly used methods within qualitative studies are document analysis, focus group sessions, and observations (Patton, 2001). Because of COVID-19 related restrictions, observation of middle-managers and their use of performance information is not possible. Furthermore, document analysis would not be relevant for answering the research question, as the focus of the research is on understanding the middle manager's point of view and motives. Last, focus group sessions are not relevant because these are oriented toward understanding group processes, which is not relevant for this study. As a result, the internal validity of the research is lower than when other methods could be used.

The internal validity of this research is reinforced by the interview methods of this study. This allows for uncovering of the causal mechanisms. Furthermore, the author of this study sets out to present deviant results and possible causes to these results in the analysis. This also increases the internal validity of the study. As for external validity, this research took the steps of random selection to strengthen this component. However, as for the generalizability of the results, the results of the study can only be generalized to other middle managers within the DGPW and I&W. This is due to the qualitative data collection and single case design of this study.

The results can not automatically be generalized to other middle managers in public organizations. This however was not the goal of this research, which according to Bryman (2008) is common in qualitative research.

Last, it must be noted that the researcher holds a formal function as a civil servant within the CO, specifically in the operational management department. This is beneficial in terms of the access to respondents, in this case, heads of departments and coordinators, who would otherwise be difficult to convince to participate. With this dual position as researcher and simultaneously as a civil servant, there could, at least in theory, be a conflict of interest. It is therefore important to note that no entity within the CO influenced the selection of the participants, nor the formulation of the research questions and that the managers with the operational management department were left out of consideration for the interviews.

4. Results and analysis

This chapter will descriptively present the results of the interviews, as well as make an analysis of these results with regard to the hypotheses. First, the dependent variable of performance information use will be discussed. Thereafter, the results of the interviews will be discussed in the framework of the hypothesis.

4.1. Descriptive results on purposeful information use

The discussion of the dependent variable will follow the same framework as in the literature review. First, the results on the use of the information will be discussed, subsequently, a description will be given on the various forms of information that managers have at their disposal.

4.1.1. Results on purposeful information use

The respondents of this study roughly interpreted performance information as 'information that is needed in order to steer and gain an understanding of my department' (Interview 1,2,4,5) or 'information on everything that I am responsible for as head of the department' (Interview 3). In addition, when asked what the term 'management information'[2] meant to them, all respondents indicated that the component of *steering* was the distinguishing factor as compared to other forms of information. In other words, the information at hand has to help the managers to steer their department, otherwise, they would not classify it as performance information. Based on the interviews, the process towards purposeful information use can be understood as a tripartite comprising receiving, understanding, and steering (interviews 1,3,5).

[2] The terms 'performance information' would translate to Dutch be 'prestatieinformatie'. This term is uncommon as compared to the term 'managementinformatie' meaning 'management information'. Therefore, respondents were asked on 'managementinformatie'.

Upon receiving the information, respondents indicated that, in most cases, they use the performance information at hand as a starting point for a short analysis or research (when this is not already included upon delivery of the information). This differs with the information at hand. For example, respondents express that they themselves can easily interpret and act on information on the state of the leave hours within their department. Put simply, if they notice a surplus of outstanding leave hours, they will take targeted action. However, when the information refers to issues more complex or long term, respondents express that they use the information as an indicator from which they initiate further analysis (Interview 1,3,5,6). From the perspective of the managers, this takes the form of asking questions, either in bilateral meetings with specific employees or in a group meeting. For example, when faced with a numerical indication that the progress on the production was lacking, respondents used this information to ask questions to the responsible employee such as: *"What is behind it? Is it a lack of resources in which I could play a role? Or is it something else?* (Interview, 5). Another respondent indicated that asking similar questions in a group meeting was a method of uncovering the reasons behind the plain information *"One method is to discuss it in group meetings, and ask questions such as 'what is going on here?' or 'how are you doing?', this is what I am reading out of the numerical information, what is your experience of this? And then have a conversation on it"* (Interview, 1). In a broader sense, another respondent reflected on this phase of the tripartite: "*If I look at the specific monthly information then you can see like, we did not reach our targets on the lead times, then you take a closer look. Okay, we ascertain this information. Where is our own influence? Where do we need our partners and how are we going to improve?"* (Interview, 6).

This tendency of the respondents to gather further information on the causes or stories behind the information is a logical result of the way routine performance information is initially gathered, which usually only contains numerical information.

After having an understanding of the causes underneath the information and the context hereof, results from the interviews indicate that managers use performance information as a ground to have dialogues with the employees within their own department, their direct supervisor, or partners in the programs. Specific interventions that take place in these dialogues include: making new agreements, pointing out old agreements which are not complied with, adjusting the financial forecasts, organizing specific knowledge sessions to raise awareness, discussing the issue in a team meeting, and lastly reprioritizing and reallocating capacity and assets (Interview 1 to 7). In essence, the steering based on the performance information of the middle-managers take place during these dialogues.

In these manners, respondents perform their steering functions in relationship to the received performance information. As such, the way the managers of this study use performance information falls under the indicator of the concept as mentioned in table 4: *"Using information deliberately to steer organizational programs, services, or products"*. Results do not indicate that managers use different strategies with regard to the different types of information. In other words, the actions that flow out of the use of input information are similar to the type of actions that flow out of other types of information.

4.1.2. Results on types of information

When asked on which types of information managers have at their disposal, respondents initially made references to both routine and non-routine performance information. According to the respondents, the received non-routine performance information often had to do with risks in the production and the subsequent management of these risks. Given the aim of the study on routine performance information, the subsequent focus was on routine information.

The types of routine information that managers have at their disposal can be subdivided into three categories, these are HR, finance, and program-related performance information. All respondents had, to varying degrees, access to these types of information. On a separate occasion, a respondent indicated that the program-specific information was under development, and as a result, the routine information coming from the programs was limited. Examples of HR information are figures on sickness leave, staffing of their department, and holiday leave hours within their department. As for financial information, this includes information on the budgets for the products or services within their department and the financial forecasts on these matters. It should be noted that HR information on staffing is often expressed in financial terms, e.g., how much financial budget is allocated as personnel costs, this is interpreted as HR information. As such, HR and financial information fall under input information. Last, all managers received some form of program-specific information. This often included the progress, results, outcomes, and risks on certain sub-programs within the department or goals of the department. This can be interpreted as output and outcome types of information. Some managers had efficiency information at their disposal (interview 3,6,7), although this was less frequent.

4.2. Information measures and information use

4.2.1. Findings out of the interviews

Results from the interviews indicate that all managers regularly use information on input measures. Moreover, in general, managers indicate to have a preference and more often use performance information regarding output measures, as compared to efficiency and outcome measures. However, some respondents indicated that they put more emphasis on efficiency and outcome measures. When it comes to the variety of uses with regard to efficiency, output, and outcome measures, this research finds that the use of performance information with regard to the different information types is dependent on the *tasks and direct context* that the manager and the department operate in. Within this context, the degree of *internal* and *external attention* plays an important role. Where internal attention comes from stakeholders within the CO and the DGPW, and the external attention comes from stakeholders outside the CO and DGPW, these could, for example, be entities in the Dutch central government or players in the private sector. Since all managers indicated to use input information, this will be discussed first.

The data from the interviews illustrate that all respondents regularly use information on input measures. Input measures mainly refer to the earlier mentioned HR and financial information and contain information on the financial budget and state of the staffing within a department. Actions that flow out of input information use are focused on ensuring that the financial budget gets utilized and are focused on the well-being of the department (Interview 1,3,4,5,6). The use of input information can be understood as a result of *internal attention* to the agreements within the CO on these topics, and as a way to *ensure the continuity* of the department's tasks.

As for the component of *internal attention,* respondents often made references to the Management Contract (MC) within the CO. This is a contract between the head of the CO and the head of the DGPW, which contains agreements on HR and financial management. For example, a standing agreement is that financial budgets should be utilized between 98% and 102% at the end of the year. At three times a year, the head of the CO reports to the head of the DGPW on the forecasts and realizations on such agreements. Like this agreement, there are other financial agreements and HR agreements. The subsequent attention of internal stakeholders to these agreements has as an effect that managers use this information (Interview 1,2,5,6,7). This is illustrated by the following quotes *"There are of course some agreements in the management contract, so you make sure that keep an eye on how these things are going in your department"* (Interview 1) and *"Moreover, I need information on for instance the Management contract. I look for example at sickness leave, I believe we have an agreement on 4,5 or 4,3%, on which we have to steer on. Obviously, I need information for that purpose".* (Interview 6).

Furthermore, results regarding input information indicate that managers use input information to ensure the conditions and preserve the continuity of the tasks of their department. When asked on which information they needed to steer their department, respondents referred to, among others, financial and HR information. This was seen by respondents as a basic necessity, as these budgets are seen as the enabling factor to the tasks and activities of the department. This is reflected in one of the interviews with the respondents: *"Everything lands in the costs, that is main driver or limiting factor to everything we do. (…) so, everything translates to costs. So that is important. What is the budgetary framework? How much room do I have and how? How does it relate to the available budget?"* (Interview, 5).

Another respondent notes: "*As for the financial information, you use that to forecast (…) to identify certain trends with financial impact. Also, to give a warning to the directory, as in, we expect this and that to happen. Pay attention: will cost this much more, we have to get those financial resources from somewhere".* (Interview, 2).

Apart from the use of input information, which is present among all respondents, this research finds that, in general, managers have a preference for output information. The output information is program specific and thus differs per department, but generally, this contains information on certain program milestones within the department, information on the progress on certain goals, or the number and quality of products or services delivered. The reasons for the use of output information can, based on the interviews, best be understood as an effect of *external attention.*

As for *external attention,* the interviews gathered the following results. Respondents of this study expressed that they want to be informed on output measures because the output information is given a lot of attention by stakeholders in the direct environment. Respondents indicate that the attention of external stakeholders is based on the goals, agreements, or regulations that are made between the department of the manager and the external stakeholders. In all cases, these were entities from within the Dutch central government. As evident from the interviews, these goals, agreements, or regulations are often output-oriented. The subsequent attention by stakeholders to the goals, agreements, or arrangements would be a reason for middle managers to use the output-oriented performance information. *"I prefer the most, if you look at what we stand for, more output information than outcome, just because there is rock solid monitoring on various output progress, that is what our management team needs. (…). We steer on certain milestones, progress so on a lot of fixed deadlines and financial exhaustion (…) it is all, all output I think yes."* (Interview 3).

Moreover, another respondent notes: *"The national goals are very determining (…) it interests me if we attain our goals (…) on those things, it is expected that I have accurate information on those matters, so that gets your attention, and you request more information on those matters"* (Interview, 2).

On a separate occasion, a respondent indicated that there was a preference for information on outcome. Stating that "*I think, but that is inherent to the work we do at my department, that customer satisfaction and partner satisfaction are very important. So, you know "why I do this work' and how do our customers receive this information."* (Interview, 1). The manager indicates that there is a preference and subsequently more use of outcome information. The respondent however adds that this is related to the type of work that is performed at the department, which is very closely linked to generating and improving customer satisfaction. On another occasion, a respondent indicated that there was an outspoken preference and use of information on efficiency. Stating that *"If I take a look at the report of my directorate (…) and I relate this back the purpose, what are we here for? We want to work to increase customer satisfaction, answer the customer question correctly in one time and as quick as possible"* (interview 6). However, the work of the department of this manager is more operational and routine based than the work of other departments. The subsequent goals that flow out of these characteristics of the department inform the managers preference and use of efficiency information. This is interesting because other respondents indicated that they had no interest in efficiency or that this was relatively less important (Interview 1,2,4). As a result, the respondents did not make a movement to gather this information from their department.

Based on these findings, it is suggested that the preferences of managers for the various types of information are a function of the tasks and context of the department. In all cases, managers regularly used input information. Moreover, in general, managers tend to use more output information because the context in terms of their stakeholders emphasizes output-oriented goals and agreements.

The subsequent attention to these goals and agreements makes that managers more often use output information. However, in some cases, managers expressed that they put more emphasis on information on outcomes or efficiency. This preference is influenced by the tasks and the direct context of the department, in these cases, the tasks of the departments were either closely related to gaining customer satisfaction (thus outcome measures) or operational excellence (thus efficiency measures).

4.2.2. Analysis with regard to the hypotheses

On this subject, there were two alternative hypotheses formulated. As informed by the literature review and as reflected in hypothesis 1, it was expected that managers would be more likely to use input, efficiency, and output information as opposed to outcome information, because managers can exercise direct control over the input, efficiency, and output of their department. Alternatively, as reflected in hypothesis 2, it was expected that managers would have a preference for information on outcome measures as opposed to input, efficiency, and output measures because outcome measures give insight into the ultimate goals of the organization, which the former do not.

Results from interviews indicated that, in general, managers have a preference for and more often use information on input and output measures. Managers' use of the input measures, such as HR and financial information, can rather be understood as a result of *internal attention* and out of the objective to ensure the continuity of the work of the department. Managers' reasons for using output information were mainly informed by the attention it was given by stakeholders without CO, which is based on the goals, agreements, or arrangements that are made between the department and the stakeholders, and the tasks of the department.

As reflected in the hypotheses, it was expected that the preference of managers regarding the different types of information was an effect of the individual motivations and preferences of managers regarding either controllability or the ultimate organizational goals. However, when asked, the respondents of this study did not make references to the topics of controllability and only on one separate occasion made reference to information use linked to the ultimate organization goals. Thereby, hypotheses 1 and 2 are both not supported by the findings of this research. Based on the findings of this research, it is suggested that individual preferences of managers regarding the different types of information are greatly influenced by the direct environment the managers operate in and the tasks of the department of the manager.

4.3. Information richness and information use

4.3.1. Findings out of the interviews

The respondents were relatively univocal with regard to questions on the concept of information richness. In other words, all respondents referred to the same factors constituting richness in likewise manners. These are the use of *visualization*, *in-depth-commentary*, *benchmarking*, and *norms*. These will be discussed separately.

First, an element of rich information that respondents referred to is *visualization*, which is opposed to plain numerical and textual information (interview 1,5,6). Specific examples of visualizations that respondents referred to are *"meters and colors"* (Interview, 6) and *"for finance and such I think (…) if things are presented in bar charts or pie charts, I am just able to do way more"* (Interview, 1). As illustrated by these quotes, respondents indicated that they have a preference for information which is presented in a visualized manner as opposed to plain text or just exported tables.

Second, respondents made references to in-depth commentary (Interview 1,2,4,6). Examples of in-depth commentary as given by respondents include an analysis of the numerical information, a discussion on the causes or possible causes, in other words *"a clear explanation"* (Interview 6) and lastly *"directly a sort of recommendation build into it, or a plan for improvement"* (Interview 6) on how to response to the information. Managers often receive this information from people within their department, as is noted by one of the respondents: *"Mostly it is an issue of finance, that we found a way to invest in it and thus gain better results. At the time I use this information on the strategic level, I have already received the input from my advisor (…) this is how we stand; others perform better, it has to do with these factors, so I am fully informed."* (Interview 2).

Third, respondents made references to benchmarked information. The two types of benchmarks that were touched upon in the literature also were represented in the data from the interviews, these are social reference points (comparisons to other departments or organizations) and historical reference points (comparisons of their own department through time). Notations of historical reference points were less frequent (Interview 3,7), as compared to notations on social reference points.

Examples as given by respondents on social reference points were mainly in the framework of output information. Since the CO is part of the DGPW and also one of the multiple Shared Service Organizations (SSO's) within the national government, there are multiple avenues for comparisons. Specific examples include the comparisons of performance on certain product (interview 2), certain program deadlines (interview 3), and departments' out-of-pocket expenses (interview 4).

Last, respondents often made references to the use of norms in performance information. In this sense, the information of a department is compared to a general norm of the subject. A given example of information that is presented including references to a norm is the percentages of sickness leave within a department (interview 4,5,6). The difference between this comparison and those of benchmarking is that these norms can be arithmetically determined. In such a case, the percentage of sickness leave is compared to a norm that applies to all departments. As a result, the managers have direct insight into how their department relatively performs.

The preference of managers for information that contains visualizations and in-depth commentary as compared to information that does not share this characteristic can be understood in the light of the earlier discussed tripartite of *receiving, understanding, and steering*. Information made visual, for example through graphs, is easier to comprehend than information which is not visual. As a results, it is easier to steer based on this information. The same line of reasoning can be applied to in-depth commentary. Managers are in need of in-depth information on the issue at hand to determine which actions they have to undertake. This is effectively noted in one of the interviews: "*Recently, I delegated this to a team leader, with the question to summarize the most important findings out of the information. That way, I can put these issues on the agenda for my meetings with the other team leaders".* (Interview 7).

As a result, information which already includes an analysis of possible causes and gives managers a framework for action is more likely to be used. In contrast to information which does not have these elements included, which would require managers to instigate this analysis first and thus enables steering to a lesser degree.

One reason for the greater use of performance information which contains the elements of benchmarking and norms, is that it gives managers insight into what is going well and what needs improvement. This is reflected in the following quotes out of the interviews: *"This allows you to see immediately, what is going well? What is going bad? Where do we need to intervene in steering? In some scenario's it helps if we have management information compared to others, because that gives you information in terms of what areas we excel in (...) or where others excel in."* (Interview, 3). Put more simply by another respondent: *"You have to be able to say, to say when something is either good or not good. Therefore, you need to come to an agreement over a norm, a goal, or a framework"* (Interview 5). As such, the use of norms in performance information gives managers a possibility to steer purposefully on the deviations that need attention. As a result, this information is more likely to be used than information which does not share this component.

Another reason for managers to use information benchmarked information is that it provides a learning opportunity, as indicated by two of the respondents: *"Because we set national goals and these do not only apply to us but also to them, so you can learn, and you can analyze like 'you score 40% on the target and we score 60%'. What do you do differently than us, where can we learn from each other?"* (Interview 2).

Moreover, another respondent indicates *"How does the one (name department) within the national government perform compared to the others? And also look as a collective: where do we want to reinforce? Improve within the national government? Or where can we learn from each other?"* (Interview 3). As illustrated by these quotes, manager use these social reference points to have a dialogue with representatives from the other departments to uncover different or even better methods for attaining the goals. This provision of a learning opportunity has as an effect that the information is more likely to be used in comparison with information which does not share this component.

4.3.2. Analysis with regard to the hypothesis

The expectation on this subject, as reflected in hypothesis 3 was that managers are more likely to use performance information when this is *rich*, in other words, when it comes included with in-depth commentary as compared to performance information which does not have this component. The supposed reason behind this mechanism was that managers need this in-depth information to make decisions and implement new actions. Managers indicated that this is one of the elements that makes information *rich*, among other elements such as visualizations, social benchmarking, and information in comparison with general norms. Results indicate that managers are more likely to use this information because it gives them a direction as to what within their department is going well or what needs improvement. Moreover, tying back to the concrete hypothesis, rich information effectively enables middle managers to steer. The results of this study thus corroborate the expectations of hypothesis 3.

4.4. Information ownership and performance information use

4.4.1. Findings out of the interviews

In the interviews, the respondents described varying levels of information ownership, ranging from little ownership to full ownership of the information. When asked about information ownership, the respondents of this study mainly pointed towards the factors of *role conception* and, in an extension thereof, *information production* as explanatory factors for the experienced information ownership.

These factors are related to each other, but for the sake of clearness, they will be discussed separately. As for *role conception,* this refers to how a manager sees his or her own role, in this case in relation to performance information. In cases in which respondents expressed that they do not feel ownership over the information, they indicated that this is mainly due to the fact that they see it as their role in using the information and steer the overall process. In accordance with this vision, these managers expressed that, according to them, it fitted the roles of the advisors or regular employees within their department to generate and distribute the performance information. Illustrating this view, one of the respondents points out: *"I have 23 advisors who know or should know everything about their product or service. I have a hotline with these people so I can easily access the information, but they are more the owner of the information than I am. I am more generically process steering"* (Interview, 2). Another take on this concept: *"It is partly decided in the interaction, that it is greatly felt to me as: by them I get supplied or that is the supplying party. So, I feel primarily responsible for the use of the information and the additional steering. That to me is the pith of the matter."* (Interview, 3). As a result, they would not see themselves as owner of the information.

As illustrated, in extension to the factor of *role conception*, lies the factor of *information production*. When asked on cases in which managers do not experience ownership with regard to the information at hand, they often point towards the fact that they themselves are not the producers of this information. The producers of this information would rather be the owners of the information.

In contrast to the earlier noted role conceptions, other respondents indicated that they did see themselves as the full owner of the information. According to their role conception, they are fully responsible for everything that happens in their department, and this includes every information that comes out of actions of the department or has a relation to their department.

For these respondents, it matters less who produces the information, and via which source the information reaches the manager, as the claim on total responsibility overrules both of these factors (Interview 4,5,6). This role conception is illustrated in the following quote by a respondent: *"Everything that happens within my department, possibly leads to information, which eventually lands in a report or a contribution to the management contract (...) I just feel like I am the owner on all of that."* (Interview 6).

On a separate occasion, a respondent indicated that when the information was self-sourced, i.e., when they generated the information themselves from p – direkt, the respondent did feel a sense of ownership over the information, when this usually is not the case (Interview 1). On another occasion, a respondent (who already had a role conception which included information ownership) pointed out that their experienced ownership over the performance information was due to undertaken actions such as generating the numerical information and writing an analysis of this information themselves (Interview 4).

In these scenarios, the manager was essentially the producer of the information, adding to the argument that *information production* is an important factor in explaining information ownership.

4.4.2. Analysis with regard to the hypotheses

Regarding the concept of information ownership, two hypotheses were formulated. First, in hypothesis 4, it was expected that managers would be more likely to experience ownership and thus use performance information if this was either self-sourced or came from people within their own department, as opposed to receiving information from staff from other departments or stakeholders outside of the organization.

The logic behind this hypothesis was based on group identification and group thinking, in which managers identify more with their own department, and thus the information from this department, as opposed to an external source. When asked follow-up questions about the impact of various information sources of performance information on their ownership, respondents were relatively univocal. Respondents did not differentiate between the information they receive from 'their own people' or from external stakeholders. These results suggest that managers are, in the case of performance information, are not sensitive to group thinking processes. This could be, and this ties in with the findings, the information refers to issues they are responsible for. Results did however indicate that, when information is self-sourced, managers did experience a sense of ownership over the information. However, out of the interviews, there is no indication that ownership had an effect on performance information use.

Both managers who had a role conception of total ownership, as managers who had a conception of the recipient, used the information to steer. Therefore, results of this study do not support hypothesis 4.

Regarding hypothesis 5, it was expected that middle managers would be more likely to experience information ownership if they were involved early on in the performance measurement set-up. This way, they would experience more ownership when the information reached their desk. In the interviews, some managers did make references to the annual plans of the department. In these annual plans, managers did contribute to the goals of the department. However, in the interviews, respondents did not in any manner refer to this concept, nor participation in data measurement or validity as related to information ownership and, subsequently, information use.

Therefore, based on the results of the interviews, this hypothesis 5 is not supported. Building on the results, a possible explanation for these deviating results (as compared to the hypothesis) could be that the respondents have delegated the authority and responsibility for the data measurement and the data validity process to employees within their department, and thus did not participate in the process.

Table 7 gives a schematic overview of the results of this research concerning all the hypotheses.

Table 7: *Conclusions on the hypotheses*

Number	**Hypothesis**	**Conclusion**
1	Middle managers are more likely to use performance information if this contains information on input, process, or output measures as opposed to outcome measures.	Not supported.
2	Middle managers are more likely to use performance information if this contains information on outcome measures as opposed to input, efficiency, or output measures.	Not supported.
3	Middle managers are more likely to use performance information when this includes in-depth commentary or explanation.	Supported.
4	The degree to which a middle manager recognizes the information's origin as one of their own, or their departments will, through ownership, have a positive effect on the use of performance information.	Not supported.
5	The degree to which a middle manager was involved with the set-up of performance management will, through information ownership, have a positive effect on the use of performance information.	Not supported.

5. Conclusion

This chapter will present the conclusions this research and the discuss these findings in the light of the broader literature. Thereafter, the limitations off this study will be discussed. Last, the practical implications of this research will be discussed, and some suggestions for further research into performance information use in public organizations will be provided.

5.1. Conclusion

This study aimed to contribute to the understanding of performance information use in the public sector by exploring the impact of managerial - and information level factors. The research question this study aimed to answer was: "*which managerial level and information level factors explain the use of performance information by middle managers in the public sector?".* Data was gathered qualitatively via multiple in-depth interviews with middle managers within the Dutch Directorate-General for Public Works and Water Management, the main executive agency of the Department of Infrastructure and Water Management.

This research found that managers' use of certain measures (i.e., input, efficiency, output, and outcome measures) of performance information was greatly influenced by the tasks and context of the department, within this context, the internal and external attention of stakeholders to certain types of information were found to be impactful factors. In this study, the attention of stakeholders was focused on the use of input and output information, therefore, the use of these information measures was relatively larger. Aside from this general picture, some respondents indicated that they had different preferences, these can be explained by the tasks and the characteristic of the department.

As for information ownership, this research found that the role conception of the managers was determining in their experienced ownership. Some managers indicated that it was their role to receive the information and be ‘general steering’ based on the information. Other managers indicated that they felt ownership over everything that happens with regard to their department, and this includes all the information related to the department. In an extension thereof lies the theme of information production, results indicate that when information is self-sourced, they felt more owner over the information. This study did however not find a link between ownership and information use.

Concerning information richness, the answer to the research question is relatively straight forward. This study found that important elements to rich information are visualizations, social benchmarking, comparisons to norms and in-depth commentary. Managers are more likely to use this kind of information as opposed to information that is not rich, because this kind of information enables effective steering, and, in the case of social benchmarking, provides an opportunity for learning.

5.2. Discussion of the results in broader literature

Several of the findings of this study contribute to the development of the academic literature on performance information use in public organizations. These contributions will now be discussed. The first contribution lies with the managerial preferences and use of concerning certain information types. The results on internal attention of this study can be compared to the results on administrative routines, which were presented in the works of Moynihan and Landuyt (2009) and Moynihan and Lavertu (2012).

These works found that the establishment of learning forums and other forms of administrative routines has a positive effect on performance information use. In these manners, certain measures were addressed, thereby, the routines effectively facilitate the internal attention the use of performance information. Managers' use of output information was greatly affected by the attention of external stakeholders to the agreements, arrangements, or legislation on the output. These results echo the findings as discussed in the literature (Melkers and Willoughby 2005; Yang and Hsieh, 2006; Lee, 2019; Moynihan and Ingraham, 2004).

In these studies, it was found that the contribution of external stakeholders in the performance management setup (see Melkers and Willoughby, 2005), and the demand of stakeholders regarding this information had a positive effect on managerial performance information use (Yang and Hsiesh, 2007; Lee, 2019; Moynihan and Ingraham, 2004). This study adds to the body of knowledge by finding that the influence of internal and external stakeholders goes as deep as the information types that managers use, whereas previous (mostly quantitative) studies only referred to the general use of performance information.

Second, this research found that important elements to rich information are visualizations, social benchmarking, comparisons to general norms and in-depth commentary. Previous studies on information richness in public organizations, which were solely focused on politicians (see Ter Bogt, 2004; Buylen and Christiaens, 2015), found that they were more likely to use rich information when faced with environmental uncertainty (Ter Bogt, 2004). Results from this study suggest that middle managers' reasons for using rich information are different. It is suggested that the reason of this use is that rich information allows for a swift understanding and steering. In other words, information that effectively enables managers in their steering is more likely to be used.

These results could therefore be linked to studies on self-efficacy (Kroll, 2014a, Johansen et al., 2018) which find that managers are more likely to use performance information if they expect this to be helpful to the attainment of their personal goals. This study adds to the known findings around self-efficacy that information needs to be rich in order to enable managers to reach their goals.

Last, it was found that the *role conception* of managers and *information production* are important factors in the degree of experienced information ownership. Research on this concept was explicitly called for in the study by Kroll (2014). Because the literature on the antecedents of this concept is less extensive in relative terms (see discussion under paragraph 2.5.), these findings in themselves can be seen as a contribution to the existing body of knowledge. Results do suggest that group process thinking does not play a role for middle managers when it comes to performance information.

5.3. Limitations of research

As every other academic research, this study has limitations in several ways. First, as mentioned in chapter 3, in depth interviews were the only method of data collection in this study. Other methods of qualitative data selection, such as document analysis or focus group sessions, were either not suitable given the research question, or not possible due to COVID-19 related restrictions. As a result, the use of triangulation of data collection methods was not possible in this research. Although the in-depth interview provide the researcher with rich data and insights, this is a limitation to the interval validity of the study.

Second, it should also be mentioned that, given the single case design, the qualitative methods of this study, and the fact that the findings of the research are influenced by the direct context of the study, there is limited external validity to the results of this study. Therefore, the findings of this research can be generalized to middle managers within the DGPW agency and in a broader sense the department of I&W. However, the results can not automatically be generalized to all middle managers working in public organizations.

Third, another limitation that is inherent to qualitative research is the possibility of bias in interpreting the transcripts. A possible counteract to this would be to have multiple researchers work on the interpretations of the transcripts. This was however not possible because of the assignment instructions, which only allowed for a single interviewer and analyst. This also is an insurmountable limitation to this study.

5.4. Implications for practice

When discussing the societal relevance of this study in chapter 1, it was established that a sound understanding of performance information use could potentially benefit the ultimate performance levels of public organizations. Out of the findings of this study, several implications for practitioners can be identified, which could foster the use of performance information by middle managers.

First, one of the main findings of this study was that managers are susceptible to external and internal attention in their use of performance information. With this in mind, it is important for public organizations to reach a consensus both internally and externally on the strategically important issues and the performance information that comes forth out of these issues. Based on this consensus, the governance of an organization can be arranged.

By doing so, the steering of an organization can be more effective as compared to scenarios in which there is no consensus on what is strategically important, which would cause fragmented pressures toward managers and, as a result, ineffective steering. For example, the leadership of a public organization and their direct stakeholders could instigate that specific outcome measures, and the performance information on these measures, are paramount. Subsequently, when the pressures of actors toward managers are aligned, the steering would be more effective as compared to a scenario in which internal actors pressure managers to use input measures and external actors have attention for outcome measures.

Second, this research made it evident that managers are more likely to purposefully use performance information when this information includes comparisons to agreed-upon norms, is presented visually, when it is compared to other comparable departments or entities and when it includes in-depth commentary. These elements are, relatively to the organizational level, impact factors on performance information use, easy to implement. Staff members in public organizations who are supporting managers via the aggregation and presentation of information could benefit from these findings by setting organization-wide norms, making the numerical information visual, and, if suitable, make comparisons between departments or through time via benchmarking. Moreover, when the information refers to an issue which would require some analysis, staff members would be wise to include in-depth commentary and analysis to the information, to enable swift decision making. These elements are ought to have a positive effect on the purposeful use of said information.

Last, this study indicated that the source of information, i.e., managers receiving performance information via ‘their own people’ or via staff members outside of their department, had little impact on the ownership and subsequently on their use of performance information.

This finding could be relevant for staff members and people working on the information architecture within public organizations, as there could be cost and time considerations by designing it one way or the other.

Moreover, managers did not refer to early involvement in the data selection or data validation process as a factor which was important to their ownership or use. This however does not implicate that these are not important elements to trustworthy information. Based on these findings, staff members either within or external to the department could take on more ownership for this process to ensure data quality.

5.5. Suggestions for further research

This research found that managers are susceptible to external and internal pressures in their use and preferences regarding performance information. However, this research did not uncover how managers exactly respond to these different kinds, or maybe even conflicting, pressures. For further research, it would be interesting to see exactly how managers react to different kinds of pressures from various actors. For example, how would a manager react when the focus of an important external stakeholder is on outcome measures, whereas the direct supervisor of the manager desires to focus on input measures? Further research could take an experimental approach to study this issue, for example, through the use of *vignettes* to uncover the motives and proceedings of managers in such cases (see the work of Moynihan, 2015, for a comparable research design).

Second, this research took an explicit focus on routine performance information as opposed to non-routine information. As a result, this research only partly provided a picture of the total information that middle managers receive and use. This is not to say that non-routine information

is less valuable for the management of organizations. As shortly mentioned in chapter four, respondents of this study do receive information on the risks of specific programs via non-routine routes. As research on non-routine information is limited (Kroll, 2015), further research could focus on how managers take on this information and how the use of this kind of information compares to the use of routine information. Focused on risk management, it could be interesting to investigate which steps managers take to manage risks based on the information they receive. A specific question could be how the actions of managers based on this information relate to the described interventions in chapter four.

Third, this research indicated that managers mostly get their information from their advisors or from staff, as opposed to self-sourced information. As illustrated by the findings on the richness of information, these employees have some discretion in their decisions as to which information managers get to see and how they get to see it. Since it is found that this selection and presentation matters for the use of performance information, it would be valuable to investigate how exactly these advisors or staff members decide on which information to include in their reports and how they choose to present it.

Last, it must be noted that most studies into performance information use in public organizations have been conducted in western countries (i.e., European countries, Australia, New-Zealand, and North America). The exceptions being the works of Akbar et al. (2012), Sejati (2017) and Yang and Hsiesh (2007). For the sake of the development of more universal knowledge on performance information use, it would be interesting to see to which degree the findings of this study and those described in the literature review hold up in nonwestern contexts.

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Appendix A: Interview guide (in Dutch)

Opening:

- Introductie van de interviewer en de geïnterviewde.
- Toelichting op de doelstellingen van het onderzoek.
- Toelichting op anonimiteit van de resultaten.

Introductie begrip managementinformatie

- Wat versta je onder managementinformatie?
- Over welke vormen van management informatie beschik je in jouw rol?
- Hoe maak je gebruik van deze informatie?
- Welke concrete acties volgen er uit jouw gebruik van management informatie?

Karakteristieken van gebruikte managementinformatie

- Welke informatie heb je nodig om te sturen? Waarover heeft deze informatie betrekking?
- Welke kenmerken heeft de informatie welke je gebruikt voor sturing?
    - Welke soort variabelen (input, efficiency, output of outcome) vind je hierin het meest waardevol?
    - Zou je dit kunnen toelichten?
- Wanneer haal je de meeste (voortschrijdend) inzicht uit managementinformatie?
    - Welke factoren (bv. context, handelingen, processen) spelen hierin volgens jou een rol?
- Kan je beschrijven hoe managementinformatie aan jou gepresenteerd wordt?
- Welke elementen in deze presentatie vind je het meest waardevol?

Context en relatie tot het gebruik van managementinformatie

- Welke factoren in jouw omgeving spelen een rol in jouw gebruik van management informatie?
- Voel je je eigenaar van de managementinformatie die je tot je beschikking hebt?
- Zo ja/nee, waarom is dit volgens jou het geval?

Inhoudelijke afsluiting

- Is er iets dat we niet behandeld hebben tijdens dit interview wat volgens jou wel relevant is?

Afsluiting:

- Dank voor het interview.
- Toelichting op vervolgproces.