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Public Value through Innovation:

Danish public managers' views on barriers and boosters

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Abstract

This paper adds to current conversations on public value and public sector innovation by offering a quantitative analysis of the multiple types of public value that Danish public sector managers perceive to have created by innovating. Previous studies have primarily investigated public innovation on a case-by-case basis – and few with a focus on the outcomes of innovation. Access to a unique dataset permits a comprehensive study across the entire Danish public sector, centered on public managers' perceptions of value created by public innovation. Using logistic regression analysis, a number of variables are tested to explore which antecedents will affect managers' reported value creation.

Keywords: public sector innovation, public value, public management

Introduction

The expectations facing public sector managers are dynamic, complex and may at times seem contradictory (Hartley, 2018). Demographics change; economic pressure continues; new technological possibilities emerge. Different paradigms of governance propose responses to this landscape of inconsistent concerns: Traditional public administration seeks to enhance the robustness of the bureaucratic disciplines; new public management examines the incentive structures of service delivery; in public value management, continuous reflection and a collaborative approach to public service delivery (Stoker, 2006) make space for multiple types of public value (Moore, 2013). Consequently, the responsibility of public managers has expanded to finding innovative solutions to the challenges they face, to implement them, and to harvest the value of the results created (Benington & Moore, 2010; Moore, 2013; Osborne & Brown, 2011).

A recent systematic review of the public innovation literature concluded that studies of public sector innovation have thus far primarily focused on the processes of innovation, rather than on the outcomes and societal impact of public innovation (De Vries, Bekkers& Tummers, 2016). Moreover, Hartley, Alford, Knies, and Douglas (2017) call for more empirically grounded studies of public value, which they find to be lacking.

As the outcomes of public innovation can be measured by the public value created, this paper integrates literature from both streams of research. This contributes to a further understanding of the outcomes of public innovation processes, as well as an empirical grounding of public value research by asking: *What organizational antecedents influence public managers' perception of the public value created through innovation?*

The research question is addressed by a quantitative analysis based on a survey answered by 2,363 public managers, called the Innovation Barometer. The Innovation Barometer identifies four types of public value. Employing these four as dependent variables, a logistic regression analysis for each is conducted to explore the effects of a number of organizational antecedents on public managers' perceptions of creating public value through innovation.

The paper is structured as follows: First, public innovation and public value are defined. Second, a selection of studies of antecedents affecting public innovation is reviewed and matched to the dataset in order to spawn hypotheses for testing. Third, the four public values used as dependent variables in the models are introduced. Fourth, the research methods used in the preceding data compilation and the statistical models developed for the analysis are provided. Fifth, the results of the logistic regression models testing the influence of a number of organizational antecedents on public managers' perception of value creation are presented. Finally, the findings and their implications for research and practice are discussed.

Defining Public Innovation and Public Value

As definitions of innovation differ, it is necessary to explicate that the definition subscribed to in this study exceeds invention and includes implementation in the scope of innovation (Bessant, 2005). The Innovation Barometer, which the study is based upon, largely follows the OECD's definition (2005), though adjusted slightly to suit the public sector: Innovation is *"a new or significantly changed way of improving the workplace's activities and results. Innovations can be new or significantly changed services; products; processes, or ways of organizing the work or methods of communicating with external parties"* (COI, 2018, p. 13). Notice the emphasis on

outcome in this definition, where an innovation is defined as something that has been implemented, which has led to the improvement of the workplace activities, and thus has created public value.

This definition resembles the one Osborne and Brown (2011) identified in the British policy papers they studied and criticized for having a normative position, in which innovation became almost synonymous with improvement. The critique that innovation does not inevitably lead to improvement aligns well with Mark Moore's (2013) injunction that assessing public value creation entails counting the earnings as well as the costs. However, in a survey context, the inclusive OECD definition has the advantage of being easily understood, and it allows each public manager to assess their latest innovation activity based on its merits.

When Mark Moore (2013) encourages public managers to keep score of their checks and balances in terms of public value, it is in recognition of the fact that the assessment of outcomes in the public sector transcends mere marked mechanisms. Instead, public value is measured on multiple bottom lines, each defined within the specific context. Unlike customers in a private company, citizens will usually not be able to take their business elsewhere. Instead, the value to be delivered is negotiated with the public through elections, public debate, and, in some cases, collaborative service delivery.

The Innovation Barometer provided respondents with a selection of four types of public value to choose as outcomes of their latest innovation, namely quality, employee satisfaction, efficiency, and citizen involvement. Respondents were allowed to tick more than one box. Besides the four types of value, respondents were able to tick "Other" and "Don't know." Only 7 percent of respondents used these options as their

sole response, which indicates that the available categories provide reasonably good coverage.

Public value can be understood as what the public values, as well as what brings value to the public sphere (Benington, 2009). The assessment of public value in both perspectives can be contested because public value is not dealt with in an absolute currency. Rather, Moore argues, public value is relative to circumstances in the "task environment." This means that "increased quality" may have rather different implications in waste management as opposed to nursing homes, but the quality of a public service should be measured by its distinct standards (Alford & O'Flynn, 2009). Meynhardt (2009) reads the current discourse on public value as a response to NPM, and argues that cost-benefit analyses and customer-orientation are being re-conceptualized centered around "the collective." Instead of assessing value as a dichotomy with quality on the one hand and costs or efficiency on the other, a plural understanding of public value permits the recognition of the rise and fall of both types of value simultaneously, as well as democratically esteemed values such as citizen involvement and employee satisfaction. Citizen involvement may be understood as an empowered version of "customer-orientation," where citizens are viewed as both willing and able to contribute to public service innovation (Torfing, 2019). Employee satisfaction is considered a public value because compassion and commitment to serve are found to be central to the motivation of public servants (Kjeldsen, 2012).

Antecedents for Public Innovation

In the following, a selection of literature on public innovation and public value is reviewed in order to hypothesize which of the antecedents available for testing in the Innovation Barometer may influence public managers' perception of creating public value through innovation.

The first hypothesis concerns managers' perception of the role of key actors. More and more politicians expand from the one-way dissemination of traditional political oration toward more reciprocal engagement through the use of social media (e.g., Stieglitz and Dang-Xuan, 2013) or governance networks with multiple stakeholders (e.g. Sørensen and Torfing, 2018). The political focus on collaborative governance as a means of obtaining legitimacy in innovation processes, suggests the hypothesis that innovations initiated by politicians will increase the number of managers reporting to have enhanced citizen-involvement.

Sandford Borins (2001) observes that the initiative for public innovation lies not only with the democratically elected and the public managers, but also with, for example employees. Additionally, Hartley, Sørensen & Torfing (2013) find, that public managers tend to favor in-house innovation over collaborations crossing organizational boundaries. Therefore, the role of employees is likely to be another important factor that may influence managers' perceptions of value creation, motivating the hypothesis that more managers will report enhancing the quality of service, if employees initiated the innovation. Contemplating the role of these key actors inspires the following hypothesis:

H1: More managers will perceive to have enhanced "quality" when employees initiated the innovation, and "citizen involvement" when politicians initiated the innovation.

In a recent systematic review, Cinar, Trott & Simms (2019) observed a number of antecedents shown to work as barriers for public innovation. Three of the antecedents they identified are available for testing in the Innovation Barometer. Among the case studies in their review, 21 percent identified lack of resources as a barrier, 15 percent pointed to a risk-aversive or rigid organizational culture, and 12 percent identified contextual barriers in the shape of current legislation, regulation, and policies.

Inspired by this, a second hypothesis tests the influence of these three barriers on managers' perception of value creation:

H2: Fewer managers will perceive to have created "increased quality" when innovations are initiated by new legislation, financial pressure, and when they do not view their organizations as willing to take risks.

In a systematic review of empirical studies, Walker (2014) found that organizational size is an important variable when assessing public sector organizations' capacity for innovation. Walker finds inconsistent claims that can roughly be summarized thusly: Bigger organizations have the advantage of more complex facilities, more skills and higher technical potential. Meanwhile, bigger organizations are also described as monopolistic, bureaucratic, and inefficient. Walker suggests a non-linear U-shaped relationship between size and innovation capacity – especially targeted efficiency, which this study will test empirically by proposing the following hypothesis:

H3: More managers in small and large organizations will perceive to have enhanced "efficiency" by innovating than in medium-sized organizations.

In their systematic review of public sector innovation studies, de Vries et al. (2016) categorized innovations in the public sector into four types: process innovation, product or service innovation, governance innovation, and concept innovation, which corresponds fairly well with the categories in the Innovation Barometer, which are product innovation, service innovation, process or organizational innovation, and innovation in external communication. De Vries et al. find that the majority of studies on public sector innovation do not report on outcomes. For those that do, effectiveness and efficiency are the most frequent – particularly for process innovation and product/service innovation. The Innovation Barometer includes questions about both

perceived outcomes and innovation type and thus permits the examination of a pattern between innovation types and perceived outcomes.

To investigate a possible pattern between innovation types and outcomes, a fourth and final hypothesis utilizes the categories of innovation types and reported outcomes available in the data:

H4: More managers will perceive to have enhanced "quality" with new products and services, to have enhanced "employee satisfaction" and "efficiency" with new organizational forms and processes; and to have increased "citizen involvement" with innovation in external communication.

Methods

A comprehensive survey of the Danish public sector compiled in the Innovation Barometer comprises the empirical foundation for this study. The data provides a remarkable opportunity to explore managers' perceptions of value creation through public innovation. However, as the survey was designed and conducted before this analysis was conceived, there are limitations as to what questions can be answered utilizing this data. These will be addressed in the discussion. The following section presents the methods for data gathering and analysis.

Data collection

The Innovation Barometer is an official national statistic that describes the level of innovation in Danish public workplaces. Shortly after the establishment of The National Centre for Public Sector Innovation (COI) in 2014, the COI steering committee decided to conduct a nation-wide measurement of innovation activity in the public sector. COI and Statistics Denmark compiled the statistic and collected data in 2015 and in 2017. The innovation statistics accumulated by the OECD in the private sector for the past 25

years inspired the statistic (COI, 2018).This official statistic is the first of its kind to cover an entire public sector. The statistic targets workplaces, such as the individual nursing home, school, or government's agency.

The statistic is representative of the Danish public sector and is carried out in accordance with the Oslo Manual, which provides guidelines for innovation statistics (OECD/Eurostat, 2005). Following the Oslo Manual entails rigorous requirements for quality and documentation. The documentation is carried out by Statistics Denmark (2018). Answering the survey was voluntary and anonymous (COI, 2018).

Sector	**Population**	**Sample**	**Responses**	**Response rate**	**Response rate**
	Number of workplaces	Number of workplaces	Number of workplaces	% of the sample	% of the population
Municipalities	13,140	3,647	1,771	49 %	13 %
Regions	522	321	164	51 %	31 %
State	1,440	798	428	54 %	30 %
Total	15,102	4,766	2,363	50 %	16 %

Table 1: Number of workplaces, responses, and response rates in the population and sample. Source: The Innovation Barometer 2018.

The sample was stratified based on the workplace's size (3-49 employees, 50-99 employees, 100-249 employees, and 250(+) employees), regions and subsectors In order to ensure representativeness of the large and heterogeneous group of public sector workplaces. By making a stratified selection, a sufficient number of workplaces to allow for analyses of the innovation activity is ensured – also in subsectors with few workplaces (COI, 2018).

When developing the design of the survey, the themes were tested in eight workshops with a total of more than 100 practitioners, public sector managers, and politicians in different regions of Denmark. A prototype of the survey design was developed based on the selected themes, which were debated by an expert panel consisting of innovation professionals from different subsectors holding different

positions. A cognitive test was conducted on seven persons, who responded to the survey and participated in follow-up interviews. After the test, the survey was simplified and pilot-tested on a small sample of respondents. Finally, the first surveys were sent out in the first quarter of 2015. As the results generated in 2015 and 2017 are similar, this study employs data from the latest edition.

The selection of public value categories was inspired by Bason's (2007) multiple bottom lines in public sector innovation, which he identifies as productivity, service experience, results, and democracy. Based on cognitive testing of survey prototypes, "productivity" was replaced by "efficiency." "Employee satisfaction" was included after some debate concerning whether it was to be considered a public value. Values that were considered, but left out in the final version of the survey due to poor testing results were, for example, "transparency" and "legality."

Before answering the survey, respondents were given the following introduction (COI, 2018, authors' translation from Danish).

- The innovations must be new to the workplace, but can be developed or used by others previously.
- The innovations must be put to use in the years 2015-2016, but preparations can be initiated before then.
- Do not include changes that have not led to improvements in activities or results in the workplace.
- Think of innovations developed by the workplace itself, as well as innovations that follow external demands or ideas for the workplace.

In an attempt to counter social desirability bias, as well as discourage respondents from answering in general terms, respondents were asked to describe their latest innovation

briefly in an open text field before answering the survey and to respond to the survey with that particular innovation activity in mind.

Logistic Regression and Model Robustness

Before proceeding to test the four hypotheses, a table of descriptive statistics depicting the frequency of all the dependent and independent variables is presented (Table 2). The dependent variables are the four types of value available to respondents in the questionnaire: quality, employee satisfaction, efficiency and citizen involvement. The question is phrased: "*Overall, what type of value have you achieved with the most recent innovation?"* Six options are available: (*a) Improved quality; (b) Increased efficiency (e.g., same results with fewer resources); (c) Increased employee satisfaction; (d) Citizens have obtained greater influence on or insight into the tasks we do; (e) Other (f) Don't know."* Respondents were allowed to tick more than one box, and as the boxes could be either ticked (1) or not ticked (0), the variables are binary, suitable for logistic regression analysis (Mehmetoglu & Jakobsen, 2017).

One separate logistic regression model is built for each dependent variable. All calculations are conducted using STATA, and a number of tests to examine the robustness of the models have been run. When the influence of one variable is tested (using a t-test), all other variables in the model are held at their mean (kept constant). If the result is insignificant, it means that the difference between those who answered "yes" and those who answered "no" is too small to indicate any impact caused by this variable.

	Percentage
DEPENDENT VARIABLES: All in all, what type of value have you gained through the latest innovation? (If relevant, tick more than one box)	
Improved quality = Yes	73 %
Increased efficiency = Yes	45 %
Increased employee satisfaction = Yes	46 %
Greater citizen involvement = Yes	35 %
Other = Yes	9 %
Don't know = Yes	3 %
INDEPENDENT VARIABLES:	
Did politicians initiate? = No	84 %
Did politicians initiate? = Yes	16 %
Did politicians…? = Impede	8 %
Did politicians…? = Stimulate	45 %
Did politicians…? = Not relevant / Do not know	47 %
Did employees initiate? = No	65 %
Did employees initiate? = Yes	35 %
Did employees…? = Impede	5 %
Did employees…? = Stimulate	89 %
Did employees…? = Not relevant / Do not know	5 %
Did new legislation initiate? = No	84 %
Did new legislation initiate? = Yes	16 %
Did financial pressure initiate? = No	83 %
Did financial pressure initiate? = Yes	17 %
"We will accept risks in order to innovate" = Disagree	14 %
"We will accept risks in order to innovate" = Agree	83 %
"We will accept risks in order to innovate" = Not relevant / do not know	3 %
Size of workplace: Mean (std. dev.)	156 (390)
Product innovation = No	79 %
Product innovation = Yes	21 %
Service innovation = No	69 %
Service innovation = Yes	31 %
Organizational innovation = No	26 %
Organizational innovation = Yes	74 %
Communication innovation = No	63 %
Communication innovation = Yes	37 %
Complex (more than one type) = No	58 %
Complex (more than one type) = Yes	42 %

Table 2: Frequency of dependent and independent variables. Observations = 1,941. All workplaces where managers reported that they had introduced at least one innovation in the period 2015-2016.

If the models are to predict the dependent variable correctly, the prediction square should have no explanatory outcome. This was confirmed by link tests resulting in p-values between 0.14 and 0.81 for the four models.

An important criterion for doing regression analysis is that each observation must be independent. In the Innovation Barometer, each observation represents one public workplace. However, some of the workplaces can be placed in the same overall juridical organization (municipality, region, or ministry). To test for independence, a logistic regression model was run, which adjusted for cluster effects of juridical organization to see if this changed the log odds of the independent values. None of the coefficients or significance levels changed. Thus, each observation is independent one of the others.

Another important assumption in multiple regression models is that independent variables are not perfectly multicollinear. In other words, two independent variables cannot be perfectly linearly predicted from one another. This was tested for by examining the variance inflation factor (VIF). For all variables in the four models, the mean VIF is between 2.39-2.95 with a highest value of 5 except for one variable. This indicates that multicollinearity is not a problem in this model. The variable "Did employees impede or stimulate?" had a VIF value of 10. The higher VIF value may be explained by the low proportion of workplaces (5 %) in the reference category "employees impeding." After checking the collinearity between "Did employees impede or stimulate" and the four dependent variables, the variable was excluded from the model predicting Employee satisfaction because of multicollinearity (correlation of -0.18). However, the variable was kept as a control variable in the three remaining models. In the correlation matrix, two other independent variables were found to have a relatively high correlation (-0.2469), namely when politicians initiate and when they

stimulate innovation. The fact that politicians will usually also stimulate the innovations they initiate likely explains this. In this case, however, both variables were kept in the model due to the stringency of the model.

Besides controlling for all the independent variables included in the study, one extra control was added that could expectedly be of importance. While no other quantitative study has compared innovation data across the entire public sector, Damanpour's (1991) study found that the organizational type influences innovation adoption in the private sector, suggesting that subsector is a variable that should be controlled for. Thus, subsector was included as a control variable and kept at its mean, thereby making sure that any sectoral differences would not skew the results.

Variables that were omitted from this study, but which are available in the dataset, concern the organizations' evaluation practice, efforts to copy and diffuse innovation and external collaboration. While these are all interesting themes, it was necessary to limit the number of questions that could reasonably be answered in one paper. To control that the omitted variables did not influence the findings in the model, a model including the three mentioned variables was run to make sure that they did not contribute greatly to the overall determination (R^2) of the models. Finally, no potential outliers were found in the data.

As both dependent and independent variables stem from the same source (except for organizational size and subsector, which came from Statistics Denmark's registries), namely survey responses by public managers, common source bias could be a concern. However, for perceptual data, there is no way around this, and surveys are still found to be appropriate sources when the object of observation is managers' perceptions, beliefs, judgments, and feelings (George & Pandey, 2017; Podsakoff, MacKenzie& Podsakoff, 2012).

Results

Two tables present the results of the analysis: First, the reported values created by innovation and the frequency of their combinations are displayed (Table 3). To explore how organizational conditions impact the levels of a reported value, a logistic regression analysis for each dependent variable was performed to test the role of politicians and employees; new legislation, financial pressure and risk aversion; organizational size; and finally innovation type.(Table 4).

Value Complexity in Public Sector Innovation

As previously indicated, organizational changes and activities must have been fully implemented and perceived to have created value to warrant the label "innovation." Eighty percent of the managers responded that they had introduced at least one such innovation in the period 2015-2016, totaling 1,942 observations. This level of activity is largely similar to the previous survey from 2015, where 86 percent responded to have introduced at least one type of innovation in 2013-2014 (COI, 2016).

What type of value have you gained by your latest innovation?	**Pct.**
Quality	15
Quality + Efficiency + Employee satisfaction	13
Quality + Employee satisfaction	11
Quality + Efficiency	10
Quality + Efficiency + Employee satisfaction + Citizen involvement	9
Quality + Employee satisfaction + Citizen involvement	7
Quality + Citizen involvement	7
Efficiency	5
Citizen involvement	5
Quality + Efficiency + Citizen involvement	4
Efficiency + Employee satisfaction	3
Efficiency + Citizen involvement	2
Employee satisfaction + Citizen involvement	2
Employee satisfaction	2
Efficiency + Employee satisfaction + Citizen involvement	1
"Other" + "Don't know"	7
Total	*100*

Table 3: Combinations of value reported. Number of observations = 1,942. The responses have been weighed against the total population of public sector workplaces. Numbers are rounded.

Table 3 shows that 73 percent of public managers report having created quality with their latest innovation. Forty-six percent say that they have increased employee satisfaction, 45percent that they have increased efficiency, and 35 percent report having increased citizen involvement. Seven out of 10 innovations are reported to create more than one type of value. The reported values appear in all imaginable combinations. Quality appears in combination with other values in 59 percent of the cases. Efficiency appears as a reported outcome in combination with other values in 40 percent of the innovations, and for example, 25 percent of the innovations are reported to have increased efficiency as well as employee satisfaction. Only 26 percent of innovations are perceived to have created a single type of value, meaning that combinations of multiple values reported are much more common. Notice again, that quality is by far the most frequent stand-alone value created by public innovation, whereas employee satisfaction appears at the other end of the scale and stands alone in 2 percent of innovations.

In sum, this mapping reveals that public sector managers will typically perceive to be creating multiple types of value with their innovation projects and that quality is by far the most common value created by public sector innovation.

Testing the influence of organizational conditions on perceived value creation

In the following section, a logistic regression analysis is conducted to test the influence of a number of independent variables on the frequency of the four types of value reported.

	M1: Quality	M2: Efficiency	M3: Employee satisfaction	M4: Citizen Involvement
	Log odds (std. error)	Log odds (std. error)	Log odds (std. error)	Log odds (std. error)
Subsector	0.0053	0.0114***	-0.0234***	-0.0342***
	-0.00488	-0.00425	-0.00436	-0.00496

Reference: Did politicians initiate? = No	-	-	-	-
Did politicians initiate? = Yes	-0.355**	-0.294**	-0.533***	-0.0234
	-0.16	-0.147	-0.151	-0.153
Reference: Did politicians…? = Impede	-	-	-	-
Did politicians…? = Stimulate	0.13	0.0155	0.165	0.511**
	-0.213	-0.186	-0.187	-0.209
Did politicians…? = Not relevant / Do not know	-0.0323	0.0457	-0.00909	0.0509
	-0.215	-0.189	-0.19	-0.214
Did employees initiate? = No	-	-	-	-
Did employees initiate? = Yes	0.302**	-0.0392	0.610***	-0.00297
	-0.122	-0.104	-0.104	-0.111
Did employees…? = Impede	-	-	-	-
Did employees…? = Stimulate	0.433**	0.0446		0.34
	-0.206	-0.19		-0.221
Did employees…? = Not relevant / Do not know	-0.321	-0.137		0.0461
	-0.293	-0.29		-0.33
Did new legislation initiate? = No	-	-	-	-
Did new legislation initiate? = Yes	-0.0677	0.00315	-0.173	-0.176
	-0.14	-0.122	-0.124	-0.134
Reference: Did financial pressure initiate? = No	-	-	-	-
Did financial pressure initiate? = Yes	-0.711***	0.926***	-0.345***	-0.378***
	-0.132	-0.126	-0.125	-0.138
Reference: "We will accept risks in order to innovate" = Disagree	-	-	-	-
"We will accept risks in order to innovate" = Agree	0.215	0.0579	0.272**	0.14
	-0.149	-0.135	-0.138	-0.15
"We will accept risks in order to innovate" = Not relevant	-0.496	-0.785**	-0.3	0.0258
/ do not know	-0.321	-0.342	-0.322	-0.344
Reference: Size of workplace = 3-13 employees	-	-	-	-
14-29 employees	0.432**	-0.0968	0.261	-0.0939
	-0.18	-0.162	-0.162	-0.17
30-65 employees	0.267	0.0423	0.103	-0.104
	-0.167	-0.151	-0.153	-0.16
>66 employees	0.494***	0.0227	0.137	-0.0834
	-0.15	-0.134	-0.135	-0.143
Reference: Product innovation = No	-	-	-	-
Product innovation = Yes	0.132	0.0403	0.143	-0.0285
	-0.131	-0.114	-0.114	-0.121
Reference: Service innovation = No	-	-	-	-
Service innovation = Yes	0.310***	0.129	0.0356	0.304***
	-0.119	-0.103	-0.104	-0.109
Reference: Organizational innovation = No	-	-	-	-
Organizational innovation = Yes	0.904***	0.853***	0.813***	-0.075
	-0.12	-0.112	-0.113	-0.115
Reference: Communication innovation = No	-	-	-	-
Communication innovation = Yes	-0.0365	0.132	0.000992	0.857***
	-0.114	-0.0995	-0.0999	-0.104
Constant	-0.539	-1.169***	-1.057***	-1.251***
	-0.345	-0.317	-0.268	-0.354
Observations	1941	1941	1941	1941
Pseudo R-squared	0.067	0.058	0.06	0.07

*Table 4: What may influence the frequency of values reported. The table assembles four binary logistic regression models, one for each dependent variable. Standard errors in parenthesis. P-values indicators based on t-tests: * p<0.10, ** p<0.05, *** p<0.01*

Table 4 reveals that quality is reported significantly more frequently when employees initiated the innovation than when they did not and substantially more when the innovation was stimulated rather than impeded by employees. Innovations initiated by politicians receive fewer reports of increased quality, efficiency and employee satisfaction than innovations that were not initiated by politicians. However, significantly more managers report having increased citizen involvement if politicians supported the innovation process.

These findings partially confirm *H1*. Managers are more likely to report an increase in quality if their employees initiated the innovation. However, the role of politicians is more ambiguous. No significant impact on reported citizen involvement was found when politicians initiate an innovation process, but a positive impact is obtained when they serve to stimulate it.

It makes no significant difference to managers' perceived value creation if the innovation was initiated by new legislation. The managers who consider their organization willing to take risks are significantly more likely to report increased employee satisfaction as an outcome. Innovations initiated by financial pressure were reportedly more likely to increase efficiency. Thus, *H2* is only partially confirmed. Contrary to the hypothesis, two of the three tested organizational conditions do not restrain the enhancement of quality significantly. However, as expected, financial pressure is the exception; while it may serve to enhance efficiency, it simultaneously inhibits perceived quality and also reported employee satisfaction and citizen involvement.

The size of the workplace has no impact on managers' perception of creating efficiency by innovation, rejecting *H3*. A significant advantage is found in increased quality when small organizations (3-13) are compared with medium-small (14-29) and large (more than 66 employees), whereas medium-large (30-65) did not show any significant advantage over small organizations. However, the results display a non-linear influence providing an ambiguous read, and importantly, the non-significance of the variable in three of four reported values also indicates that the importance of size should not be overstated in public sector innovation.

Lastly, the data does reveal a pattern linking specific types of public sector innovation to specific types of value creation as hypothesized in *H4*. Notably, service innovations are more likely to increase quality. Besides enhanced quality, organizational innovations also increase reported employee satisfaction and efficiency. Innovations concerning external communication are especially likely to increase citizen involvement. While the pattern is not complete, it allows the partial confirmation of *H4.* The only innovation type left out is product innovation, which does not significantly impact the frequency of any of the reported values.

Discussion

With the data available in the Innovation Barometer, the scope for empirically recognizing public value through innovation is expanded from focusing primarily on effectiveness (Bryson, Sancino, Benington& Sørensen, 2017) to including democratically esteemed values such as quality, citizen involvement, and employee satisfaction. These values are viewed not merely as instrumental in creating public value but as outcomes in themselves. This broad overview of value creation across the entire public sector provides a solid baseline for discussions of public management and the

development of the public sector in general. It has become clear, that the goal of public innovation is not limited to financial concerns, but also includes sustaining and developing high-quality service while remaining an attractive workplace for public servants.

The integration of the public value concept into public innovation theory brings with it an outcome-oriented focus, which has been lacking in many case-studies of public innovation (De Vries et al., 2016). The public value scorecard (Moore, 2013) is a reminder, that not all innovative solutions are equally valuable. Some may show unintended or poor results. This point is particularly well demonstrated when the perceived value creation for innovations initiated by economic pressure is tested. While innovations caused by economic pressure succeed in increasing efficiency, it comes at the cost of reduced quality, employee satisfaction, and citizen involvement. Thus, it is important to keep in mind that, while it may be possible to improve the balance of the books, those savings can turn out to be costly in terms of other types of public value. This sort of tension between different types of public value is not uncommon in innovation projects. For instance, technological advances in public administration are currently under scrutiny for ethical and privacy issues (Meijer & De Jong, 2019).

Also, the study revealed that innovations introduced by politicians resulted in fewer public managers perceiving to have created public value. This finding could be explained by Arundel, Casali & Hollander's (2015) conclusion, that a bottom-up approach to innovation yields better results than policy-driven innovation. Hartley et al.'s (2013) observation, that managers tend to favor in-house innovation and thus will be prone to a more critical assessment of ideas coming from outside the organization may also explain this finding. However, the data is not detailed enough for assessments

of motives. Rather, this finding indicates that the collaboration between public managers and politicians is sometimes difficult and needs further exploration.

Although the survey has a large N, there are limitations to the scope of this study. For instance, it reflects only the perception of managers. Further study is needed targeting multiple informants or applying mixed methods if a deeper understanding of how public servants perceive "quality" or how different stakeholders obtain the values they perceive to create. Moreover, as is the case in all register-based studies, research questions are limited to what the database covers. This means that the independent variables must be selected from among those that are available. However, the register-based data has the obvious advantage of strong coverage in sampling and response rate and thus offers interesting opportunities for utilization by researchers.

Other Scandinavian countries initiated comparable studies in 2018 and 2019 and in the coming years similar surveys are expected to be conducted in several other European countries. Likewise, semi-annual repetitions of the Danish survey will provide evidence of the robustness of these findings over time and across nations. This data should provide interesting future research opportunities regarding public innovation and value creation in the European public sectors.

Conclusion

The research fields of public sector innovation and public value may be relatively young, but the debate is booming (for reviews, see de Vries et al. 2016; Hartley et al. 2017). Case studies of innovation processes and lacking empirical grounding have dominated the fields. Thus this study offers an important contribution to the body of research on public innovation and public value by providing a macro-level mapping of the public value outcome created by innovation. The significance of this contribution

rests on the comprehensive dataset, which grants solid coverage of the entire Danish public sector, as the dataset is based on a survey of Danish public managers with a high response rate equivalent to one in six public workplaces in Denmark.

The study has investigated the impact of a number of organizational contingencies that have interested researchers in public management and innovation but which thus far lacked have quantitative empirical grounding. The study advances existing knowledge and has made unexpected discoveries, especially concerning the role of key actors and economic pressure in innovation processes.

The research question posed in the introduction to this paper is answered by concluding that a number of antecedents influence public managers' perceptions of creating public value through innovation:

Particularly surprising was the discovery that innovative initiatives by local politicians appear to impede managers' perceptions of creating public value. Innovations initiated by new legislation showed no significant impact on the perceived value creation.

Innovations initiated by employees increased the reports of enhanced quality and employee satisfaction. This finding indicates that the innovation employees initiate, aims at improving the service delivery in which they take part, and it is satisfying for employees to be able to influence the development of their work. When public managers characterize their organization as willing to take risks, the innovations are also more likely to increase reports of employee satisfaction.

When economic pressure initiates innovations, more managers report to have increased efficiency with their innovation, but simultaneously, significantly fewer report creation of all other types of value.

The impact of organizational size on managers' perceived value creation was also tested. In line with previous studies (Walker, 2014), the read was ambiguous and suggested that size does not necessarily make an innovative advantage in itself with regard to public value creation.

Finally, a pattern was uncovered between types of innovation activities and managers perceived public value creation. New services are reported to enhance the quality of the service delivered as well as increase citizen involvement. New processes or ways of organizing are reported to enhance the quality as well as employee satisfaction and efficiency. New types of external communication will, perhaps not surprisingly, increase the frequency of reported citizen involvement.

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