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Abstract:
Project management offices (PMOs) are frequently referred to as necessary, or even indispensable, for carrying out projects in multi-project settings, which often occur in public authorities' Information Technology (IT) projects; particularly in times of today's sweeping digitalization. Hence, this research studied Swedish public authorities and their IT departments' use of PMOs; a survey was directed to IT project managers. Findings showed that even though PMOs are commonly described as significant, those that applied PMOs were fewer than those that did not. This research searched for correlations between the existence of PMOs and 88 variables that resulted in relatively few, mostly weak correlations. A hypothesis test did not show significant association between PMOs' usage and project models' usage. The research contributions are principally that PMOs do not appear to be that significant after all for Swedish public authorities, and to have reasonable expectations on PMOs. For practice, the implications foremost concern the importance of understanding conceivable pros and cons.

1. Introduction

Projects are carried out in all kinds of organizations, not least in public authorities; particularly when Information Technology (IT) is involved, like in digitalization projects that are frequently applied today. Public organizations are of especial interest since they are not just as any other organization. To begin with, there are some prominent, distinguishing features about public organizations, not least the fact that public officials are used to exercise power from their authoritative positions, e.g. to make decisions that affect citizens' living conditions. Further, these organizations do not exist to make a profit for the owners; they are paid for, and maintained by tax revenues, i.e. conveying a responsibility for common economy. Hence, public organizations are in focus of both citizens', and other (higher) authorities' scrutiny since they are expected to act in accordance with existing laws and regulations. Santos and Varajão [1] pointed out several aspects that distinguish public organizations from others. With these aspects in mind, projects could be an efficient and effective way of carrying out tasks that fit into the project conception. Klakegg et al. [2] discussed major public projects' challenges from the perspective of how these could be mastered. Williams et al. [3] found that applying institutional frameworks, as well as the governing of project activities, were highly important to fulfil purposes of legitimization and reassurance. Aubry and Brunet [4] propagated the need for public administrations to configure the authorities' PMOs in compliance with specific, local requirements, and contexts. In other words, it is not possible to consult existing models with the aim to copy them because each project management office (henceforth PMO) must acknowledge the need for specialization, and the actual context. Parchami and Koosha [5] also proposed the use of PMOs, and stated that different configurations of PMOs should be expected in different organizations/contexts. Further, the PMOs must be proactive in anticipating changes that need to be carried out to deliver successful project outcomes to the organization [4]. Still, as pointed out by Artto et al. [6], organizations sometimes practice managerial control arrangements in a similar way that would be applied by a PMO, even though such a specialized unit does not even exist; a situation that could be equally accurate for public authorities.

PMOs are often described as sufficient and important for carrying out successful projects (e.g. [7]), but there are other opinions that point out problems as well [8], [9]. To look further into these matters is important since it is indisputable that it is both costly, and resource consuming to put PMOs into practice, no matter how valuable they turn out to be. A fundamental assumption that often exists concerning PMOs, is that they must be considered as evidently worthwhile if they should be implemented and applied. To quote Forrest and Rowe [10], who propagate PMOs' necessity of making their customers more productive, "… they must offer a clear, well-articulated value proposition". Hence, those who decide on establishing PMOs should be aware of both upsides and downsides to PMOs, to be able to make initiated, well-considered decisions. This is particularly important in public authorities that spend public revenues, i.e. the citizens' taxes. According to Khalema et al. [11] and PM Solutions [12] the strategic maturity of PMOs is of considerable importance for the prospects of deriving advantage from projects; a direct correlation exists between PMO maturity and its value for the company.

Despite the value that PMOs deliver, their contributions are often not recognized, which leads to PMO members experiencing a need to justify their existence [13]. A key for being considered to provide value is closely connected to PMOs' ability to support the end users, and to how the PMOs manage to deliver successful outcomes. Those who decide about the PMOs' existence should be convinced about the PMOs' prospects of delivering valuable contributions before PMOs are implemented [13]. This is particularly important for public authorities. PMOs are often recommended [14], [7] in organizations that usually carry out several projects at the same time, and especially when big, complex projects are involved. Still, there are also doubtful voices describing PMOs as less useful than they generally are described [15], and that many PMOs are closed down or reconstructed [16]. Now and then, project organizations and programs are mixed up with PMOs [17]; well-managed projects are not necessarily managed by PMOs [6], which is not to say that PMOs are generally overrated. Nevertheless, organizations could run a well-functioning, sufficient, and adequate project management organization without a PMO. In Sweden, IT projects are frequently carried out; commonly due to the ongoing digitalization in society. Hence, it is of interest to look further into the reasons for applying PMOs. Particularly when it comes to public authorities that handle citizens' common economy, and therefore

should carry out their tasks as effectively and efficiently as possible. Hence, the research question is: *How significant are PMOs for (Swedish) public authorities?*

The remaining of this paper is structured as follows: Section 2 provides a background to PMOs; section 3 presents the method, including the data collection; section 4 presents the findings; section 5 analyzes and discusses the findings, and section 6 concludes; i.e. answers the research question, highlights implications, and proposes further research.

2. Background – theoretical frameworks for PMO

To sort things out a little bit more about PMOs' possible advantages and drawbacks, as well as providing initiated background information about PMOs, this section is digging further into these matters.

2.1 Basic concepts

The intention behind this sub-section is to provide a fundamental understanding of PMO. A recent definition of PMO is provided by the Project Management Institute's PMBOK [18, p. 554]: "An organizational structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques". However, some [4] still favor an earlier definition [19] as being more adequate in describing PMOs in accordance with its responsibilities. The first PMOs (program offices at that time) were put into practice in the 1950s during the cold war's big US defense projects, and according to Kerzner [9] they were established to get in closer contact with the customers, who were more interested of the technology and schedules than of the costs, even though they had to finance them. This changed a bit during the 1980s as the budget aspects became more important and watched over. The 1990s regarded PMOs as cost efficient, and from year 2000 (to present), PMOs became commonplace in different kind of organizations [9]. According to Darling and Whitty [15] PMOs have changed throughout the years and from starting out as managing non-operational work they have evolved to also include management of human resources that are involved in the projects. Even though projects nowadays are carried out in all kinds of organizations, projects are still deeply connected with IT. De Carvalho [20] studied opinions among IT personnel, PMO staff, and business personnel and found that IT personnel had a higher commitment to project management methods than business personnel had. Still, these two groups of personnel had a similar view of project conflicts stemming from partly a semantic gap, partly from a lack of trust. The PMO staff on the other hand reported different project priorities, and a lack of commitment to follow project management methods as the main reasons for communication barriers during IT projects. Andersen et al. [21] propagated some features that stood out as being especially important for establishing PMOs in large organizations. To begin with, there should be an unambiguous and clear need for the PMO, and the top management's support should be evident and explicit. Further, the credibility and organizational authority must be manifest since PMO successes are tightly connected to these basic conditions. This is in line with Aubry et al.'s [22] statement about PMOs that should not "be considered an isolated island within an organization" (p. 328).

Aubry et al. [23] found that PMOs are instable organizational entities, characterized by tensions and various states of transitions that often changes. Still, Aubry et al. [23] did not consider that these changes should be regarded as if there were something wrong with the PMOs, instead should these changes be regarded as necessary, and rather deal with aspects about why they should change, i.e. outline the reasons for the change. A PMO that is successful must be able to implement the project management standards to a point where the project management practice is embedded in the organization. However, by doing so, the PMO is almost making itself unnecessary, and "could be unable to justify its survival" [24, p. 767]. According to Aubry et al. [24, p. 767] this "emptying process" (p. 768) should be considered an effect of PMOs being embedded in their host organizations. Hurt and Thomas [7] seemed to agree when it came to looking upon PMO changes as natural and necessary development activities that are used as means for PMOs to remain fit and useful. Hobbs et al. [8] also described PMO changes as expected and natural events. Hence, PMOs should be regarded as organizational innovations that could take place in any type of organization [8]. Additionally, there could be different ideas about whether PMOs should be outsourced or not, and Martins and Martins' [25] research findings did not support outsourcing of PMOs since appliance to the organizational culture was considered particularly important for

the opportunity to take substantial advantage from the PMOs' benefits. Establishment of PMOs convey considerable costs, which makes it important to carefully consider the consequences. Darling and Whitty [15] argued that it could be doubted whether the costs associated with implementing PMOs really would create the expected return, even if the performance were assumed as being in compliance with "best practice". There could, however, be different ways to determine a PMOs value except the direct financial effects, e.g. impact on organizational changes. The basic value concerns the goals that were set for the PMO when it was created / implemented and how these goals are eventually fulfilled [26]. The ability to make relevant decisions about public authorities' practicing of PMOs, implies that the decision makers hold at least a fundamental understanding of what such an establishment would entail. The public officials, who have the power to decide, should agree with both positive and negative aspects associated with PMOs.

2.2 Conceivable pros and cons

Dai and Wells [14] found that organizations with an established PMO were more successful regarding their project performance (according to the authors, not statistically significant though!). The reason was that the PMOs distinctly promoted project management standards and methods, and could therefore better avoid failure. Martin et al. [27] argued that PMOs did not apply standard project management practices to a higher degree to judge from their research findings. Hobbs and Aubry [16] stated various literatures' commonly propagating of PMOs' value for project successes, and for applying of best practices, as being widely exaggerated. Their [16] research showed opposite result with a clear lack of consensus about PMOs' value. PMOs that did not perform well were considered far too costly and inefficient, and PMOs that were regarded as value-adding entities were highly appreciated, and the conclusion was that PMOs were more legitimate in mature organizations [16]. Hobbs and Aubry [16] proposed that there is no such thing as a general promise of value for money for those who decide to apply PMOs. Nevertheless, Aubry and Hobbs [28] stated that PMOs are important since "…they are in touch with the projects, programs, project portfolios, corporate strategy, and functional and business units" (p. 12). Additionally, there are also other problems associated with PMOs; Kerzner [9] raised a bundle of negative aspects and risks of applying PMOs such as employee burnout and excessive administrative tasks. Still, there are also positive sides such as more effective scheduling, standardized reporting formats, synchronization, fewer delayed decisions, and information that are adjusted to the current needs [9].

Projects' successes or failures are often discussed today; projects are commonly applied, and not only for IT related projects. It is often put forward as necessary for achieving project success that the project managers hold project certificates. Research findings however, indicate that Swedish employers do not value, or search after certified IT project managers [29]. Malloy and Stewart [17] noted that people often are being careless with how they name projects and programs; these are different phenomena to begin with, and probably falsely, are projects being more associated with failure. Maybe, the unsuccessful projects were not really about projects in the first place. Müller et al. [30] claimed that PMOs are on the one hand, important for successful projects, and on the other hand, PMO members did not turn out as the most popular knowledge providers. Instead, it was earlier partners that had been working together in other projects, who turned to each other when they needed support. Neither did PMO members exchange much knowledge among themselves, even though they shared knowledge with project managers outside the PMO. They did however show a tendency to overrate their importance as knowledge providers. Despite this, the PMOs turned out to be highly esteemed when it came to delivering successful project outcomes [30]. Pemsel and Wiewiora [31] found project managers in general as being reluctant to share project experiences and knowledge, even though they often talk about their projects per se. Further, they needed PMOs as knowledge brokers if they should share knowledge with others, and expected the PMOs to arrange e.g. workshops and cross-project discussions [31]. McKay et al. [32] found that it varied how many projects IT PMO leaders had an oversight of, and that they often handled projects spanning over several organizational units. Tsaturyan and Müller [33] propagated the need for coexistence of formal and informal networks that should ensure integration with a good balance between project concepts and other organizational tasks. Their study however, found that the PMO staff perceived employees outside the PMO as unwilling to contact them for help or consultancy because of the heavy bureaucracy associated with PMOs. Parchami and Koosha [5] also dealt with issues concerning PMOs' place in project-oriented organizations, and propagated the necessity of senior managers' supporting the PMOs. Additionally, there is a need for an organizational understanding of project methods, as well as an

understanding of, the presence of project managers and other project professionals in the organization. Such support and tolerance for the PMOs could not to be taken for granted according to the research findings [5]. Tsaturyan and Müller [33] put forward a discussion about large organizations that often must manage several PMOs. Because of these, often loose-coupled entities that have been established at different hierarchical levels within the organization, there is a need for control. At the same time, it is important for projects (and PMOs) to be able to remain unique and autonomous.

Ward and Daniel [34] stated that managers who are planning to establish a PMO should be aware of that there is a risk associated with such an implementation; a risk of being exposed to more scrutiny and intolerance regarding possible project problems (at least if problems seem to stem from the projects) from senior management. To deal with these problems, Ward and Daniel [34] suggested that PMOs should not primarily focus on controlling that the organizations' projects are carrying out an effective project process as regards keeping to budget, planning and following up on plans. PMOs do not contribute sufficiently if they only are used for basic project management tasks [35]. Instead, the PMOs must be more interested in improvement of the project success and in satisfying management, i.e. they should be more involved during the pre-project phases and at the end of the project's lifecycle [34]. Heising [36] also put forward a necessity to focus more on the early project phases. Aubry [37] proclaimed that the PMO's supportive role is the factor that actually, increases project success, business performance and project maturity, i.e. it is not its controlling role that is achieving it. According to Spelta and Albertin [38, p. 50) their findings suggested that "…some firms create an IT PMO despite a high level of satisfaction with project deliveries" even though it is more usual that firms that are not satisfied create an IT PMO.

3. Method

The research method is a survey, based on a prior designed questionnaire (Appendix A for more detailed information). This method section presents the data collection, the profile of the participants, and method critique.

3.1 Data collection

The data was collected (during 2016) by a designed questionnaire sent out to all Swedish public authorities. A similar questionnaire had been used in another research in 2007 [39]. In this current case, the respondent group were IT project managers in Swedish public authorities, and the steps taken for getting in contact with them can be described as follows. All Swedish public authorities were contacted (535), 50.3% percentages (269) answered that they would forward the message to the requested individuals, who were in charge for the IT departments. The remaining 266 (49.7%) authorities did not answer at all. About the 269 that answered positively to the initial request, there were 64 (24%) contacts saying that they did not have their own IT staff. Of the remaining 205 public authorities, 73 (36%) authorities did participate. It was 104 questionnaires sent out to these 73 authorities, and 82 individuals participated.

The statistical analysis of the data was conducted by using IBM SPSS 22.0. Firstly, a descriptive analysis was made (accounted for in sub-sections 3.2 and 4.1). Secondly, correlations were calculated with Spearman's correlations since the variables were of ordinal or of ranked data only. The significant correlations are presented in sub-section 4.2, and the not statistically significant correlations are presented in sub-section 4.3. Even though the latter correlations should not be interpreted, they are in this case still presented. Finally, a hypothesis test was carried out (accounted for in sub-section 4.4). The questionnaire was used before, so the questions had been tested [39], which is helpful for the validity. Additionally, minor re-formulations were made in order to better apply to the actual context, i.e. public authorities. The reliability is another important issue, which is trickier, since IT is in focus here, beside PMO, and there are steadily ongoing changes regarding IT, which in turn are most likely to affect the frequency, and mode of PMO entities in Swedish public authorities. Issues related to project interdependencies are most relevant [40].

3.2 Profile of the participants

After the initial procedures, 104 questionnaires were sent out; 82 individuals answered (response rate 79%). These 82 individuals were appointed in 73 different authorities. The profile of the participants is summarized (N=82) in Table 1.

Table 1. The profile of the respondents

Questions	Variables	Frequencies % N= 82
What is your gender?	Male	56.1
	Female	43.9
What type of public authority do you work in?	Other	37.8
	Municipality	25.6
	County council /Region	15.9
	University	13.4
	Supervising authority	7.3
What is the emphasis of the authority? (multiple-choice item)	Other	29.3
	Education / Competence development	34.1
	Health and medical service	26,8
	Law	18.3
	Inspection and controlling	17.1
	Infrastructure	9.8
	National defense/Police/Fire department	4.9
	R&D	6.1
	Event	1.2
Period of employment with the authority?	0 – 3 years	39.0
	4 – 6	19.5
	7 – 10	13.4
	11 – 20	19.5
	21 years –	8.5
How many are employed in the authority?	1 – 50 employees	2.4
	51 – 100	3.7
	101 – 250	9.8
	251 – 500	6.1
	501 – 1000	17.1
	1001 –	61.0
Do you hold a project management certificate?	Yes, IPMA	8.5
	Yes, PMI	3.7
	Yes, other	26.8
	No	61.0

3.3 Limitations

This study is subject to limitations. It was complicated to reach the IT managers that could provide further information about whom to contact, and many of those who were contacted revealed that their authority were not applicable for the study, since they either had their IT department outsourced, or they stood right before an outsourcing of IT. This conveyed a problem when it came to the opportunities for relevant testing of e.g. hypotheses that were notably reduced.

As regards the figure concerning PMO usage (Table 2, Yes = 42.7 %), it must be taken into seriously consideration if this is a particularly low figure or not. A best practice report from Computer Economics [41] revealed that even though PMO use generally remains high, it is relatively low in government/education (35%). This was a declining figure compared with the year before when 57 percentages (government/education) used PMOs, which were reported to be growing in popularity at that time [42]. However, it would have been preferable with more respondents than the 85 individuals, from 73 authorities, who after all, were possible to engage for participation. It would also have been favorable if the survey had included questions about previous existence of PMOs in the studied authorities.

4. Presentation of the findings

This section presents the study's descriptive findings, correlations, and a Chi-square test.

4.1 PMO related descriptive findings

The findings related to issues directly concerning PMOs are presented in Table 2.

Table 2. PMO usage

Questions	Variables	Frequencies %
Does the authority that you work in apply PMO? N=82	Yes	42.7
	No	52.4
	Do not know	4.9
How many years have PMO been practiced in this authority? N=35	0 – 2 years	40.0
	3 – 5	40.0
	6 – 10	11.4
	11 years –	8.6
How does the PMO function? N=35	1 (bad)	2.9
	2	8.6
	3	37.1
	4	37.1
	5 (good)	14.3
Which duties are handled by the PMO? N=35 (multiple-choice item)	Method / Model	74.3
	Coordination	68.6
	Quality	51.4
	Training / Education	40.0
	Project start decisions	37.1
	Other	22.9

Eight (22.9 %) respondents chose the alternative *other* to complete their responses regarding the duties that the PMOs handle. Other duties were: supporting portfolio management, funding, applying for grants from the European Union, following up on finances and on big projects, dealing with issues that cover the whole, and establishing the initial project process.

4.2 PMO related correlations

In order to carry out the correlation statistics as accurate as possible, the four respondents that *did not know* if they had a PMO or not were temporarily removed (marked as missing with the option "exclude cases pairwise") from the variable view, a procedure that entailed: N=78 (Table 3). A similar procedure was applied regarding the question about if there was an established project model (N=77, Table 4), and support for that model (N=67, Table 3). The correlation statistics resulted in s*even significant correlation on the 0.01 level*, *18 on the 0.05* level, and *63 that were not significantly correlated*. Table 3 and Table 4 shows the significant correlations; The analysis of the correlations set out from the question about if PMO was applied. Spearman's correlation was used (IBM SPSS 22.0) with the aim to: i) Explore the strength of the relationship between two continuous variables, and ii) the direction of the relationship as well. The variables are of ordinal level or rank data.

Table 3. Two-tailed correlations ($p < .01$)

Questions	Correlation coefficient Sig. (2-tailed)
	Is there a PMO? N=78
How often do you use the project model?	.321** .004
How would you describe your competence in the authority's project model?	318** .005
Is there any support available in the authority on its project model? N=67	.317** .009
To what extent are you and other project managers trained for your roles?	407** .000
How structurally does the authority work with the realization of the business value?	.331** .003
To what extent do you think that the sponsor is able to distinguish between technical IT-issues and business issues?	.426** .000
How do you value the sponsors' work?	.311** .006

The correlations in Table 3 are of a medium strength according to Cohen [43], who suggests, as a guideline, medium strength to be $r = .30$ to $.49$.

The correlations accounted for in Table 4 are weak [43].

Table 4. Two-tailed correlations (p < .05)

Questions	Correlation coefficient Sig. (2-tailed) Is there a PMO? N=78
Is there an established project model? N=77	.248 * .029
What is your judgement about the users' knowledge level during the project?	273* .016
How important is the IS for your project work?	.268* .018
How would you consider your employer's appreciation for your work?	.274* .015
To what extent are different experiences represented in the projects?	.288* .011
To what extent do you consider that you can take in the whole project?	.228* .045
To what extent do the users get any training for their project role?	.237* .037
To what extent can you influence the user training?	.278* .014
How complete decision support can you supply the decision makers with?	.226* .046
How understandable decision support can you supply the decision makers with?	.246* .030
How good is the leadership that you practice in the projects?	.241* .033
In a long-term perspective - to what extent does the authority work with the business value realization?	.261* .021
To what extent would you consider that the sponsor understands the intention of the decisions?	289* .010
How do you value your communication with the sponsors?	.247* .029

Table 4. Two-tailed correlations (p < .05) (cont.)

Questions	Correlation coefficient Sig. (2-tailed)
	Is there a PMO? N=78
How do you value your co-operation with the sponsors?	225* .047
Which competence level do you consider the project members to have as regards the IS/IT-sector?	.253* .025
To what extent are different genders represented in the projects?	.240* .034
How important is leadership quality for your work as a project manager?	.224* .049

4.3 Not significant correlations

The remaining correlations (i.e. 63), that did not turn out to be significant, are roughly summarized below. Correlations that are not statistically significant shall not be interpreted. Hence, they are not accounted for in detail, and just broadly outlined. Still, providing some information about these could be illuminating to some point, and should only be seen as an attempt to complement this research about PMO usage in Swedish public authorities.

Whether the authorities applied PMOs or not, did not correlate significantly with the IT project managers' possibilities to influence on the effects of the projects and the business benefits / values, the sponsors' decisions / strategies, staffing of the projects, co-operation, communication and discussions, the users' knowledge, competence and motivation levels. If the IT project managers were certified, how many years the PMOs were used, how the project model worked, and the quality of the support for the project model did not make any difference as regarded correlation with PMO usage.

Nor did PMO usage correlate with the IT project managers' opinions about the users' ability and willingness to increase and maintain their competence (e.g. about project methods) and motivation levels, during and after the projects' results were commissioned. Neither correlated PMO usage and the IT project managers' occupational pride, their intuition, private / occupational experiences, their status, position in the authority, individual gain, private / society's / authorities' norms. There was no significant correlation between PMO existence and auditors' / sponsors' training, the project managers' ability to grasp the whole of the project, the significance of product / project / project charter quality at the initial project phase.

There were no significant correlations between PMOs and the IT project managers' rating of their communication and co-operation with the project staff, external stakeholders, users and auditors, nor as regarded the discussions with sponsors, project workers, external partners, users, and discussions with the auditors. Neither, did the PMO usage, and how consciously the authorities worked with the realization of business values, correlate significantly. When the project's goal fulfillment was followed up on, the sponsors' knowledge level about the IS at the start of the projects, the importance of organizational culture and sector knowledge did not either correlate with PMOs' existence. Further, there were no statistically significant correlations between PMOs and to what extent different ages, and different ethnics were represented in the projects.

The non-existing significant correlations should not be subjected to statistical interpretation but might contribute to an increased understanding of the whole, and to broaden the perspectives on PMOs in public authorities.

4.4 No significant association between usage of PMOs and usage of project models – a hypothesis test

A Chi-square test was performed to test the hypothesis (presented below) concerning the possible distinctions that could appear between public authorities that did apply PMO, or that did not, and to what extent there was an association with establishment of a project model in those authorities.

- H0: There are no distinctions between the public authorities that have an established project model depending on whether there exists a PMO or not.
- H1: There are distinctions between the public authorities that have an established project model depending on whether there exists a PMO or not.

The null hypothesis was assumed [44], [45]. The Chi-square test for independence (with Yates' continuity correction) indicated no significant association between the public authorities' use of PMOs and the authorities' use of project models, $x^2(1, n = 77) = 3.47$, p = .06, phi = .25.

5. Analysis and discussion

This section analyzes and discusses the findings in relation to others' research (5.1), as well as the relatively low application of PMOs at the respondents' workplaces (5.2).

5.1 The findings in the light of other researchers' findings

PMOs are generally apprehended as sufficient and necessary for both successful and efficient handling of projects. A competing view of PMOs as being less significant is available in the literature, and that view was carefully considered when the findings from this research were analyzed. Prior research, questioned PMOs as knowledge brokers [31]; they did not even share knowledge among themselves [30], and repelled project managers because of the heavy administration connected with PMOs [33]. This research's findings, did not clearly reject PMOs' deficiency as knowledge providers but did not support it particularly either; even though there was a weak positive correlation between PMOs and the extent to which the users were trained for their project roles. Issues that the project managers considered, and that they could influence were, with a single exception for user training, not correlated to usage of PMOs. Neither, were there any correlations between how the respondents rated their communication and co-operation with project members, external stakeholders, and auditors. The co-operation and communication with the project sponsors were weakly correlated though. Proportionately few findings showed distinct results in a direction that proposes PMOs to have an important influence for project processes and project outcomes in Swedish public authorities.

Of the 88 correlations that were calculated, seven cases of medium strength and 18 of weak strength were found. Dai and Wells [14] argued that PMOs led to successful projects even though their findings were not statistically significant. Hence, their research presents ambiguous findings, and it would perhaps be more appropriate to play down these findings since there were no statistical significance to indicate the correlation between PMO and project success. When it comes to research, statistical significance should not be ignored. Still, in some cases it might be regarded as relevant to show non-existing correlations for providing a fuller understanding of the whole picture of the current phenomena. Not least, to avoid overestimating the significant correlations that actually exist anyway. That is why the not statistically significant correlations from this research are briefly presented in sub-section 4.3.

Most PMOs in this study (80%) were rather new and at the oldest six years. According to Aubry et al. [23], [24], and Hurt and Thomas [7] it is necessary, and should be expected, that PMOs change, and even are being closed, for the sake of innovation, and adaption to organizational needs. Besides, it is often a part of the assignment to transfer project knowledge/culture so it will be embedded in the organizations; a process in which PMOs are making themselves unnecessary [24]. An organization that had closed one or more PMOs could successfully start new ones. If that would

be the case in these authorities is not be possible to know, because it was not followed up in the survey if there had been PMOs before, or if there were any plans for establishing PMOs.

In the literature, it is raised as a problem that PMOs' tasks are often not recognised in the organization, conveying that PMOs must defend their existence [23]. The findings showed weak correlations between the respondents' opinions about how they considered their employer to appreciate their work and the PMOs. Further, there were no significant correlations between PMOs and the respondents' occupational pride, between PMOs and their intuition, or how his/her individual gain influenced the job. Neither were there any significant correlations between PMOs and influence of norms, or importance of organizational/sector knowledge as concerned the decision foundations.

In the literature [34], there are opinions that implementing PMOs could convey a risk for being increasingly exposed to more scrutiny, than otherwise, just because there is a PMO, which is expected to deal with all project related problems. PMOs should not be judged simply on grounds regarding monetary value, neither should PMOs be established only to give legitimization to the projects [38], and it is not the amount of control, that the PMO exercise, that add to the project performance [37].

5.2 Relatively low PMO usage in Swedish public authorities

Even though the data collection was not as covering as hoped for, the findings still point in a direction that there were a proportionately low application of PMOs in the Swedish public authorities that took part in this research. It was IT PMOs that were studied, and the authorities, in which the IT departments already were outsourced (or should be soon), did not find it meaningful to participate in the survey. That is understandable, but the fact that IT was outsourced in 64 authorities (that did not take part in the survey), makes it still interesting to compare with Martins and Martins [25] research. They argued that outsourcing of PMOs were not recommendable since the organizational culture is too important to let go off. External parts were not considered as being equally good, from a culture preserving perspective. Organizations that want to take advantage of PMOs' benefits should rather keep the PMOs internal, and manage them in-house. This argumentation should be just as applicable on outsourcing of IT, and would probably convey that IT PMOs also were outsourced. The risks connected to external parts dealing with IT issues in a way that are not manifest in the authorities' culture, could be applicable for outsourced IT PMOs as well as for outsourced IT departments. The public authorities' culture probably would differ from private companies [4], [2], [5], [1]. Most respondents (61%) worked in large authorities, with more than 1001 employees, which could be a motivation to keep IT in-house, even for those authorities that did not apply PMOs. There were positive correlations of medium strength between i) project managers that were trained for their project role, ii) between how often the project model was used, iii) between the project managers' competence in the project model, and iv) between the support for the project model and the existence of PMOs. Still, the Chi-square test assumed the null hypothesis (cf. 4.4). The fact that IT project managers' opinions were studied, and that they worked at authorities that had their own IT departments, could possibly partly explain these findings, which however, also could be influenced by the respondents' general project management knowledge and competence. Still, a majority (52.4%) of the respondents' workplaces did not apply PMOs, and the project managers did not hold project management certifications (61%), the latter is however, not regarded as necessary to deliver successful project outcomes [29]; these findings indicate that it is not that significant to adopt PMOs. According to Artto et al. [6] managerial control over projects could be practiced without PMOs; IT project managers with accustomedness to IT projects could be even better equipped for such a commission. Besides, the authorities must be particularly careful with how they spend the taxpayers' money. It would not be accurate to presume that decisions about applying PMO has its origins in anything other than initiated decisions, and weighing of the pros and cons. The IT sector has especially long experience from carrying out projects, since the modern project management era started out from handling technical projects that are closely connected with IT. The IT personnel also show a higher commitment to project management methods than business personnel according to de Carvalho [20]. The research findings indicate that PMOs are not that sufficient, and PMOs are also questioned in the literature. Researchers do not agree about the necessity of PMOs; some found them even to be overrated [15], others stated that organizations could apply managerial control in a way that is principally comparable to what a PMO would have done, and stated that PMOs do not apply project management practices to a higher degree that other organizations [6], [27], [35]. This research showed just a weak, positive

correlation between PMOs and establishment of project models, and no significant association between usage of PMOs and usage of project models. There were no correlations at all with PMOs and the importance of product / project quality, intuition or the projects' effects for the project managers' work, and the sponsors' organization. Neither, were there any correlations between PMOs and the quality of the project charter at the initial project phase, at what time the goals were followed up, the sponsors' ability to grasp the whole / the knowledge level regarding the IS when the project started, and none regarding the respondents' private / occupational experiences. Several issues pointed in the same direction, and the findings are unambiguous when it comes to presenting a picture of the whole about the usage of PMOs in Swedish public authorities.

The fact that a majority of the public authorities did not apply PMOs does not really say anything about the underlying reasons. Well-informed decisions could have been taken in mature project organizations (i.e. the authorities) [7], [8]. There could have been PMOs earlier that have made themselves unnecessary through an "emptying process" [24]. There was no question about earlier / future PMO existence in the survey. Organizations that are running PMOs must accept their presence, and the top management must support them [5]; something that is just as true for projects in general, with or without PMOs. When PMOs are not applied, as is the case in most of the respondents' authorities, it might be a proof of that the projects are manageable without PMOs, and that the projects are explicitly accepted, and supported, by the top management. It could be related to skilled and experienced project managers, and it does not have to be a result of bad judgement or of less initiated decisions about PMO implementations.

6 Concluding remarks and answers to the research question

In this section, the answers to the research question will be summarized, implications for theory and practice will be presented (6.1), and future research will be proposed (6.2).

6.1 Answers to the research question and implications for theory and practice

The research question was: How significant are PMOs for Swedish public authorities? The short answer is that PMOs do not appear as particularly important. There are some partial answers that contribute to a richer understanding of the research question. There was 42.7 percentage of the respondents, who answered that their authority applied PMOs. This figure is however, even lower since some of the respondents work at the same authority (82 respondents appointed in 73 authorities). Concerning what could be statistically proven about PMOs significance for public authorities, there were seven medium strong correlations ($p < .01$), 18 weak correlations ($p < .05$) (cf. 4.2), 63 correlations were tested and found not statistically significant (cf. 4.3), and one Chi-square test was carried out (small effect size) that did assume the null-hypothesis (cf. 4.4). Hence, the findings related to PMOs are not convincing when it comes to validating the PMOs' necessity and sufficiency for Swedish public authorities, rather the opposite.

The most prominent theoretical implications are summarized as follows:

- The findings indicate that PMOs are of less significance for successful projects than they are frequently pointed out to be.
- The fact that there are no PMOs in authorities could be a result of:
  - Earlier instances of PMOs have been exposed to "emptying processes" that actually imply that project management practices have been spread successfully in the organization due to mature PMOs
  - New PMOs that are under development, that should be implemented but are not yet, since PMOs should preferably be regularly renewed.
- IT project managers are often used to carrying out projects, and therefore there could be less need for PMOs when the projects concern IT.

The implications for practice are mainly connected to the importance of acknowledging that PMOs could entail both pros and cons, and that they do not solve all conceivable problems associated with projects and project management. A thorough understanding of these issues is likely to provide a more reliable foundation for substantiated decisions about PMO establishments, and should convey that overestimated expectations are avoided.

6.2 Suggestions for further studies on PMOs in public authorities

Further studies should be carried out in order get a better hold of the factors that influence PMO usage in public authorities. The correlations, and also the non-existing correlations, could give input to follow-up studies that would probably gain from being carried out as case studies [46]. Deep interviews, focus groups combined with surveys, and preferably in a longitudinal study design, which allows for following up on interesting aspects regarding the innovation perspective, and PMOs almost inherent abilities to change, innovate, and to adapt to the organization in a way that make themselves unnecessary whilst embedded in the organization instead [24], [16]. Issues connected to the value for money problem [15], and to the problems with PMOs being entities that project managers in general hesitate to contact because of their reputation as not being interested in knowledge brokering [30] should be further elaborated on.

Acknowledgments

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Appendix A. Questionnaire

The 89 questions (including the question about if there was a PMO or not) from the questionnaire that were used in this research are listed in sub-section A1. These questions / variables have been calculated with Spearman's correlation, resulting in 88 correlations (7 significant correlations on the 0.01 level, 18 on the 0.05 level, and 63 not significantly correlated). The questions regarding the participants' background data (profile) are excluded below. The participants profile is available in sub-section 3.2.

A.1. Questions

Is there a PMO?
How long have the authority applied PMO?
Is there an established project model in the authority?
How does the project model work?
How often do you use the authority's project model?
Is there any support available in the authority on its project model?
How good do you consider the support on the project model to be?
How would you describe your competence in the authority's project model?
How significant is your occupational pride for your work as a project manager?
How significant is your occupational experience for your work as a project manager?
How significant is your private experience for your work as a project manager?
How significant is project quality for your work as a project manager?
How significant is product quality for your work as a project manager?
How significant is auditor training for those who take on project accountant tasks?
How significant are your private norms for your work as a project manager?
How significant are the authority's norms for your work as a project manager?
How significant are the society's norms for your work as a project manager?
How significant is your status in the authority for your work as a project manager?
How significant is your position in the authority for your work as a project manager?
How significant is your individual gain for your work as a project manager?
How significant is your intuition for your job as a project manager?
To what extent are the authority's managers trained for their project sponsor roles?
How significant do you consider training, for those who take on a sponsor role, to be?
How would you judge the importance of a project's effects for the project sponsor's organization?
To what extent can you influence the projects effects and business benefits?
To what extent can you influence the sponsor's decision-making?

To what extent can you influence the sponsor's strategy?
To what extent can you influence the communication?
To what extent can you influence the co-operation?
To what extent can you influence the discussions?
To what extent can you influence the staffing of the projects?
To what extent can the organization's managers influence the staffing of the projects?
To what extent can the project sponsors influence the staffing of the projects?
To what extent can you influence the users' knowledge level?
To what extent can you influence the users' competence level?
To what extent can you influence the users' motivation level?
How do you value the users' abilities to increase their competence levels?
How do you value the users' willingness to increase their competence levels?
How do you value the users' ability to maintain their competence after the project, and after the products (i.e. the IT systems) have been commissioned?
How do you value the users' competence at the time when the products (i.e. IT systems) are being commissioned?
How do you value the users' willingness to maintain their competence?
How do you value the users' knowledge level during the project?
How do you value the users' motivation level during the project?
How do you value the users' motivation level after the project, when the products (i.e. the IT systems) have been commissioned?
How do you value the project staff's competence regarding the project method / work?
To what extent do you consider that you can take in / grasp the whole of the project?
To what extent do you consider that the sponsor can take in / grasp the whole of the project?
To what extent do you consider that the sponsor can grasp the product of the project?
How complete decision support can you supply the decision makers with?
How understandable decision support can you supply the decision makers with?
How good is (i.e. what quality has) the project charter at the initial project phase?
How important is organizational knowledge (i.e. culture) for the decision foundations?
How important is sector knowledge for the decision foundations?
What is your assessment of your over-view of the product?
What is your assessment of your employer's appreciation for your work?
To what extent are different experiences represented in the projects?
To what extent do the users get any training for their project role?
To what extent can you influence the user training?
To what extent are you and other project managers trained for your roles?
How good is the leadership that you practice in the project?
How important is leadership quality for your work as a project manager?
In a long-term perspective – to what extent does the authority work with the business value realization?
When is the goal fulfillment (i.e. the effects) of the project followed-up on?
To what extent would you consider that the sponsor understands the intention of the decisions?
How do you value your communication with the sponsors?
How do you value your communication with the project staff?
How do you value your communication with the external stakeholders?
How do you value your communication with the users?
How do you value your communication with the auditors?
How do you value your co-operation with the sponsors?
How do you value your co-operation with the project staff?
How do you value your co-operation with the external partners?
How do you value your co-operation with the users?

How do you value your co-operation with the auditor?
How do you value your discussion with the sponsors?
How do you value your discussion with the project staff?
How do you value your discussion with the external partners?
How do you value your discussions with the users?
How do you value your discussions with the auditors?
How do you value the sponsors' work?
Which competence level do you consider the project staff to have as regards the IS/IT-sector?
How important is the IS for the project work?
To what extent do you think that the sponsor is able to distinguish between technical IT-issues and business related issues?
How would you assess the sponsor's knowledge level about the IS when the project starts?
To what extent are different genders represented in the projects?
To what extent are different experiences represented in the projects?
To what extent are different ages represented in the projects?
How structurally does the authority work with the realization of the business value?
How consciously does the authority work with the realization of the business value?

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