DIFFERENCES BETWEEN THE PUBLIC AND THE PRIVATE SECTOR IN INFORMATION SYSTEMS DEVELOPMENT AND EVOLUTION PRACTICE AND RESULTS

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Abstract

We have in earlier work pointed to differences between how public and private Norwegian organizations are able to use time on value adding activities in their work on IT. Using responses to the IT i praksis – surveys done by Rambøll in 2014, 2015 and 2016, we in this paper both confirms this pattern and look upon how public and private organizations differ relative to maturity of practice and how this might influence their ability to have time for value added IT-activities. ‘IT i praksis’ is sent to large Norwegian private and public organizations, and the overall response rate is around 45-50 %, although not all respondents answer all questions. The data presented in this survey is based on responses from more than 200 organizations for each year. When we compare public and private organizations in the last surveys we find statistically significant differences supporting the claims of better usage of resources for information systems evolution in private than in public sector. We also find differences between private and public sector as for reported maturity of IT-management practice that might partly explain the difference.

1 INTRODUCTION

Many authors claim that there are more problems with effective and efficient digitalization in the public than in the private sector. In (Moløkken-Østvold 2004) it is reported that "Public projects had an average effort overrun of 67%, as opposed to the 21% average in private projects. This observed difference appears to be caused by systematic differences between private and public organizations found at 1) the political level, 2) the organizational level, and 3) the individual level". A number of reports indicate that this is an international trend (Flak et al 2009) in OECD countries, USA and in the UK (PASC 2012).

A reason these failures get so well-known though might be because they are in the public sector, thus information about success and failure is also public information. As reported e.g. in (Budzier and Flyvebjerg 2011) failure is happening both in public and private sector, and usually, the failures are only partial; most systems get delivered and are used at least partly. In (Jørgensen 2015b), there was not reported any significant differences between project success in public and private organizations as for delivered benefit, cost overrun and adherence to schedule.

On the other hand, the work in this area is in our view too much focused on development projects. Although it has long been known that only a small fraction (15-20% on average) of the effort used on IT in organizations is done on making new systems (Krogstie 1995, Veld and Krogstie 2014), research in information systems and software engineering is excessively interested in this part of the system lifecycle. As summarized in (Jørgensen 2015a), there is an obvious potential for improvements in this area. Many investigations points to that around 10% of the investments in new projects ends up delivering nothing (Jørgensen 2015b, Sauer, Gemino et al. 2007, El Emam and Koru 2008, Tichy and Bascom 2008). On the other hand it is also important that it is possible to evolve system through the life-cycle, also being able to add new functionality to systems in production. Since most work on IT is not on developing new systems, but on maintenance, operation and user-support (Jones 2006), an alternative way to compare IT efficiency than only looking at the development efficiency, is looking upon how work is distributed in the IT-organization, and the amount of work being possible to allocated to value-adding activities. Applica-
tion systems are valuable when they provide information in a manner that enables people to meet their objectives more effectively and efficiently (Boehm and Sullivan 1999). An application system is part of an encompassing organizational system, which in turn is part of a broader environment that is under constant change. This environment of change raises constantly new requirements and possibilities that an organization must address which implies that the supporting information systems also must be easily adaptable. As stated already in (Brooks 1987), it is one of the essential difficulties with application systems that they are under a constant pressure of change. Given the intrinsic evolutionary nature of the sources of system needs as described above, it should come as no surprise that information system must evolve as well.

The goal of both development activities and maintenance activities is to keep the overall information system support of the organization relevant to the organization, meaning that it supports the fulfilment of organizational goals. A lot of the activities usually labelled ‘maintenance’, are in this light value-adding activates, enabling the users of the systems to do new task. On the other hand, a large proportion of the ‘new’ systems being developed are so-called replacement systems, mostly replacing the existing systems without adding much to what end-users can do with the overall application systems portfolio of the organization (Davidsen 2009). Based on this argumentation we have earlier developed the concept application portfolio upkeep as a high-level measure to evaluate important aspects of to what extent an organization is able to evolve their application system portfolio efficiently. How application portfolio upkeep is different from maintenance is described further below.

In this paper, we present results from survey-investigations performed in Norwegian organizations in this area in 2014, 2015 and 2016. When comparing the overall results with similar investigations done in 2013, 2008, 2003, 1998 and 1993 (Veld and Krogstie 2014), we find a stable overall pattern of distribution of work since the late nineties. We will in this paper look more closely at the results from the last investigations, comparing figures from public and private organizations on central variables. As we have reported differences before, we will here extend the investigation to see to what extent they co-varies with different maturity in IT-management practice.

Norway has quite a number of companies which are defined as private, but yet having substantial public ownership, the state being a major shareholder. Also, a lot of previous public organizations have been transformed to private companies or state owned limited companies or other kinds of organizations with varying degrees of freedom being run more according to private business principles than what was usual earlier. On the other hand we find certain important traits among public organizations e.g. that they all have to abide to the same (arguably non-optimal) rule of procurement found in the EU legal framework for public procurement and development of IT-solutions. For instance, when external companies are involved in developing the requirements to a system, they are not allowed to be involved in the implementation of the system (Følstad et al. 2004). A stricter year to year budgeting regime can also be witnessed in public sector. Public sector organizations also have a different safety net. E.g. a municipality will not cease to exist due to bankruptcy (although it can be put under administration). Public organizations often have political constraints that can change frequently and in an unpredictable manner. This might lead to an unstable environment. There is often little competition on the services they are delivering, and this means that they do not need to fight for the customers like private organizations do. Regarding goals, a public organization have stricter goals on equality and accountability. The primary goal of a private organization is to make profits. All this makes the dichotomy between private and public organization meaningful. Thus our core research questions are:

1. Is information systems development support conducted in a less optimal way in the public sector, compared to how it is done in the private sector in Norway.
2. Do such differences co-vary with maturity of IT management-practices in the organization.

We will first give definitions of some of the main terms used within information systems evolution. We describe the research method, including a number of more detailed hypotheses spawned from the field detailing the above research question, before the main results from our investigation are presented. Then a
closer investigation on the differences between private and public sector respondents are presented. The last section summarizes our results and presents ideas for further work.

2. DEFINITION OF CORE CONCEPTS

Traditionally, IT-activities are divided into development and maintenance, where maintenance is used on all work done on systems that are already in production. Maintenance has traditionally been divided into three types: corrective, adaptive and perfective (IEEE 1991) based on e.g. (Swanson 1976). This vocabulary is well established both in theory and practice, and we here use the IEEE terms with some clarifications and further division of these categories also anchored in the literature:

*Maintenance* is defined as the process of modifying a software system or component after initial delivery to production.

- Corrective maintenance is work done to correct faults in hardware and software.
- Adaptive maintenance is work done to make the computer program usable in a changed technical environment.
- Perfective maintenance is work done to improve the performance, maintainability, or other attributes of a computer program. Perfective maintenance has been divided into enhancive maintenance (Chapin 2000) and non-functional perfective maintenance. Enhancive maintenance involves changes and additions to the functionality offered to the users by the system. Non-functional perfective maintenance implies improvements to the quality features of the information system and other features being important for the developer and maintainer of the system, such as modifiability. Non-functional perfective maintenance thus includes what is termed preventive maintenance, but also such things as improving the performance of the system.

Adding to the traditional distinction between development of system not in production and maintenance of running system, we have introduced the concepts application portfolio evolution and application portfolio upkeep (originally termed functional development and functional maintenance when introduced (Krogstie 1995). At the same time, the concept of devtenance (cf. the current popular term devops) were introduced to indicate the need to look across system in development and system in production.

1. Application portfolio upkeep: Work made to keep the functional coverage of the information system portfolio of the organization at the current level. This includes: Corrective maintenance, adaptive maintenance, non-functional perfective maintenance and development of replacement systems.

2. Application portfolio evolution: Development or maintenance where changes in the application increase the functional coverage of the total application systems portfolio of the organization. This includes enhancive maintenance and development of new systems that cover areas, which are not covered earlier by other systems in the organizations.

Figure 1 presents an illustration of application portfolio upkeep and evolution and how it relates to the different types of development and maintenance. We note that some researchers provide more detailed overview of maintenance tasks (Chapin et al 2001, Jones 2006). Jones (2006) has in total 21 categories: This includes user-support as a part of maintenance an area usually looked upon as belonging to ‘other work’ in other overviews.
For tasks in an organization, also the IT-oriented task, one can define different levels of maturity. Process maturity measures the level of sophistication of each process on a scale from zero to five, where five represents the highest degree of maturity. If a process is caught between two categories, it can be assigned a half-point (e.g., 2.5). If a process does not consistently rest at a specific level, it is rated at the lowest common denominator. Definitions of these rating levels are as follows:

0. Not recognized—The process is not done even when it is acknowledged that it should be. (It is not necessarily the case that all processes in a reference process framework should be performed.)

1. Ad hoc—An ‘Ad hoc’ rating indicates that the process is performed on a ‘memory bases each time. (CMM: initial (Paulk et al. 1993)).

2. Repeatable—This rating refers to how consistently a unit has implemented the process. To qualify as having a ‘repeatable’ process, a function or task must be performed as an iterative set of steps consistently used by the people involved in the process. If a policy or checklist also governs the process, it may be rated at 2.5. (CMM: Repeatable)

3. Deployed—The process has been formally documented and communicated and is used consistently. (CMM: Defined)

4. Metrics and continuous improvement—To achieve a rating of ‘4’, a process must be documented, be fully and consistently implemented, and have result and process metrics that are used as bases for continuous improvement. (CMM: Managed)

5. Business results—To qualify for a rating of ‘5’, a process must be measured and improved, and the process and its measurements and improvements must demonstrably contribute to the overall strategic goals and objectives of the client’s organization. (CMM: Optimized)

Not all processes are beneficial or possible to achieve a level higher than 3 or 4.

**Figure 1.** Activities in maintenance and development

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**3 RESEARCH METHOD**
In connection to this work, we have used data from the IT i praksis yearly survey arranged by Rambøll in 2015 (Rambøll 2015) and 2016 (Rambøll 2016). We have earlier used data from IT i praksis from 2014 (Rambøll 2014). In these surveys we have included the questions relative to work distribution from our own replication study, to compare this with e.g. the perceived result of IT and the IT management process maturity.

The ‘IT i praksis’ investigation is sent out to around 500 organizations each year, equally divided between the public and the private sector. These are the 500 largest private and public organizations in Norway. In 2015 out of 500 distributed survey forms in ‘IT i praksis’, 272 responses (i.e. 54%) where returned. 227 provided responses to all our questions (45%). In 2016 similarly 500 companies where given the survey, where 289 responded and 232 also responded to all our question (46%). This is a quite high response rate for such surveys, but still there are limitations with survey methods, which we will discuss in some more detail in the discussion and conclusion section. Unfortunately it is not room in the paper to include the full survey form. See e.g. (Rambøll 2015) for more detail on how the investigations are carried out.

3.1. Previous Investigations

We have earlier compared some of the results from 2014 with the results of similar investigations (Veld and Krogstie 2014). This included:

1. The investigation carried out by Davidsen and Krogstie in 2008 reported in (Davidsen & Krogstie, 2010)

2. The investigation carried out by Jahr, Krogstie, and Sjøberg in 2003 reported in (Krogstie, Jahr & Sjøberg 2006).

3. The investigation carried out by Holgeid, Krogstie and Sjøberg in 1998 reported in (Holgeid, Krogstie & Sjøberg 2000).

4. The investigation carried out by Krogstie in 1993 reported in (Krogstie & Sølvberg 1994).

5. The Lientz and Swanson investigation (LS) reported in (Lientz & Swanson 1980): That investigation was carried out in 1977, with responses from 487 American organizations on 487 application systems.

6. The Nosek and Palvia investigation (NP) reported in (Nosek & Palvia 1990): A follow-up study to Lientz/Swanson performed in 1990 asking many of the same questions as those of LS. Their results are based on responses from 52 American organizations.

A number of later investigations on the distributions of work have been done, but they typically focus on the distribution of maintenance tasks only (Gupta et al 2006, Lee and Jefferson 2005, Schach 2003), many only looking on the situation in one organization. As mentioned (Jørgensen 2015a) only look at development.

3.2. Hypothesis

First we wanted to see if the differences found in (Veld and Krogstie 2014) on private vs. public sector also were upheld in the 2015 and 2016 surveys. To detail the main research question presented in the first section the following hypotheses were formulated to investigate the development of the different measures for distribution of work between private and public sector. Since we are looking for differences, we have formulated the hypothesis as if private and public sector are equal (to potentially refute this).
• H1: There is no difference between the percentage of time used for development in private and public sector. Rationale: When comparing the percentage of time used for development activities in organizations earlier, we have found this to be decreasing, but not so much between the three last investigations. Thus is interesting to see if this is equal also between private and public sector.

• H2: There is no difference between the distribution of work among maintenance and development between private and public sector when disregarding other work than development and maintenance. Rationale: Since the amount of other work than development and maintenance is taking up more time now than 15-20 years ago, we found it beneficial also in the surveys in 1993, 1998, 2003, 2008 and 2013 to look at the proportion between development and maintenance time only, a figure that has been quite stable over the last decade.

• H3: There is no difference between the distribution of application portfolio upkeep in private and public sector. Rationale: These numbers were on the same level in 2013, 2008 and 2003 as in 1998, and it interesting to see if it would be equal also across private and public sector. A high percentage fn application portfolio upkeep would in particular signal poor IT support practice cf. the discussion in the introduction.

• H4: There is no difference between the maturity of IT management practice in private and public sector. It is believed that the maturity of practice in public sector is less than private sector although having come closer in the last years (Jørgensen 2015a)

• H5: There is no difference between distribution of work in organizations with high and low maturity on the IT-management practices. Poor IT-management practices has been reported to be a problem for IT-projects. Limitations on maturity of these management disciplines are all included as important reasons for project failure (Patanakul 2014), thus it is interesting to see if they also have effect on longer term in the application system management. Patanakul (2014) also mention other aspects, but these where not explicitly asked for in the survey. It is interesting to see to what extent this also influence the distribution of work on IT in organizations. Finally we will look if this can explain part of the problems in public sector IT.

Thus to look more on possible reasons for any differences between private and public sector, we here look at the maturity of IT management (more precisely on project, program, portfolio and benefits management), both as for effect on the maintenance figures and for differences between private and public sector. Whereas project-management is closely related to the traditional projects, program and in particular portfolio management looks upon the whole application portfolio including applications in production. Likewise benefits managements follows systems from development into production with maintenance and continued evolution of the system to ensure that the expected benefits are accomplished.

Whereas we look on numbers from all of 2014, 2015 and 2016 for the first 3 hypothesis, we only look at numbers from 2015 on the two last areas. This is because the ways to operationalize process maturity is changed in 2016 in a way not being comparable with what was done in 2015, which was by giving score along a scale with the following type of questions (example from program management)

‘Program management includes the coordinated organization, planning and performance of changes/projects to achieve common goals and realizing strategically important benefits. Which of the following statements best describe the current situation in the organisation:

0. Program management is not done in the organisation
1. Programs are identified and are managed differently than projects
2. A minimum of techniques and methods are used across the projects in the program
3. A complete program management methodology is introduced in the organization
4. The program management methodology is used consistently in the organization, and one is collecting experiences from the use of the methods
5. The program management methodology is continuously improved by identification and implementation of best praksis
4 DESCRIPTIVE RESULTS

Work on application systems was in the survey divided into the six categories presented in section 2. The same categories were also used in 1993, 1998, 2003, 2008 and 2013. We also asked for the time used for user-support and for systems operations. For these figures we have numbers the IT i praksis also from 2015 and 2016, and we present the numbers from these studies below. Note that in the surveys, we do not ask for numbers of our specific figures on application portfolio evolution and upkeep, but calculate them from figures of the more well-established types of maintenance and development.

Both in 2015 and 2016 around 40% of the total work among the responding organizations is maintenance activities, and around 17% is on development activities.

![Development of application portfolio upkeep and evolution over time](image)

**Figure 2.** Development of application portfolio upkeep and evolution over time

When disregarding other work than development and maintenance of application systems, the percentages are as follows: maintenance activities: 72% in 2015, 74% in 2016, development activities: 28 % in 2015, 26% in 2016 (see Fig 2 where each line indicate the development of the numbers of the main variables from Fig. 1). This is at the same level as in 2013, which was slightly more skewed towards maintenance than in the previous investigations, back to the level reported in 1998. 67% (2015) and 69% (2016) of development and maintenance work was application portfolio upkeep, and 33% (2015) and 31% (2016) was application portfolio evolution. Looking on the graph we see a slight increase in application portfolio upkeep over the last decade.
Fig. 3 summarizes the results on the breakdown of maintenance activities from our investigations where we look upon the complete portfolio of the responding organizations. Most interesting for comparison with other surveys is looking at corrective, adaptive, and perfective maintenance, which appears to be much more stable than the numbers reported from others. We do note though that the enhancive maintenance part of perfective maintenance appears to have stabilized on a lower level than we found 20 years ago. (LS is Lientz/Swanson (Lientz and Swanson 1980))

Finally Figure 4 presents the reported distribution of maturity on the investigated management disciplines (Project management, Program management, Portfolio management, and Benefits management)
5 HYPOTHESIS TESTING

In the light of this stability of the main figures, we have divided the population to test H1-H3 comparing private and public organizations. Before looking for significant relationships, the variables used in the comparisons were tested for normality. Data for most variables cannot be investigated as if they were normally distributed. For these either the Shapiro-Wilks (S-W Sign) and/or the Kolmogorov-Smirnov (Lilliefors-Sign.) significance levels are less than 0.05. On some variables we could use the assumption of normal distribution in the tests below, using t-tests, whereas for the others we use a non-parametric test (Mann-Whitney).

We tested H1-H3 by comparing the numbers from private and public sector as summarized in Table 1 – Table 3. We list the number of cases, the mean and the standard deviation for all relevant figures to test the first three hypotheses. $\Delta$ is the absolute difference in the mean between private and public sector, and $p$ is the probability for erroneously rejecting the equality of means. Significant differences are highlighted using **boldface**. As can be seen all hypotheses were rejected, there are significant differences between public and private organizations as for the time they are using on developing systems, proportion of development to maintenance, and application portfolio upkeep in the advantage of private sector.

Table 1. Test of hypothesis – 2013/2014 data

<table>
<thead>
<tr>
<th>Sector</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>$\Delta$</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>Development, percentage of all work (vs. H1)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Private</td>
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<tr>
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<td>12.8</td>
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<td>.012</td>
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<tr>
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<tr>
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<td>164</td>
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<td>19.0</td>
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<tr>
<td>Application portfolio upkeep (vs. H3)</td>
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<td>.000</td>
</tr>
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<tr>
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Table 2. Test of hypothesis – 2015 data

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<tr>
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<td>13.2</td>
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<td>Maintenance, disregarding other work (vs. H2)</td>
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<td>Public</td>
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<td>19.6</td>
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<td>Application portfolio upkeep (vs. H3)</td>
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Table 3. Test of hypothesis – 2016 data

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<th>Mean</th>
<th>SD</th>
<th>Δ</th>
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<tr>
<td>Development, percentage of all work (vs. H1)</td>
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<tr>
<td>Private</td>
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<td>14.8</td>
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<td>.004</td>
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<td>14.2</td>
<td>13.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance, disregarding other work (vs. H2)</td>
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<td></td>
<td>-5.5</td>
<td>.031</td>
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<td>.031</td>
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<td>Public</td>
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<td>76.9</td>
<td>18.7</td>
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<tr>
<td>Application portfolio upkeep (vs. H3)</td>
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<tr>
<td>Private</td>
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<td>63.5</td>
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<tr>
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<td>73.1</td>
<td>18.1</td>
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</tbody>
</table>

Due to space limitations, for the rest of the paper we look upon the numbers from 2015 in more detail. We next looked upon how the maturity of different management practices is related with differences in main variables, with a focus on the amount of time used for development of new systems, proportion of maintenance to development, and application portfolio upkeep. We differentiated between poor maturity (level 0 and 1 on CMM) and organization having ‘good’ maturity (level 2-5). Table 4 list for each management discipline the average maturity for all organization, average maturity in public organization, average maturity in private organizations, indication of if the difference was significance. As illustrated, for all the areas, a lower level of maturity was reported in public than in private sector. Based on this we can reject H4. The last two columns indicate the number of organizations overall with good and poor maturity of the area. Table 5 can be looked upon in the light of these.

Table 4. Difference in maturity of management disciplines between private and public sector

<table>
<thead>
<tr>
<th>Management discipline</th>
<th>Overall</th>
<th>Public</th>
<th>Private</th>
<th>Significant difference, public/private</th>
<th>Good #</th>
<th>Poor #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management</td>
<td>2.04</td>
<td>2.25</td>
<td>2.56</td>
<td>.002</td>
<td>154</td>
<td>66</td>
</tr>
<tr>
<td>Program management</td>
<td>0.92</td>
<td>0.68</td>
<td>1.31</td>
<td>.000</td>
<td>58</td>
<td>156</td>
</tr>
<tr>
<td>Portfolio management</td>
<td>1.57</td>
<td>1.44</td>
<td>1.77</td>
<td>.044</td>
<td>108</td>
<td>113</td>
</tr>
<tr>
<td>Benefits management</td>
<td>1.65</td>
<td>1.58</td>
<td>1.77</td>
<td>.040</td>
<td>120</td>
<td>102</td>
</tr>
</tbody>
</table>
In Table 5 we list for each management discipline the different work distribution of those organizations with poor and good maturity as defined above, and if this difference is significant. Based on this we can partly also reject H5. We discuss the result further in the next section after discussing a bit on limitations of survey investigations, both in general and in this particular instance.

Table 5. Correlation between maturity of management disciplines and distribution of work

<table>
<thead>
<tr>
<th>Management discipline</th>
<th>Amount development</th>
<th>Maintenance disregard other work</th>
<th>Application portfolio upkeep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project management</td>
<td>11.6 – 20.1 (.000)</td>
<td>80.4 – 68.2 (.000)</td>
<td>72.4 – 64.9 (.000)</td>
</tr>
<tr>
<td>Program management</td>
<td>15.8 – 22.5 (.001)</td>
<td>73.9 – 64.4 (.002)</td>
<td>67.3 – 63.7 (.196)</td>
</tr>
<tr>
<td>Portfolio management</td>
<td>15.5 – 19.4 (.015)</td>
<td>73.9 – 69.2 (.047)</td>
<td>66.9 – 66.8 (.885)</td>
</tr>
<tr>
<td>Benefits management</td>
<td>14.9 – 19.6 (.012)</td>
<td>73.8 – 69.9 (.105)</td>
<td>65.8 – 67.4 (.831)</td>
</tr>
</tbody>
</table>

6 Conclusions and Further Work

A survey investigation of this form has known limitations (Jørgensen 1994, Kitchenham et al 2002). In our case we had a larger number of responses than in earlier surveys, and a response rate of around 45% with responses from around 230 organizations for each investigation gives us increased confidence in the results. Most of the persons who responded were IT managers in the company. They may have different views of the reality than developers and maintainers. For example, Jørgensen (1994) found that manager estimates the proportion of corrective maintenance to be too high when based on best guesses instead of good data, see also (Schach et al 2003) which report a similar effect. All our investigations have data from IT managers though, thus it is reasonable to compare between these investigations when looking upon trends.

Achieving consistent answers requires that the respondents have a common understanding of the basic concepts of the survey form. This may be difficult to ensure in practice. For example, Jørgensen (1994) found that the respondents used their own definition of, for example, “software maintenance” even though the term was defined at the beginning of the questionnaire. A pilot study in several companies to detect unclear questions is done each year in IT i praksis to address among other thing terminological issues.

Among the risks when designing survey forms are leading or sensitive questions, resulting in biased or dishonest answers. We believe that we have mostly avoided this problem. We promised and effectuated full confidentiality to the respondents.

Another issue is that all the investigations have been done in Norway. When we did the first investigations (Krogstie and Sølvberg 1994), these where compared with the main international investigations at that time, finding similar patterns as what had been reported in other countries. ‘IT i praksis’ has been
run in Denmark for 20 years, and it would be interesting to compare the results from the Norwegian stud-
ies with similar studies done in Denmark.

Overall percentage of time used for evolving systems in production compared to time used for
development is remarkably stable over time, a pattern that is also repeated in the latest investigations. In
earlier investigations the differences found between private and public sector was not significant
(Krogstie 2012), but when getting more data on this, we find significant differences in all of the
investigations of 2014, 2015 and 2016 generally pointing to that private organisations are able to use
more of their time on value adding IT-activities. In addition to this difference the efficiency of the time
used for development and maintenance tasks are not captured in these investigations, i.e. the amount of
new functionality provided through the development of new systems or enhancive maintenance, cost
overruns etc.

To try to look in more detail on what is behind the difference between private and public sector we look
upon the maturity in public and private sector relative to selected IT management disciplines. We also
here find a significant difference between public and private sector, that also co-variate with difference in
main variables for usage of time. In particular having a mature project management discipline looks to be
important in this regard, both for short and long-term effects. It can be argued that the CMM-style of
maturity is useful in standardized situation, whereas organization ability to change is just as dependen
don dynamic capabilities (Teece 1997)

Several of our results have spurred new areas that could be interesting to follow up on in further
investigations, and we have in addition to the survey performed several detailed case studies in different
public sector IT-departments (Engelstad 2016). On a short note we will also to more detailed analysis on
the data from the 2016 investigation, which has just been made available.

On the short-term, we plan to collaborate with Ramboll on ‘IT i praksis’ also in 2017 to get additional
data points being able to confirm or refute the pattern found in this investigation. We also hope to be able
in include some questions on relevant dimensions on dynamic organizational capabilities and newer
technologies (Mikalef et al 2016). A long-term plan is to do a similar investigation as done in 1993, 1998,
2003, 2008 and 2013 in 2018 in parallel to following the IT i praksis investigation, also following up the
5 year cycle of the original investigations.

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