

DOES OUTSOURCING MATTER? USE OF TECHNOLOGY AND PROCEDURES TO ENHANCE DATA QUALITY IN NIS FOR POWER GRID COMPANIES

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ABSTRACT

In this paper we study how two different Norwegian grid companies have organised their data collection procedures for NIS, and ask the question how outsourcing of grid work affects data quality. A preliminary answer would be that outsourcing puts a strong pressure on the grid company to establish and follow stringent work practice for data collection and quality control. However, almost all measures employed by the outsourcing company could be employed by a non outsourcing company too, if it was willing to implement them.

INTRODUCTION

Starting in the -90s all Norwegian grid companies has acquired some sort of Network Information System (NIS) where information concerning the state of their grids is stored. Implementing the various NIS has been, if not easy and in promised time and cost, manageable for the grid companies. However, due to several factors the benefits of NIS has been smaller than envisioned. Today's systems are operating, but underutilized, data quality remains poor, new work practices are not implemented and old system run in parallel with new ones.

Since today's IT-systems are rather powerful, flexible and underutilized changing IT-systems is unlikely to give any significant benefits for the companies. Therefore the starting point of our research has been that solution(s) to increase utilization of NIS seems to lie in better data quality, better organisational routines, work practice and better use of supporting technology for improving data flow.

The authors have studied the flow of data from the field site, i.e. work on the grid, into NIS in two companies, form here called company X and company Y. The two companies are similar in several respects:

- Both among the largest grid companies in Norway
- Operating complex grids in big cities and

surrounding areas with a lot of costumers

- Employs the same NIS
- A history of growth by acquisition the last decade

They differ in one important respect. Company X has chosen to outsource its installation work, and hence does not it self employ any installers. Company Y on the other hand have kept their installers. Having studied data flow, data management and data quality issues in both companies through meetings, interviews and observation it became clear to us that there were significant differences between the two companies on these topics. Given the emphasis on outsourcing the last years a question arose: *To what degree were the differences connected to the outsourcing/not outsourcing decision?*

DATA COLLECTION PROCEDURES IN THE TWO COMPANIES – STATUS AND DIFFERENCES

In the following we will give a short description of data collection procedures in company X and company Y. Having described the processes we will summarise the differences.

Data collection and quality assurance in company X

In company X data flows from grid work into NIS as shown in figure 1, please note that all information flows electronically, paper is not used:

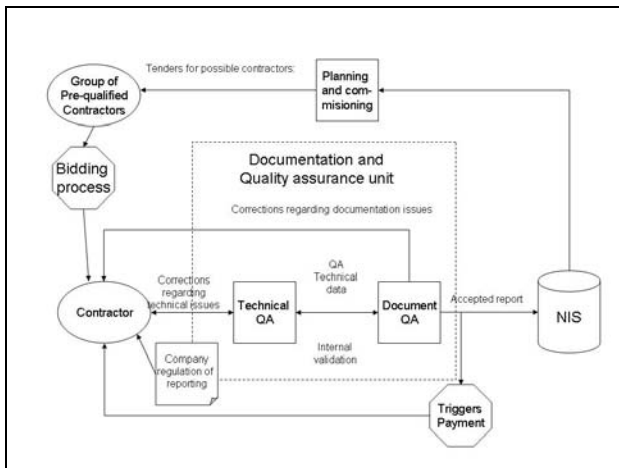


Figure 1 Data flow in company X

The planning and contract unit sends a tender for some grid work to a list of pre-qualified contractors. After bidding a contractor is chosen for that particular work. When the contractor has completed the work on the grid the contractor sends a report to the documentation and quality assurance (D&QA) unit, in Figure 1 this is the unit within the dashed box. The report must follow certain guidelines from company X regarding form as well as content.

The D&QA unit (dashed box) consists of 10 former certified installers and a manager. It is divided in two parts, technical QA (8) and document QA (2). When a contractor claims to have completed a job and sends in a report the technical QA checks out both the report and the physical work done. A member of the technical QA unit physically travels to the work site, inspects it and documents correspondence between the tender, the work actually conducted and the report. The technical QA unit employs much technology in its work; lap top PCs with broadband internet connectivity, digital cameras for documentation purposes, and GPS-systems. The new technology has supported the quality and speed of the unit, as well as improved the work environment for the controllers.

If any discrepancies are found the contractor must correct them to the Technical QA unit's satisfaction. When the technical QA is satisfied it sends the report to the documentation unit. This process smoothes both factual errors and document errors before the report reaches the document QA unit.

The documentation unit validates the report and checks that the report contains all the specified information reported in accordance to specified forms. If the documentation is not found up to standards the document QA requires corrections from the contractor. Finally, when both technical and document quality is assured data is entered into NIS, and payment for the work will be delivered.

The unit keeps track on overall data quality by measuring numbers of errors found in the reports. One of the originally pre qualified contractors consistently delivered poor reports and was removed from the list of pre qualified contractors. This overall error number has decreased since the outsourcing started and is now considered to be acceptable.

Data collection and quality assurance in company Y

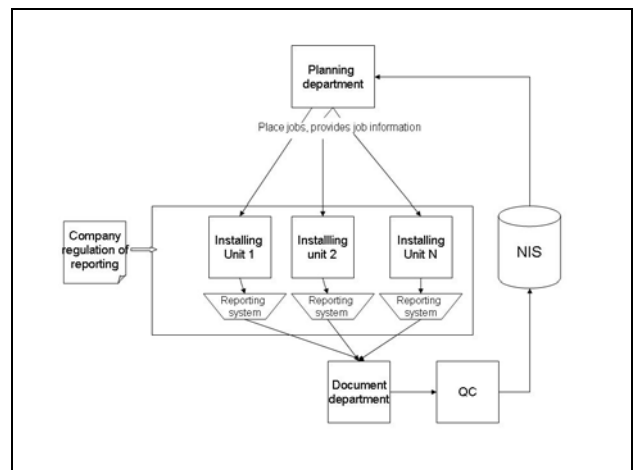


Figure 2 Data flow in company Y

In company Y data is entered into NIS as shown in figure 2. The planning department sends a work order to the installing unit responsible for that geographical part of the grid. The installing unit is provided with all necessary information from the planning department. This documentation is sometimes provided on paper, sometimes electronically.

The leader of each installing unit then prioritizes the order, assigns an installer for the job and provides the installer with all information. When the installer has conducted the work he reports back to his leader, who in turn furthers the report to the Document department of company Y. There is no problem in getting reports from the installers. According to the installers managers the installers should be, and many are strongly motivated to report, since they know they will rely on this information in their future work on the grid.

Reports from installers and their managers should be structured according to internal guidelines (with a "Data Handling Handbook"), but this is often difficult in practice. One reason is a lack of common understanding of these guidelines, or the technical complexity of some types of information, another problem is old systems, remnants from smaller grid companies acquired by company Y, employed by the various installing units to report to the document department. Little has been done to streamline these

systems, and some reports to the documentation departments are sent on paper. Further, the speed of reports from projects to the document unit varies greatly according to our informants, from some days to a year.

Within the document department two persons handle the reports from the installing units. Their task is to validate the data and check that all necessary information that should be included is included. This is company Y's QC. Then data is entered into NIS.

Company Y has no central measurement of data quality. However, the documentation unit checks validity of the data, data that is not valid will be identified and corrected.

Differences between company X and Y

As can be seen from the descriptions of the two companies there are several differences between the companies regarding how data flows into NIS. The differences can be summarised as follows:

1. Integration of QA-work (X more integrated than Y)
2. Use of technology (X more than Y)
3. Streamlining of flow of data (X more than Y)
4. Motivation for reporting (Y more than X' contractors)
5. Consciousness and common understanding of data quality in the whole organisation (X more than Y)
6. Quality of data (X overall better than Y)
7. Speed of entry into NIS (X overall better than Y)

Company X has a much larger and more *integrated* QA unit than company Y. QA in company X is in the D&QA unit, in company Y it is *distributed* in the whole company. Regarding technology company X provides its QA unit with more and more relevant technology than company Y. Company X uses laptops and cell phones with broadband connectivity, digital cameras and GIS systems. Such technology exists in company Y, but is used more sparsely. Regarding streamlining all information in company X is electronically transferred and entered; this enables company X to build in technical validation procedures early in the process. Further, the emphasis on technical QA of course both ensures that the quality of grid work for company X is checked independently, and smoothes out a lot of errors in documentation and reports before the reports enter the final QA-phase. Company Y relies on internal control by the installing unit. This is not necessary poor control; the motivation for reporting is higher among installers for company Y than company X. In order to get satisfactory reports company X had to install the delay procedure in payment (no payment before good reports) as well as removing one contractor from their list of pre-qualified

contractors, due to poor reporting performance. Company Y gets their data from their installers, but there is no common understanding of what data actually is important, how they should be reported and so on. In short data quality in company Y is in practice defined independently by each separate installing unit. In company X, the situation is quite reverse, here the QA unit use lot of time and energy to establish common understanding of data quality among its employees. According to the unit this is one of the outmost important aspects of work in the unit, and one that leads to high data quality.

As a result of point 1 to 5 we will conclude that company X overall has better data quality than company Y, including higher speed of data into the system. We cannot measure this with any quantitative instrument at the time being, but base our judgement on interviews and observation.

One of the key reasons for this conclusion is the integration of QA-work in company X. Data quality can be divided in two: technical quality and document quality. The first is the process of ensuring that whatever is the situation in the grid is reported correctly. Thus technical data quality ensures that there is correspondence between physical world and the information system. Document quality is concerned with ensuring that the necessary amount of information is registered systematically according to predefined standards, in order to enable analysis and planning. By integrating these two functions into one unit company X successfully has created an arena where both functions can learn from each other, develop the other and jointly optimise total data quality.

Finally it must be mentioned here although in our opinion company X has the best data quality of the two companies we cannot know whether or not the data quality of company Y is good enough. Too high data quality is unlikely to be cost efficient. However, in this paper we focus on how to achieve the highest possible data quality, and ignores question of cost effectiveness.

DOES OUTSOURCING MATTER?

Assessing the relative merits of data quality in the two companies demonstrate clear differences, but does not answer our research question: To what degree were the differences connected to the outsourcing/not outsourcing decision?

What is outsourcing?

Let us first consider what outsourcing is. Outsourcing refers to the purchase of intermediate inputs from an external supplier instead of producing them internally. Outsourcing thus establishes a legal border between two companies

where there were none before. In economic terms, outsourcing opens for market relations between companies, as opposed to hierarchical relations. So company X after outsourcing can choose between a set of competing installers, instead of its internal division of installers. Company Y, having chosen not to outsource, will have to rely on its own installer.

This change in relationship has two kind of effects on data quality, direct and indirect. Direct effects are those that follow from the changes in legal/ organisational relationship, while indirect effects are those that follows from the reorganisation process that takes place in the aftermath of an outsourcing.

Direct effects on data quality from outsourcing

Outsourcing and market relations opens up for (sometimes or always) NOT choosing the former installing unit to do grid work. A possible reason why company X has better data quality relative to company Y could be because company X managed to get rid of its own poor/incompetent installers, while company Y still has their share. However, none of the companies express any such sentiments. At the contrary company Y emphasis good motivation among installers for reporting, since they know that they themselves will suffer if data quality is poor. Company X on the other hand emphasised problems with getting reports, at least at outset, because the contractors were not interested in reporting. The contractors could see no benefit from it.

Company X's solution to that motivational problem was simple: we don't pay before the report is delivered. This is a solution that is rather heavy handed, but it worked. It forces the contractors to report, and report as specified. This is a solution that is easier implemented in a market, than within an organisation. But it is a solution to a problem company Y does not face. Rather it is a solution to a problem created by outsourcing, since any contractor tries to minimize his work and get the same amount of money out of it. The direct effects of outsourcing thus boils down to a possibility to force the reports to conform to the grid company's standard.

Indirect effects from outsourcing on data quality

At first glance the list of differences between the two companies seems sobering for proponents of outsourcing. None of the beneficial differences company X has relatively to company Y is directly linked to outsourcing. If company Y wants to it can establish an integrated QA unit, employ technology in the same way as company X, streamline its reporting practice and create a more common understanding of data quality. There are no legal hindrances to this that outsourcing removes. On the contrary, this is all within the borders of company Y, also after an outsourcing, and thus

under managerial control and responsibility of this company. So any grid company could emulate the data flow, integrated approach to data quality and use of technology of company X.

However, outsourcing does provide motivation, or rather need, for streamlining the data flow. Company X did not start with figure 1, rather it arrived at it after a "steep learning curve". When the reports from contractors were lacking, in poor quality etc, company X was forced to implement changes. Company X found good solutions, but the same solutions could be implemented by any company.

Another benefit from outsourcing is the way the company X specifies the work to be done. Instead of describing what work should be done in the grid company X defines the *function* of that part of the grid. Company X provides what it calls a basic solution describing grid functionality, and leaves implementation to the contractor. This lets the contractor employ their own solutions, creativity and work methods and of course may result in lower price for the work done. The downside of this is of course that if a function is specified in the contract, the contractor will not deliver it. While the net effect of this practice could be very positive for company X it is not however, connected to data quality issues.

CONCLUSION

This paper has focused on data quality only. The direct benefits from outsourcing on data quality are minor. The indirect benefits however are considerable and should not be ignored. It basically boils down to a question of motivation for change. If management in a grid company feels itself willing and able to establish clear procedures for work specification, reorganise its data flow from grid work into NIS, establish large QA-units with internal technical QA of work etc, then it is entirely possible to do so.

However, our experience as well as theories of organisational change, indicates that such a change is a very difficult task for management. Some practices, like use of technology, could probably relatively easily be copied, but the most important practices like shared understanding of data quality and very clearly specified work orders are more difficult to establish without the need to do so that outsourcing provides. While striving to improve existing organisational practice regarding data quality may seem like slow work it is less risky, and company X provides some goals for that change process.