Julie Runde Krogstad (jrk@toi.no), Institute of transport Economics

Tracking the Challenges of E-ticketing: An analysis of the implementation in the Oslo region

Introduction

In the last decade, several European cities have replaced conventional paper tickets with smartcards\(^1\), and implemented so-called electronic ticketing in the public transport sector. The most significant and large scale development has taken place in global cities such as New York, Paris, Hong Kong, Singapore, Tokyo, Seoul and London. Some countries such as Denmark and the Netherlands have introduced national electronic ticketing systems, implying that travelers can pay their fares all over the country using one smart ticket. Such projects are ongoing in South East England, Germany, Finland and Norway. Mobile ticketing and bank card ticketing are gaining popularity, and London commuters can already pay their fares using contactless bank cards instead of Oyster cards.

The implementation of technology in public sector is often associated with budget over-runs and delays. Scholars point out that problems often occur when projects involving technology are implemented (Bouwman et.al. 2005; Heeks 2006). Such problems have also been present in the public transport sector. One case that illustrates this is the implementation of the electronic ticketing system “Flexus” in the Oslo region of Norway. The project involved the cooperation of several public authorities and Public Transport Agencies (PTAs). This study\(^2\) suggests that coping with organizational barriers prior to the implementation of technical solutions is determinant for successful implementation. The crucial challenge in the Flexus project was the lack of fare reform and the need for an overarching managing structure. Fare systems represent strategies and operational goals, which can challenge implementation of reform. In addition, the choice of ticketing technology and the design of the implementation strategy are affected by sensitivity to political issues.

---

\(^1\) A smartcard is a plastic card with a microprocessor chip connected to an antenna. A reading device deducts the cash stored in the smartcard within some centimeters of placement, and a transaction takes place (Lomax 2005).

\(^2\) The study is based on data used in Krogstad (2010)
The implementation of electronic ticketing in the Oslo region was expected to simplify the process of settling accounts between the PTAs\(^3\) which often was a source of disagreement. In addition the system was expected to modernize and increase the profitability of the public transport system (Røsland 2008: Tape 1). This study investigates why the implementation of the electronic ticketing system failed to meet expectations, leading to budget over-runs, time delay and the systems’ low quality. The study examines the relationship between the technological and organizational factors and considers under what conditions the problems occurred.

The Flexus project is an example of a technology project and a public sector project; both types of projects have been neglected parts of project managing and implementation research (Gomes et.al. 2012; Wirick 2009; Bouwmann et.al. 2005). Hence, this study will contribute to the literature by identifying factors crucial for the successful implementation of technology projects in public sector. Furthermore, there is a gap in the literature on the policy and organizational issues regarding the implementation of smartcard technology, with most studies providing technical information (see for example Lomax 2005; Najman 2009). As electronic ticketing and other complex technology in public transport are increasing, this study can be seen as a contribution to mapping policy and organizational challenges of technology implementation in this specific sector.

**The scope of the study**

The overarching goal of the study is to explain why the implementation of an electronic ticketing system in the Oslo region has resulted in problems such as budget over-runs, time delay and the systems’ low quality. The project has been labeled as a scandal both by the media and politicians. The travelers witnessed access gates and validation equipment be set up in the city central subway stations, that could not be used for over six years. Today, the system is operating full-scale, but is still being reviled in newspaper articles as a system of low quality\(^4\). As the project has become a strain on the reputation of public transport in the region, the companies decided to abandon the name “Flexus” in 2011, and

---

\(^3\) Since the 1970s they had offered transitional arrangements for the public transport passengers in the region, meaning that all tickets should be valid across different companies and transport modes.

\(^4\) Halvorsen 2013; Nærø 2012; Samferdsel 2013
rather use the names of the companies on the ticketing device (Holm & Sletteholm 2011).

When the project was initiated in 2000, three companies owned by different public authorities provided public transport in the Oslo region: OS\(^5\), owned by the municipality of Oslo, was responsible for the metropolitan area; SL\(^6\), owned by the county of Akershus, was providing public transport in the surrounding region; NSB, the Norwegian national railway company owned by the state government, provided commuter train services. In 2008, the OS and SL merged into a joint public transport company wholly owned by the respective authorities. The Flexus project was organized as a joint project involving the three companies; however the cooperation was based on full autonomy. The companies procured the ticketing systems separately, planning to link-up the systems through a back office. It is likely, however not confirmed by all the companies, that the project has cost at least around 62 million euro. In 2008, the project had cost the OS exclusively, about 35 million euro (Bjørgan 2008b).

Even though the study seeks to explain the overall problems of the project, the scope of the study is limited to investigate the proceeding of the process in the OS and the municipality of Oslo from 2000 to 2008. The reasons for this are twofold; the Oslo metropolitan area experienced the most wide-ranging problems, among others due to poor project organization and the complexity of the public transport system\(^7\). In addition, the implementation process in the OS has been open to the public to a larger extent than the processes in SL and NSB, and informants involved in the OS project have been willing to provide information.

In the Oslo metropolitan area, the electronic ticketing system Flexus was scheduled to be ready for operation in 2005, but was not available for all customer groups until 2011. Hence, the project was delayed for about six years; the budget was exceeded by more than 35 million euro and the user interface has been poor both for the users and the employees who use the system as a working tool in their everyday routines. The PTA in the Oslo region received 14 000 requests on ticketing and fares in 2012, it is however unknown how many of them were complaints (Halvorsen 2013).

\(^5\) Oslo Sporveier, owned by the municipality of Oslo  
\(^6\) Stor-Oslo Lokaltrafikk, owned by the county of Akershus  
\(^7\) The public transport system in the Oslo metropolitan area consists of buses, trams, subways and boats
**Data and research techniques**

The data used to assess which factors have frustrated the implementation of the Flexus project, has been gathered through document analysis and interviews with key players, selected through purposive sampling. Evidence consists of policy papers, reports, an inquiry held by the municipality of Oslo, online newspaper articles and four semi-structured in-depth interviews.

The document analysis is conducted by looking at reports from policy meetings in the Oslo city council, from the PTAs and from the City Auditor in Oslo. The tape from the inquiry held the 23rd of October 2008 is transcribed and direct quotations are used in the analysis. The semi-structured in-depth interviews took place in March and April 2010, lasted about 1 hour each and were recorded using a dictation machine. The interviewees were key players in the implementation process and selected through purposive sampling. They were easily identified through documents, which makes the method of purposive sampling appropriate (Tansey 2007:770). The interviewees were: The director of the OS, the OS project leader (in the second phase of the project), the commissioner for transport in the municipality of Oslo and an employee representative from one of the operating companies.

**Theoretical approaches**

Several scholars (Bouwmann et.al. 2005; Wirick 2009; Gomes et.al. 2012) have called for more research on implementation of technology projects in a public sector environment, which have been neglected parts of project managing and implementation research.

The implementation process is often featured as the “missing link” in politics, referring to the gap between political adoption of a solution and the result of a project (Hargrove 1975). The research of implementation started in the 1970s, and the first studies were divided into two camps; the top-down approach and the bottom-up approach. The top-down approach implies a hierarchical approach to the implementation process (Pressman & Wildawsky 1973; Van Meter & Van Horn 1975), while the bottom-up approach stress the importance of the actors in

---

8 In addition, the author contacted a project associate in NSB, but could not succeed in making a further appointment. Due to limited time resources, it was not possible to contact further persons.

Researchers have pointed out that both approaches are fundamental to understand implementation (Cline 2000; Offerdal 2005), and more recent studies on implementation such as network theory, have concentrated on synthesizing both perspectives. Network theory assumes that policy is made in complex interaction processes between a large number of actors which takes place within networks of independent actors. Policy networks can be defined as stable patterns of social relations between interdependent actors, which emerge around policy problems (Klijn & Koppenjan 2000). In this perspective both Pressman & Wildavskys’ (1973) concern with linkages and the bottom-up perspective is represented.

Public sector projects are often more challenging than private sector projects, because they involve parties from government, private sector and other quasi-governmental agencies, each with their own, sometimes conflicting objectives (Torres & Pina 2004). Furthermore, scholars claim that technology in itself may cause problems in the implementation of technology projects, and call for a broader understanding of the implementation processes (Bouwman et.al. 2005; Baldersheim et.al. 2008). Looking at the Flexus project as a public sector project and a technology project, the implementation process will be analyzed in three perspectives: the top-down approach (veto-points), the bottom-up approach (communication channels) and the technology approach.

The theory of veto points (Pressman & Wildavsky 1973) hold that action in an implementation process depends upon a number of linkages in an implementation chain. Goal achievement is expected to be low in projects involving a large number of participants, because the participants are expected to hold conflicting perspectives. Even though they agree with the project at a general level, conflicting objectives will emerge in the decision points (veto points), as the actors need to interact. Some of the conflicting perspectives may be a) incompatibility with other commitments, b) preferences for other projects, c) lack of time and attention to the particular project, d) dependence on actors who lack a sense of urgency in the project, e) disagreement over leadership and organization of the project, f) legal and procedural differences between the actors, g) agreement coupled with a lack of power (Pressman & Wildavsky 1973:110).

Communication channels and organizational learning is another important core component of implementation. To implement a project successfully, communication channels between the actors in the line organization and the
decision makers have to be established (Elmore 1980; Hjern & Porter 1981). In addition, a period of organizational learning is required to cope with the new system, a fact that is often ignored by managers (Boddy & Macbeth 2000; McNish 2001). McNish (2001) points out that the extent to which a project is successful or unsuccessful is probably affected by the ensuing quality of the communication patterns.

The assumption that technology causes problems in the implementation process is based on two factors: i) the importance of the technology for the organization as a whole (rather than a secluded part of the organization) and ii) whether the technology is mature or immature. The implementation process is likely to turn out challenging if the technology can be characterized as immature and if it is affecting the organization as a whole (Baldersheim et.al. 2008; Bouwman et.al. 2005).

It is assumed that the three approaches all can shed light on aspects that have caused budget over-runs, time delay and the systems' low quality. However, it is assumed that the theory of veto points explains the implementation problem more thoroughly, and influences the explanation factors provided by the other approaches as well. The expected interaction between the explanatory variables is showed in Figure 1.

![Figure 1 Proposal of expected interaction between the explanatory variables](image)

"Figure 1 Proposal of expected interaction between the explanatory variables"
The implementation process analyzed in three perspectives

The following sub-sections in this empirical section provide an account as to what happened in the implementation process. The analysis assesses what really happened through process tracing, and looks at the implementation process using the three approaches outlined above: The top-down approach, the bottom-up approach and the technology approach.

The top-down approach: Veto points

In the Flexus project, agreement between the actors was obtained and there was no great conflict. Pressman & Wildavsky’s framework of veto points (see Table 1) shows how the actors, despite overall agreement, represented conflicting issues in important decisions during the implementation process. The decisions analyzed are defined as “joint decisions made through interactions across organizational boundaries, crucial to drive the project forwards”.

Table 1 Veto points

<table>
<thead>
<tr>
<th>Veto point</th>
<th>Time</th>
<th>Decision</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>2003</td>
<td>Contract of cooperation between OS, SL &amp; NSB</td>
<td>Various goals and plans of progress made it difficult to coordinate the procurement of the three ticketing systems</td>
</tr>
<tr>
<td>II</td>
<td>2004</td>
<td>OS, SL &amp; NSB tried to decide on a fare reform</td>
<td>Different goals and organizational differences made it difficult to attain change. Political leadership was absent in the process</td>
</tr>
<tr>
<td>III</td>
<td>2004</td>
<td>The NPRA (Norwegian Public Roads Administration), counties and public transport companies in the eastern region of Norway completed a standard handbook for electronic ticketing</td>
<td>Implementation of the new standard required changes to be made in the upcoming systems and additional resources</td>
</tr>
<tr>
<td>IV</td>
<td>2005</td>
<td>OS approved the installation test when the system did not work. This led to renegotiation with Thales and a new project organization in OS</td>
<td>The OS’ lacked the required time, resources and expertise. The vendor Thales did not acknowledge the existing challenges</td>
</tr>
<tr>
<td>V</td>
<td>2005-07</td>
<td>Technical workshop involving OS, SL, NSB and the three vendors. About 200 issues were clarified.</td>
<td>Different goals between the vendors</td>
</tr>
<tr>
<td>VI</td>
<td>2007</td>
<td>OS demands a switch in Thales project organization</td>
<td>Thales did not give sufficient priority to the project, underestimated the resources needed and lacked understanding of the Oslo situation</td>
</tr>
</tbody>
</table>

(juli)
Veto point I: Establishment of a joint project organization

In 2003 a joint project organization was established and the PTAs agreed upon cooperation based on full autonomy. This decision was important, as it established cooperation structures and a common understanding that the systems were to be integrated at some point. At this point however, the actors had already started to develop their ticketing systems separately having different goals and strategies (Akershus city council 2006). One of the informants pointed at the lack of joint partnership as one of the main problems: “There was lack of coordination of the systems in the beginning, which resulted in difficulties of merging the systems so that they would be interoperable in the end” (Kristiansen 2010 [interview]).

The relationship between the PTAs was characterized by “an agenda of survival”, meaning that the companies had to deal with fluctuating budgets every year. They were competing against each other, rather than holding a perspective of cooperation and mutual trust between partner organizations. The companies also had different market shares, with OS focusing on public transport mode shares around the clock, SL concentrating on the peak hours and NSB stressing national goals rather than serving local needs of the Oslo region (SKØ\[9\] 2005:12; Nilsen 2008: Tape 4).

Veto point II: Work on a fare reform

In 2004, a project group was organized to ensure harmonization of the fare systems (Akershus city council 2005). This was an important decision, as the project was advised both from the experience of similar projects and vendors to reform the fare structures before implementing the ticketing system. A fare reform would imply that OS and NSB based their fare systems on zones rather than a flat rate and distance. SL on the other hand, would have to reduce their 88 zones considerably.

The group did not agree on any comprehensive changes. The different goals of the companies combined with organizational differences were some of the reasons why it was difficult to make the required changes (Nilsen 2008: Tape 4). The OS director pointed at the difficulty of reforming fare structures when public transport in the region was divided between two transport units managed by two counties (in addition to NSB) (Bjørgan 2008b:11). However, the commissioner of transport in the municipality of Oslo did not see the importance of fare reform (Oslo City

---

\[9\] The association of Public transport in the East of Norway
He admitted that there was almost no contact between the two counties before the preparations on the 3rd Oslo transport package\textsuperscript{10} started in 2004 (Myhre 2010 [interview]).

**Veto point III: Completion of a national standard for electronic ticketing**

In 2004, the NPRA (Norwegian Public Roads Administration) started to develop a national standard for electronic ticketing (NPRA 2004). The idea to link-up the electronic ticketing systems in the whole country through a back office, made it possible for the companies in Oslo to purchase different ticketing systems. Several actors were involved; counties and their respective public transport companies in the eastern region of Norway, the Norwegian Ministry of Transport and NSB. The national standard represented an additional actor in the implementation process and demanded changes in the ticketing projects in the Oslo region. The OS project leader underlined that it would have benefited the implementation if the national standard had been completed before the project was initiated (Kristiansen 2010 [interview]).

**Veto point IV: Change of project organization in the OS**

In 2005, the OS director replaced the original OS project organization. The reason for the dismissal was an established asymmetry of information and expertise between the vendor and the OS. The OS project organization consisted of only 3-4 persons, none of them holding qualifications in electronic ticketing. In addition, the involvement of and communication with the line organization as the prospective users of the system, had been poor (Office of the City Auditor 2009:17-8). In November 2005, the project leader approved the definitive tests although the system was not actually working. He also accepted the shipping and installation of the ticketing equipment in Oslo, which resulted in access gates and validation equipment that could not be used for six years in the city central stations.

The unsuccessful approval showed that the old project organization in OS lacked time and resources to follow the delivery properly (Office of the City Auditor 2009:21). It also showed that the vendor did not recognize the gravity of the situation. The decision to replace the original project organization was important as a new and better organized group was established, the definitive tests were

\textsuperscript{10} The 3rd Oslo transport package is an overall plan to develop and finance infrastructure in the municipality of Oslo and the county of Akershus
annulled and it was agreed to start all over (Bjørgan 2008b:17). The new structure of the project organization provided better opportunities for control and follow-up. At most, 150 employees were involved in the project, including the line organization (Office of the City Auditor 2009:20).

**Veto point V: Interoperability and technical adjustments**

In 2005, the requirement specification of interoperability was introduced. This was important, as it led to a closer cooperation between the companies and the vendors, which had to take each other's systems into consideration and adjust their own systems accordingly.

A joint company, IO\(^{11}\), was established to ensure the interoperability of the three systems. A problem was that the requirement specification designed for the interoperability was subject of different interpretations by the three vendors. It was important that the operations were implemented in a similar manner, so that the electronic tickets could function seamlessly across the three technical systems. The cooperation of three different vendors was challenging, as they normally compete against each other and was reluctant to reveal sensitive information. (Bjørgan 2008b:17). A project group was established to take care of the new challenges. 13 technical workshops were being held from August 2005 to August 2007. Through the meetings, approximately 200 issues were being clarified. This includes issues connected to transferring of information, erasing of old tickets, validity of tickets, business rules, etc. (Bjørgan 2008b:15).

It can be concluded that the separate procurements of the ticketing systems complicated the process. The OS project leader put it this way: “Everybody has tried to defend their own system, and rather not use more money than planned. And nobody could impose changes on the other or taking the extra costs to do it” (Kristiansen 2010 [interview]). Because of the multiple adjustments to be implemented in the systems, the progress of the project was delayed for all the parties concerned (Bjørgan 2008b:15).

**Veto point VI: Change of project organization in Thales**

In the beginning of 2007, the cooperation between OS and Thales had escalated into mistrust, and OS demanded a change in Thales’ project organization (Kristiansen 2008: Tape 4). This was an important decision, as the OS project

\(^{11}\) Interoperabilitetstjenester AS
leader claims they would not be able to complete the project without making changes in Thales’ project organization (Kristiansen 2010 [interview]).

The OS viewed that Thales had undervalued the project relative to the resources needed. They also lacked an understanding of the diverse ticketing principles and the complex situation in the Oslo region (Bjørgan 2008b:16; Kristiansen 2008: Tape 4). The replacement in Thales’ project organization resulted in an additional delay of about six months. In October 2007, Thales established a new project group and finalized the contract in 2008 (Bjørgan 2008b). Because of the reorganization of public transport in the Oslo region at that time, the OS handed the ticketing system over to the new PTA.

The bottom-up approach: communication channels

Communication and organizational learning are important factors to implement a project successfully. Focusing on the OS company, the communication channels and barriers to communication between the project organization and the line organization are being analyzed. The analysis shows that lack of communication in the previous phases of the projects, was important for the latter phases, which caused extra costs and delays.

When the project was initiated, the OS project organization was small and not connected to the OS organization as a whole. The employees that operated buses, trams and the subway were not involved in the project (Office of the City Auditor 2009:29). The OS director admitted that the future users of the systems did not get sufficiently involved in the early phases of the project. The communication structures that were established were not frequently employed in the beginning (Bjørgan 2010 [interview]).

There was a lack of communication between the employees that would have to use the system every day and the project organization. As a result, their needs and wishes were not taken into account, which resulted in poor user-friendliness. The employees and the project organization had different goals for the ticketing system. The employees had long fought for cashless buses and trams which was not included in the project, while the project organization wanted to ensure the income potential (Floberg 2010 [interview]; Udbjørg 2008). One of the informants stated that the project organization didn’t listen to the passengers or the employees, and prioritized income security rather than user-friendliness (Floberg 2010 [interview]).
When the new project organization was established in 2006, the employees were included on a higher level than before. However, the specifications had already been set and the job was to make the system work according to the order. It was not possible for the question to start all over again (Kristiansen 2010 [interview]). The employees reacted naturally negative to the new system in the beginning. The motivation was very low and many of them felt that they had shouted loudly, but never been heard.

The new ticketing system has led to big changes for the line organization in OS. The system is an important working tool for thousands of employees and has to function optimally during hectic work days (Kristiansen 2008: Tape 4). The employees stress three issues that have changed when introducing the new electronic ticketing system: Monetary management, user friendliness and efficiency.

In the new system, monetary management was handled by a “floating register”, which means that the ticket revenues were collected in a computer system for all ticket sales (Bjørgan 2010 [interview]). This often led to registration errors that were felt as a strain on the employees (Floberg 2010 [interview]). The employees also thought the user-friendliness and efficiency of the system was poor, as it became more difficult to find ticket combinations on the ticketing machines (Udbjørg 2008). “The system is slower than the old […], and the user interface is terrible” claimed the employee representative from one of the operating companies (Floberg 2010 [interview]).

**The technology approach**

The technology approach is based on two factors: i) the importance of the technology for the organization as a whole, and ii) whether the technology is mature or immature.

It can be concluded that the technology enters the whole organization and not only separate parts. Kristiansen (2010 [interview]) states that the ticketing system has impacts across the whole organization; the bus and tram drivers, the ground controllers, the traffic planning and the financial management between the three public transport companies.

Whether the technology was mature or not is a more complicated question. When the municipality of Oslo set as criteria for the approval of the loan warrant for a new ticketing system, it was a demand that the technology should be well-known,
standardized and tested. Bjørgan (2008a: Tape 2) concludes that the ticketing machines, the check-in/check-out gates and the system that safeguards the cash flow in the OS-system, was all standardized and well-known technology.

However, as each city is different, it is not possible to buy a complete “package”. Even if the hardware and software is standardized, the total solution has to be formed by the organization itself and includes reorganization and changes in every day routines. In addition to that, it would be impossible to buy a standardized system that could deal with the complicated fare systems in the Oslo region (Kristiansen 2010 [interview]). The logic in the new ticketing system was not adequate to handle the complex situation in the Oslo region, which implied that the system had to be accommodated. It turned out to be extremely difficult to make a self-service ticketing system that could calculate transitional arrangements and zones for hundreds of combinations of different tickets.

Electronic ticketing involves complex technology. However, the solutions are well-tested and well-known in many parts of the world and a competent supplier industry exists. However, it has been observed that technological challenges basically are small in these kinds of projects. The greatest challenges are related to other issues such as cost allocation, reaching agreements and having competent organization as well as overcoming differences in culture, mindset and goals (NPRA 2009).

The most challenging part of the project was to implement the complex fare structures. Bjørgan (2008a: Tape 2) admitted that the interoperability system, which was fundamental to connect the three systems together, was new technology. There is no existing soft-ware that can readily be transferred to match the 3 ticketing systems in Oslo and make it interoperable. It seems that a simplification of the existing fare system and tariff structures could have improved the conditions for smoothing the implementation process. An adequate implementation of technology demands an ‘accommodating’ organization to overcome barriers created by organizational boundaries: If you automate a mess, you get an automated mess (Meijer & Zouridis 2006).
Conclusions and recommendations: Lesson learned?

The analysis shows that the three approaches all can shed light on aspects that have caused the implementation problem, defined as budget over-runs, time delay and the systems’ quality.

The top-down approach shows that lack of decisions to drive the project forwards have contributed to the problems. The OS had to make wide-ranging modifications in their system in order to connect it to the interoperability system, which has cost both time and money. Reforming the fare structures proved to be the key for the system to operate at a full-scale level, which was achieved after the implementation of a new fare system in the region in 2011.

The bottom-up approach shows that lack of communication between the project group and the line organization caused implementation problems. The future users of the system were not involved in the design of the system, which later led to extra costs of improving the user interface. It also resulted in time delay because of the challenges to implement the system as a working tool among the employees, which required changes in every day routines.

The technology approach shows that the technology affects the organization as a whole and is characterized by immaturity. The result was a ticketing system at first unable to operate at a full-scale level. The technology couldn’t handle the challenging fare systems in the region. At the same time the problem could have been solved by fare simplification at an earlier stage.

In 2008, the political authorities in the counties of Oslo and Akershus merged OS and SL into the new PTA Ruter, wholly owned by the two authorities. The merger made it possible to decide on a fare reform which was implemented in 2011. When the new fare structures were implemented, the ticketing system was able to operate on a full-scale level. It seems that the technology was not mature enough to handle the complex fare systems in the Oslo region, which could have been solved by overcoming organizational barriers and reforming fare structures. The lack of fare reform stands out as the main reason why technological challenges occurred.

As the technology hardly could handle the complicated fare systems in the region, the user interface turned out to be insufficient. However, the poor user-friendliness can also be explained by the lack of communication between the original OS project organization and the line organization, which resulted in a
poor user interface. The dissatisfaction among the employees led to some changes in the system, which resulted in additional costs and delays.

Both veto points and lack of communication inside the OS organization call for the necessity for coordination and leadership. The implementation of the project is characterized by autonomous actors that are mutual dependent to achieve common goals. The actors act strategically and choose solutions based on their perceptions of the problem, which creates a need for cooperation. The tension between mutual dependence and different goals and interests resulted in conflicts and demands for increased coordination and leadership. This suggests that coping with organizational barriers is extremely important before implementing technical solutions.

This paper shows that the implementation of technology requires changes on an organizational level to succeed. The crucial challenge in the Flexus project was the lack of fare reform. Fare systems have turned out to be hard to change as they represent different implementation strategies and operational goals, as well as sensitivity to political issues. Prior to implementation it is crucial that the barriers for implementation are identified and that possible reform is anchored on a political level. Today, the authorities in the Oslo region have succeeded in implementing fare reforms and reorganizations which have led to a working ticketing system. However for the future, the Ruter director wants to invest in mobile ticketing and some of the ticketing device has already been replaced. The Flexus system as it stands today will probably be replaced by newer technology in the years to come.

The Flexus project as a public sector project has shown that multiple mutual dependent actors demand a need for increased coordination and leadership. In a technology perspective, the study shows that collaboration between social sciences and information technology scholars may be fruitful in understanding the implementation of technology projects. Future research should concentrate on examining public sector technology implementation projects that have succeeded, and map what factors that are crucial for success rather than failure.
References

Literature


Public documents


Newspaper articles


Samferdsel (2013, april). "Ute av drift”, Samferdsel leder nr. 3

Public inquiry


Interviews


