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Harboe, Peter Georg; Riis, Eva

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The Danish Rejsekortet (Smart Card for Public Transportation): Project Governance for Failure or Success?

Peter G. Harboe, Associate Professor, VIA University College, Horsens Denmark
Eva Riis, University of Southern Denmark

1. Background

The Smart Card for Public Transportation is regarded as a major failure in Danish public investments. Its introduction was delayed for nine years with an estimated cost overrun of 125 million Euros. The system has been operational for three years, yet it still covers only four of the five Danish regions. Discussion about discontinuing the system is ongoing.

Project management studies of major public IT projects in Denmark are relatively rare. A set of recommendations for administering public IT projects have been published by the Finance Ministry and the Danish Board of Technology (Finansministeriet, 2010; Work Group under The Danish Board of Technology, 2001), while the National Audit Offices published a series of ad hoc evaluations (Rigsrevisionen, 2010, 2011). The technical and customer interface aspects of IT projects have also been the topic of academic research (e.g. Melchior Jensen, 2008; Sørensen, 2014). However, no studies of the *governance* of such projects have been identified; a recent paper on management of public investment projects found a similar dearth in the literature in Germany (Mertens, 2012).

Looking elsewhere than Denmark the situation is very different although most of the research addressed large infrastructural projects, not IT projects. When IT projects have been studied, spectacular failures have typically been the focus of research, and scholars have approached the phenomenon from a variety of project governance perspectives. For instance, Keil and Mähring have studied how complex projects can turn into “black holes”. Their principal case was the New Deposit System at a European Bank and, more specifically, a diagnosis of the escalation and countermeasures at the heart of the problem (Keil & Mähring, 2010). A further aspect of escalation, in the form of decision-making, was studied by Drummond in the case of the Taurus system of the London Stock Exchange (Drummond, 1996). The IT systems of the London and Melbourne ambulance despatch services (Beynon-Davies, 1999; Dalcher, 2001) have been analysed for their problematic implementation and subsequent operation. Information system development for public Health was studied in an exploratory way with no theoretical framework proposed (Gauld, 2007) and Lorenzo, the NHS IT project, has also been investigated with a special emphasis placed on project approval, risk decisions, and the underlying knowledge regarding the social construction of IT projects and project management that were used as a basis for their project governance (Cicmil & Braddon, 2012). As early as 2007, McManus and Wood-Harper identified in their investigation of 214 public and private IT projects across the EU some key project governance issues such as leadership, stakeholder and risk management, and decision-making (McManus & Wood-Harper, 2007). Yet to date, no comprehensive project governance framework for major IT projects has been articulated.

The present study, whose interim results are summarised in this paper, hopes to help in closing this gap by identifying a comprehensive framework of project governance of major public IT projects. Beginning with a review of the literature on governing major projects, the principal features of governance are explored for through the empirical research already done on major infrastructure, engineering and IT projects. The aim is to advance the current understanding of project governance by synthesising findings on different key issues of project governance into a framework of project governance. This framework will be tested through analysis of three similar cases of smart card projects before a second phase with primary data collection.

The three case projects discussed here are the Rejsekortet (Denmark), the Oyster Card (United Kingdom) and the EZ-Link (Singapore). All three concern major IT investments in the public transport sector. In Flyvbjerg’s terminology they are ‘major projects’ – their budgets are measured in hundreds of millions of

Euros, as opposed to ‘mega-projects’, which are measured in billions of Euros (Flyvbjerg, 2011, 2014). Data relating to the three projects are taken from public domain sources including material from government or local authority sources, official parliamentary acts, national audit offices’ evaluation reports and consultants’ reports to the government or the project owners. These data were collected and analysed in Spring 2015, and the present paper presents some of the major results of the analyses. A second phase of research is foreseen for Autumn 2015 and will include the collection of primary data through qualitative interviews with management representatives from the relevant authorities and operating companies, and key stakeholders from each of the cases.

2. Conceptualising project governance

Definitions of project governance differ in terms of perspective and outlook. On the one hand there is a very narrow perspective such as that focusing on the contract type of governance (Turner & Simister, 2001). On the other there is a broad perspective where governance concerns structures for evolutionary shaping and evaluation throughout the life-cycle of a project so that an anticipated value can be generated (Miller & Lessard, 2008).

Using a somewhat different approach, Ahola, Ruuska, Artto, and Kujala identified distinct streams of literature on project governance (Ahola, Ruuska, Artto, & Kujala, 2013). For the present paper, the stream that deals with governance of single projects is particularly relevant. It brought out the following main features:

- “A governance structure consisting of shared coordination, control, and safeguarding mechanisms needs to be put in place to align the interests of multiple organizational actors to work towards a joint goal” and
- “The governance structure of the project should be aligned with both internal (e.g. organizational capabilities, etc.) and external contingencies (regulatory practices, etc.)” (Ahola et al., 2013, p. 8)

In the words of O’Leary, “project governance provides the management structures, policies, processes, roles and responsibilities which help ensure that (a) organisations choose projects, which support their business strategy; (b) the objectives of business investment are translated into the right project objectives, activities and tasks; and (c) the project management structures and processes are in place such that implementation can be managed in line with objectives and business expectations” (O’Leary, 2012, p. 175). In order to construct a project governance framework, case studies of major projects have been

Recent studies of frameworks of project governance have been more focused on larger infrastructural projects, and typically deal with the project implementation period (Brady & Davies, 2014; Miller & Hobbs, 2005; Pryke & Pearson, 2006; T. Williams, Klakegg, Magnussen, & Glasspool, 2010; Winch, 2001).

A study of two *successful* major projects, which sets Brady & Davies (2014) apart from the majority of studies, showed some similarities in how projects handled structural and dynamic complexity. The work of Brady & Davies builds on the observation that handling complexity has been the major source of failure for large engineering projects (T. M. Williams, 1999). They build on the understanding of structural complexity being “the arrangement of components and subsystems into one overall systems architecture (Brady & Davies, 2014, p. 24) by extending it to include stakeholders and the relations between stakeholders and the project. Dynamic complexity arises from the interaction between the system or individual system components and the environment, which are influenced by the uncertainties in the project including technological challenges, the newness of the market/area and the time constraints of the project (Brady & Davies, 2014, p. 25).

In their description of the approaches to managing complexity – both structural and dynamic – Brady and Davies highlight the following aspects as critical to project success:

- Stakeholder profile (characterisation of the multiple stakeholders and their interests/conflicting interests)
- Governance structure – governing body(ies) and subsidiaries
- Overall management approach – who is manning the project team and providing oversight of the project (for example supplier, owner, etc.)
- Incentives for closer cooperation between supplier and client – economic incentives to deliver on time and rewards for delivering performance levels on cost and time
- Contract standards – single contract or multiple contract types allowed in project with subcontractors or suppliers
- Legal approach – focus on contracts or solutions?
- Approach to technology – for example, off-site testing, standardization of major components, prototyping, policy of not adopting untested technologies on-site, etc.
- Approach to uncertainty – for example expecting innovative solutions to emergent problems (Brady & Davies, 2014, p. 33).

In addition, Davies & Mackenzie, in their study of the London 2012 Olympics, argue that a systems integration ability is essential for managing interdependencies between scattered collections of systems that make up the project and the change and uncertainty that emerge from them (Davies & Mackenzie, 2014).

In the seminal research of major projects by Morris & Hough (1987), the role of stakeholders in major projects was described as a critical component of success in major projects. However, traditional approaches to stakeholder management have recently been challenged as not relating to “challenges and problems of stakeholder management in reality” (Eskerod & Huemann, 2013). In Eskerod’s words the dominant assumption seems to be that stakeholders mainly ask themselves “What’s in it for me?” (Eskerod, 2014).

Eskerod (2014) draws on the strategic management literature to enrich the concept of project stakeholder management. This sets her concept apart from the assumptions that stakeholders pursue their “self-interests by conducting a cost-benefit analysis, that is by comparing the expected and perceived costs and benefits” (Eskerod, 2014, p. 42).

Eskerod supports her challenge by drawing on the work of Bosse, Phillips, & Harrison (2009) who found that the pursuit of self-interest is restricted by the individuals’ perception of “fairness”. Stakeholders will “assess their perception of fairness in three dimensions: 1. Distribution of benefits – do they perceive the distribution of benefits among the stakeholders as fair? 2. Do they think that the other stakeholders are involved sufficiently in the project’s processes and governance procedures? 3. Do the stakeholders think that the representatives of the project organisation treat themselves and the other stakeholders in a decent, friendly and respectful way?” Bosse, Phillips, & Harrison claim that only if stakeholders have a perception of fairness in all of the three dimensions will they contribute as needed to the project (Bosse et al., 2009). These dimensions of fairness appear to us relevant to a project governance framework.

The approaches to overall cost and schedules of major and mega-projects have been extensively researched by Budzier & Flyvbjerg (2013) and Flyvbjerg, Bruzelius, & Rothengatter (2003). Their findings show that major cost and schedule overruns are not idiosyncratic events. Some of the explanatory factors are internal to the project and controllable. Their findings point to the importance of how projects manage uncertainty and the generation of value (extending beyond project completion) – for both had a significant impact on budget and schedule overruns. This means that when dealing with the value process of a project – which can be broken down into the three steps of value identification, value creation and value harvesting – it is not merely the value creation stage, but rather the full process, that should be considered (Riis, 2015).

A strengthened stakeholder management is also recommended by a recent German investigation of 10 major public IT projects (Mertens, 2012). Mertens found that tendering in two phases – one on the basis of a high-level functional description, and another with processes, risks and deliveries specified – might enhance the chances of public IT projects.

3. The project governance framework

From the review of literature an number of key aspects of project governance of major projects were identified and they form four groups, which are listed below with the corresponding references:

- a) The project specifics and status
- b) The governance approach
- c) The project management approach and
- d) The decisions on the legal approach

Key aspects of project governance	References
The project specifics	
Integration and Interfaces - System of systems	(Brady & Davies, 2014)
Stakeholder profile	(Brady & Davies, 2014; Eskerod, 2014; Mertens, 2012)
Approaches to Governance, Management and Legal elements	
Governance Approach	
Project development and Operating Company Ownership	(Brady & Davies, 2014)
Senior level engagement	(Comptroller and Auditor General, 2007)
Governance structure	(Brady & Davies, 2014)
Value focus	(Budzier & Flyvbjerg, 2013)
Project Management Approach	
Overall management approach	(Brady & Davies, 2014; Henisz, Levitt, & Scott, 2012)
Approach to stakeholder management - Managing <i>of</i> stakeholders or managing <i>for</i> stakeholders <ul style="list-style-type: none"> • Dimension 1: Distribution of benefits • Dimension 2: Sufficiently involvement • Dimension 3: Respect in interactions 	(Eskerod, 2014)
Incentives	(Brady & Davies, 2014)
Approach to risk	(Budzier & Flyvbjerg, 2011, 2013)
Legal Approach	

Key aspects of project governance	References
Contract standards (single contract or multiple contract types)	(Brady & Davies, 2014; Williams, Klakegg, Magnussen, & Glasspool, 2010)
Focus on contracts or solutions?	(Brady & Davies, 2014; T. Williams et al., 2010)
Incentives (for example fixed-price contracts for specific project components)	(Ahola & Davies, 2012, p. 668; Henisz et al., 2012)
Dispute resolution (dispute resolution procedures utilized to solve problems quickly and limit the need for litigation)	(Ahola & Davies, 2012, p. 668)

4. Case study work

Case material was gathered through:

- Search for research papers in the Scopus and Web of Science databases on the Danish Smart Card, the Oyster Card and on the EZ-link
- Search via homepages of the relevant authorities and government ministries and google.com for official documents and reporting in the public domain on the projects

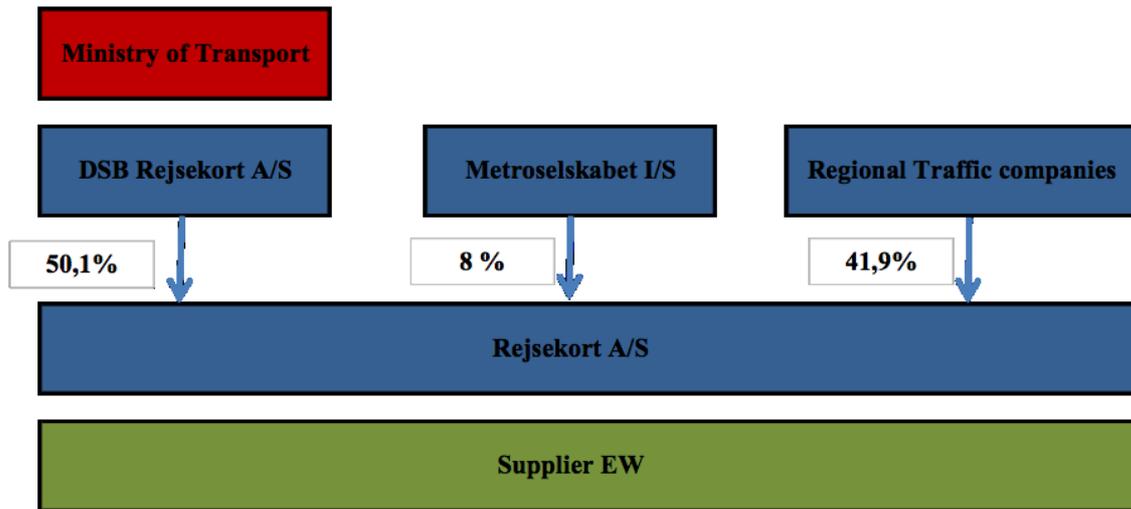
Material on Smart Card Rejsekortet was collected from the Rejsekort A/S homepage, Danish national Audit Office and external consultants' evaluation reports, Parliament documents, reports and other documents made public by the regional traffic companies that have a shareholding in the Rejsekort A/S (see full list of material in appendix A). One of the sources, a 2010 evaluation report by a consulting company, was only available in the form of a management summary. An application from the weekly of the Danish Engineer's Association "Ingeniøren" to access the full report with reference to the Public Information Act was turned down with the reason that such a report is exempt. Releasing it would cause substantial adverse financial impact on Rejsekortet A/S and their shareholders and the system's supplier, as it concerns the security of the system, confidential business relations and the supplier consortium's financial conditions and negotiation positions (Transportministeriet, 2011). There is very little information in the public domain about the management of this project, let alone the basis for decisions on initiating the project. Most of the information is presented as defensive reactions when delays and budget overruns were criticised in the media.

4.1 Rejsekort Smart Card

The Rejsekortet project is alternately called "project" and "programme" in the source documents. For the clarity of this case description, the term "project" is used consistently, as it is also the term used by the authorities in Denmark. The project concerns an electronic ticketing system for all public transport in Denmark.

The project preparations started in 2003 when HUR (Copenhagen County development authority), Ørestadsselskabet (metro operating company, Copenhagen), DSB (national railway corporation), Storstrøm Trafikselskab, Vestsjælland Trafikselskab, Vejle Amts Trafikselskab og Nordjyllands Trafikselskab (county traffic companies) founded the limited liability company Rejsekortet A/S. The purpose of the new company was to "direct the establishment and operation of an electronic ticketing system to serve the public within transport on trains, busses and metro and other forms of public transport and other associated activities" (own translation, from <https://www.rejsekort.dk/om-rejsekort/rejsekort-as.aspx>). The shareholders' agreement included a power of veto on selected articles.

Rejsekort A/S is organised as follows:



From very modest beginnings, the staff of Rejsekort A/S was increased in 2008 on all levels, from 11 to 16 employees, and in 2009 it grew to 31 employees.

Suppliers: A parliamentary act on Smart Card Rejsekortet was passed in 2005, and the same year a contract with a private supplier consortium for the supply of the system was concluded that covered the development of hardware, infrastructure and software. The consortium is called East-West Denmark (EW). It is owned by Thales (80%) and Accenture (20%), along with IBM. The supplier had experience with developing smart card systems, such as in the Netherlands and in Hong Kong.

The evaluation in 2010 found that the supplier consortium was composed of “powerful” players. Thales is one of the world’s foremost suppliers of terminals and validators. Accenture is strong on systems integration and operation and IBM is highly experienced on the server hardware side. At the same time, the evaluation found the role distribution between the partners to be suboptimal, and the division of labour not sufficiently linked to their competences. For instance, establishing the required “back office” system for the Danish system was a big challenge for Thales as it was technically different from other similar installations in other countries (Transportministeriet, 2010).

Contract: The contract between Rejsekortet A/S and the supplier was a standard contract¹. The number of functional requirements in the contract was about 2,200. They were subsequently broken down into 17,000 technical requirements from the supplier – for which Rejsekortet A/S had no insight (Transportministeriet, 2010). No incentives were included in the contract – management would only accept a flawless system for implementation.

As it turned out a central problem in the project has been that the supplier did not fully understand the systems requirements of Rejsekort A/S. The requirement specification did not describe which concrete tasks the system should support, and the specification could be interpreted in a variety of ways. The contract prevented Rejsekortet A/S from undertaking any suppliers’ tasks, but did not prevent an active monitoring of the project (Rigsrevisionen, 2011).

¹ (Contract K33 was developed by the Legal Advisor to the Danish Government in 1987 and the prevailing contract for public IT-projects at the time, it was updated in 2007 to the K02 standard contract)

Since 2005 Rejsekort A/S has entered into five additional agreements with the supplier (Rigsrevisionen, 2011).

Organisation: Rejsekortet A/S was established as a lean organisation, whose primary task was to monitor the systems supply contract. However, the 2010 evaluation described the organisation as “the chain of a number of owners, which establish a company that contracts a consortium – which consists of a number of supplier companies (with a hidden consortium agreement). This makes it difficult to carry out an unambiguous management of the whole project” (own translation, Transportministeriet, 2010).

The board of directors of Rejsekort A/S has the task of looking after the interests of the company as a whole. In addition to the board, Rejsekortet A/S established an advisory group, led by the managing director of Rejsekortet A/S and made up of representatives of the management of each of the regional traffic companies. Its task is to convey the interests of the regional traffic companies to Rejsekort A/S. Furthermore, the organisational setup of Rejsekort A/S includes a number of working groups. They deal with the day-to-day coordination between Rejsekort A/S and the traffic companies, and they are the channel through which the staff of the traffic companies contributes with practical input to ensure that the technical interests of the traffic companies are taken into account.

The regional traffic companies are thus involved both directly and indirectly in the decision-making of Rejsekort A/S: through the company board, the advisory group and the working groups. Many resources were used in handling the divergent interests of the different traffic companies. Terms of reference were agreed upon for each of the groups, but the 2011 evaluation found that in practice it was not clear who made decisions and who merely informed the decision-making process. In summary, it was found that the organisational make-up of Rejsekort A/S and the traffic companies led to unclear communication with the supplier (Rigsrevisionen, 2011).

Approach to risk: Rejsekortet A/S asserted that risks, which could influence the time schedule and the technical solution, would be clarified and dealt with during contract negotiations and through minor adjustments in the course of the project. In 2004 it carried out a risk analysis that pointed at a number of general risks. Nevertheless, the company did not devise any risk management plans of its own. Instead, up until 2008 the management of risks was based on the supply contract, which gave the supplier the full responsibility for risk management.

In addition, Rejsekortet A/S did not follow a very active monitoring approach (Rigsrevisionen, 2011). Only from 2008 to 2010 did the company begin to monitor the supplier closely. The fifth additional agreement included in the contract in 2010 committed the company to cooperate more closely with the supplier in ensuring that the supplier delivered the system required according to the revised time schedule. However, as late as 2011 the company did not expect substantial risks for systems development as it was expected that 80% of the systems development would concern the re-utilisation of programming work from the supplier's other completed smart card projects (Rigsrevisionen, 2011).

Supervision and control within the project: The Ministry of Transport was given the role of monitoring the project in connection with the government's decision in 2005 that the state could engage in the development and implementation of the Smart Card Rejsekort project. The Ministry of Transport received information on the project through the state's joint ownership of the DSB Rejsekort A/S (state railway company) and the Metroselskabet I/S (the Copenhagen Metro Company).

Project Evaluations: There have been two public evaluations of the project, in 2010 and in 2011. The first was instigated by the Ministry of Transport (carried out by Gartner Consulting company). Its task was “to evaluate how probable it is that the Smart Card Rejsekort project can supply a well-functioning, national system before the end of 2012” (own translation) (Transportministeriet, 2010). The findings of the evaluation were:

- Rejsekortet A/S should adopt a more prominent role, together with the supplier, in order to manage the project, including the relevant prioritisations and decisions
- Rejsekortet A/S' should be further professionalised by supplying it with the resources and competences necessary for it to participate in the management of the project.

In 2011 the National Audit Office instigated an inquiry into the project because of the delay and the substantial state investment via the state-owned railways and the metro company. The purpose of the inquiry was “to evaluate how the Rejsekort A/S has prepared and managed the Smart Card Rejsekort project and how the Ministry of Transport has monitored the project”.

To this end, the following four questions were addressed:

- Did Rejsekortet A/S prepare the Smart Card Rejsekort project satisfactorily before the contract was signed?
- Has Rejsekortet A/S managed the project satisfactorily?
- Have the finances in the project developed satisfactorily?
- Has the Ministry of Transport monitored the project?

The inquiry led to the following conclusions:

- Rejsekortet A/S did not prepare the project satisfactorily, for it did not ensure that the supplier had fully understood the requirements of the Danish smart card system.
- The supplier was not capable of keeping to the agreed time schedule for delivery of the various components of the smart card system. Rejsekort A/S prioritized work so as to protect its legal position and did not react sufficiently in its risk management to the supplier's problem with delivering.
- A closer cooperation between the supplier and Rejsekortet A/S is a sound basis for delivery of the smart card system, but the project still entails risks (own translation, Rigsrevisionen, 2011).

4.2 Oyster Card

The Oyster Card is an electronic ticketing system used on public transport and valid on all public travel modes within the Greater London fare zones in the UK. The card is run under contract by Transport for London, an independent government body controlled by a board whose members are appointed by the Mayor of London. The Board of Transport for London leads a management team with individual functional responsibilities. One of these responsibilities is the Oyster Card run by the Director of Fares and Ticketing.

London for Transport initiated the Oyster Card project by a Private Finance Initiative (PFI) contract in 1998 with TranSys a consortium lead by Cubic, a company specializing automated fare collection and ticketing. In the consortium Cubic's role was to design, install and maintain ticketing machines and EDS, one of the worlds largest information technology companies participated with system infrastructure and the supply of fare cards. After 10 years of operation Transport for London terminated the contract within the contract stipulations and awarded Cubic a contract of operation. Oyster Cards were first issued to the public in July 2003 with a limited range of features and a phased introduction of further functions has followed. In 2009 the card was made contactless after a number of investigations also from the London Assembly Transport Committee. This enabled the system to accept other contactless cards and the Barclay Bank issued cards functioning both as credit cards and smart cards for ticketing.

By June 2013, over 70 million Oyster cards had been issued and more than 85% of all journeys on public transport in London were made using the card.

4.3 ez-link

Ez-link is an electronic smart card for payment of fares in the public transportation, parking and road toll payment systems. ez-link cards are sold, distributed and managed by EZ-Link Pte. Ltd., a subsidiary of Singapore's Land Transport Authority.

The ez-link card was initiated by the Land Transport Authority which in 1999 awarded the ERG/Motorola Alliance the contract to supply an integrated fare collection system by 2002. The alliance consisted of ERG, now Videlli Limited, an Australian Group specializing in fare collection systems, Motorola's World-wide Smartcard Solutions Division and a number of local Singaporean companies.

The ez-link card was introduced to support an extended fare structure where the objective was to allow commuters to transfer between different operators with the backend system apportioning the fares among different operators. The ez-link card was also at the outset developed to be a store for cash and competed against a local bank-owned card system "Nets" of debit and credit cards for payments at stores. Later, in 2003, a standard for value storage CEPAS, was initiated in cooperation between Nets and ez-link.

In 2000 the first pilot programme was running in the MTR-subway system and by 2002 the smart card was introduced to the public transportation system in phases starting with basic transportation modes followed by introduction into other modes such as parking, toll-road-payments, taxis etc. The card is also used as an ID-card for students, the elderly and government officials.

5. Analysis - Framework and Cases

Elements	Rejsekortet (Smart Card)	Oyster card	EZ-Link Card Octopus
The project specifics			
Emphasis in formal description and Time constraints	"Smart Card is an IT project which shall make it easier for the passengers to use the public transport as they no longer need to buy a paper ticket for a trip, but can use the electronic Smart Card" (Danish National Audit Office) Old ticketing system expires 2015	The Oyster® card is an electronic smartcard, introduced in 2003 to replace tickets and cards	The ez-link® card is a card introduced in 2003 to replace tickets and cards and smoothly move between operators

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Elements	Rejsekortet (Smart Card)	Oyster card	EZ-Link Card Octopus
Concept: Ticketing	Open stations – gate-controls “check in” and “check out” with card	Closed stations – no gate controls and limited open stations “check in” and “check out” with card (mobile phone at a later stage)	Closed stations “check in” and “check out” with card (mobile phone at a later stage) Also payment for taxis and car parking
Concept: Fares	Several fare-systems and discount offers	One fare-system Fare-freeze with the introduction of the system	One fare system
Integration and Interfaces System of systems	Integration with local operators	Integration with local operators’ systems	Operators in one system
Stakeholder profile	Elected local politicians, public railways, Danish Transport Authority, Ministry of Transport	Board for Transport for London (TfL) (local government body) Members from various interest groups elected by the Mayor of London	Board of Land Transport Authority, Singapore (Board of Professionals elected by the Singaporean Government)
Status – project progress			
Time – Quality - Resources	2003-2012 (not fully rolled out in regions before 2017)	1998-2005 Not delayed Introduced in busses 2001	1999 (contract) -2002
Approaches to Governance, Management and Legal elements			
Governance Approach			
Project development and Operating Company Ownership	Rejsekort A/S a limited company with shareholders from 7 of 10 regions	The Oyster card was set up under a Private Finance Initiative (PFI) contract between Transport for London and TranSys, a consortium of suppliers	EZ-Link Pte. Ltd., a subsidiary of Singapore's Land Transport Authority.

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Elements	Rejsekortet (Smart Card)	Oyster card	EZ-Link Card Octopus
Senior level engagement	Board of Rejsekortet A/S with representatives from Regions and Danish Railways Danish Transport Authority, Ministry of Transport no formal role	Managing Director of TfL responsible for all fares policies and ticketing operations	
Governance structure	One governing body – Board of Rejsekort A/S and one subsidiary – Rejsekort A/S	One governing body	One governing body with a subsidiary
Value focus	Focus of regional traffic companies: investment for joining system and operational costs Focus of Ministry of Transport: project costs		
Project Management Approach			
Overall management approach	Principal contractor working in project team, Rejsekortet A/S providing oversight “Management of contract” until 2010 “Management of the project” after 2010	Private Finance Initiative (PFI) Subsidiary with operational and financial responsibilities after implementation	Subsidiary Subsidiary with operational and financial responsibilities after implementation
Approach to stakeholder management - Managing <i>of</i> stakeholders or managing <i>for</i> stakeholders	Managing of stakeholders – involvement in working groups but no clear roles		
Dimension 1: Distribution of benefits	Local regional boards have opted out for reasons of other investments or separate business case		Customer Approach
Dimension 2: Sufficiently involvement	Local regional boards have expressed frustrations		Customer Approach

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Elements	Rejsekortet (Smart Card)	Oyster card	EZ-Link Card Octopus
Dimension 3: Respect in interactions	Local regional boards have expressed frustrations		Customer Approach
Incentives	No incentives – Management will only accept a flawless system for implementation	Incentive to develop project to be a complete success as management of project will run the system after implementation	Incentive to develop project to be a complete success as management of project will run the system after implementation
Approach to risk	All risk mitigated to supplier		
Legal Approach			
Contract standards (single contract or multiple contract types)	On contract with complicated specifications, the National Auditors later found major inconsistencies	Private Finance Initiative with contract specifying functions – To be confirmed	No formal contract between LTA and ez-link regarding ticketing, fares or development programmes but statements from the board og LTA regarding strategies To be confirmed
Focus on contracts or solutions?	Contract		
Incentives (for example fixed-price contracts for specific project components)	No incentives		
Dispute resolution (dispute resolution procedures utilized to solve problems quickly and limit the need for litigation)	Several public issues	Issue resolution not applied	Issue resolution not applied

6. Main Preliminary Findings

The three projects differ in their technical setup and, hence, complexity. From the outset, the Danish Rejsekortet was planned to service open stations and a number of fare systems. It was also intended to integrate the data from the smart card system into local operators' accounting systems. This made the implementation of the Danish Rejsekortet more complex than the two other systems (Geraldi, 2011).

Other differences between the Danish project and the projects in London and Singapore can be gleaned from the table above. They include, in particular, difference in governance structure, project management

approach and legal approach. Together these might be even more critical to the projects' outcome than technical setup and complexity.

The Rejsekortet system is being governed by a coalition of Danish regional entities and the Danish national railways. The interests of these stakeholders can vary widely. The top governing board consists of representatives of the coalition whose principal task is reconciling divergent institutional interests. The board does not include senior level civil servants from the national government or professionals from any relevant industry.

In the case of both Transport for London and the Land Transport Authority wholly owned subsidiaries were formed with the sole purpose of implementing the new systems. Board members in both cases were elected for the single purpose of governing the project. They include representatives of suppliers and the management from the main transport organising bodies who, in principle, were selected for their professional competence.

Structural differences aside, there are also marked differences in the perception of the project management role. Rejsekortet A/S in Denmark viewed its role in the first five years as being that of a "contract holder" with little concern for cooperation and systems' adjustments. On the contrary, the companies in London and Singapore were focussed on these roles from the outset – after all, they were given the task of running the system after implementation.

Underlying the structural differences and the divergent perceptions of the management role are the different legal scopes covered by the three cases. At one extreme, the legal basis of the Danish Rejsekortet restricted the system to administering a set of complicated specifications for a tender. At the other, the Private Finance Initiative-framework in London, and also in Singapore, focussed on managing functions and a functionally-oriented contract between the supplier and the company responsible for project implementation.

7. . Summary, Discussion and the Way Forwards

The three cases show marked differences in their governance structure, approach to project management and legal orientation. To some extent these are differences arising from project specifics. Some major elements of governance and approaches to management lead to higher levels of complexity and a risk of project failure.

This corresponds with Flyvbjerg et al. who state that cost and schedule overruns are internal to the organization and, hence, controllable.

Elements of governance structure, the staffing of boards and the management approach also appear vital for achieving project success.

The framework for analysis of the governance presented in the analyses provides a checklist with vital points for decisions both in the project start-up phase and in the execution phases of major public IT projects.

Next steps in the research will include data from the early phase and interviews from London and Singapore.

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Material on Smart Card Rejsekort:

Høring i FynBus's ejerkreds om udskiftning af eksisterende billetteringssystem med Rejsekortet Dec.2011 (Hearing in FynBus's owner circle on renewal of the existing ticketing system with smart card Rejsekort) December 2011	Document addressed to the municipalities on Funen and Region of Southern Denmark
Business case Rejsekortet –Rejsekortet as a reinvestment project in Midttraffik (BC2013) (Business Case Rejsekortet som reinvesteringsprojekt i Midttrafik BC2013)	The regional traffic company Midttrafik joining the Rejsekort , Third updating of the traffic company's business case, the first was done in 2007. Focus on finances
Parliamentary Document 105 of 5 th May 2011	On expanding the equity of Rejsekortet A/S
Parliamentary Document 98 of 30 th May 2013	On refunding extra costs 2013-2018 to one of the regional traffic companies because of joining the smart card Rejsekort
Finansministeriet. (2010). <i>Professionalisering af arbejdet med it-projekter i staten</i> . Copenhagen, Denmark.	Report on public IT-projects with recommendations from the Ministry of Finance
Rigsrevisionen. (2011). Beretning til Statsrevisorerne om rejsekortprojektet. Copenhagen.	National Audit Office valuation report
Transportministeriet. (2010). <i>Review af Rejsekortprojektet - ledelsesresumé</i> . Copenhagen, Denmark.	Management summary of the consultant evaluation (for the Ministry of Transport) of the Rejsekort project
Transportministeriet. (2011). Answer to Magnus Bredsdorff on request to right of access to Rejsekort documents on grounds of the Public Records Act. <i>Letter of 9 June 2011</i> . Retrieved May 1, 2015, from http://www.scribd.com/doc/110403052/DEL-2-af-2-Svar-p%C3%A5-anmodning-om-aktindsigt-i-rejsekortet-til-Magnus-Bredsdorff-1	Ministry of Transport's answer to a request of access to Rejsekort documents from the weekly paper "Ingeniøren"

Material on Oyster Card and ez-link:

Harvard Kennedy School: Cracking Oyster: Shashi Verma & Transport for London Confront a Tough Contract (A) Teaching Note 10/14- 2014	Basic information on Oyster Card set-up and contracts
Transport for London Annual Reports 2002-2014	Information on policies extensions etc.
London Assembly The Future of Ticketing	Investigations into the business case of contactless cards and issues with the customer experience
Telecompaper.com http://www.telecompaper.com/news/ergmotorola-alliance-wins-contract-for-public-transit-network	Information on contract and time schedule
Nanyang Technological University, Nanyang Business School, Christina Soh and Yvonne Chong ez-link and Nets e-payment; Creation a standard and building a platform of innovation	Information on the competitive landscape and objectives of ez-link