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THE STATE OF IT GOVERNANCE

PATTERNS OF VARIATION AT THE CENTRAL GOVERNMENT LEVEL IN NORWAY

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Abstract. The aim of this article is to analyze IT governance practices in the Norwegian government ministries. We seek to identify the ministries IT governance regimes, and, more specifically, the different government sectors policies and principles regarding the use of ICTs. Moreover, we seek to explain differences in IT governance regimes across ministries.

The empirical evidence has been collected from policy documents, budget proposals and other document. These data have been supplemented by qualitative interviews with key civil servants in the various government ministries. The analysis of the data is based on a theoretical framework consisting of four IT governance models and a classification of the functions that ICTs fulfill within the various government sectors. Our findings indicate that there is some correlation between IT governance models and ICT functions.

Keywords. *Key words*: IT governance, e-Government, Norwegian ministries, governance models

1 INTRODUCTION

In 1958, the first computer was introduced in public administration in Norway. At about the same time, Leavitt and Whisler claimed, in a Harvard Business Review-article ("Management in the 1980s"), that IT would replace the traditional organizational hierarchies with a leaner structure resembling an hourglass. As the hourglass structure eliminated the need for middle management, productivity would sour, according to the authors.

50 years on, Leavitt and Whisler predictions appears dubious: the IT governance structure of the Norwegian central government, as in most other countries, is still seemingly based on the centralized and hierarchical management style that is associated with the public sector. Moreover, IT governance can be seen as a subset of general administrative policies, which rely on two unchanging principles: sectorization and line organization at the central level; autonomy and self-determination at the municipal level.

This apparent stability notwithstanding, over the last 30 years or so, new administrative policies have been introduced in Norway. The first reform program was launched in the late 1980s and incorporated certain NPM features. But this reform program contained few (if any) initiatives that could meet the challenges created by the use of ICTs in public administration. However, in 1990, performance-based management, Management-by-Objectives,

was introduced, and since then ICTs has gradually become a more central factor in central government reforms.

These developments make it relevant to ask how and to what extent 30 years of administrative reforms have impacted on the governance of ICTs at the central government level? Can it, as Leavitt and Whistler predicted more than five decades ago, be described as a singular "hourglass phenomenon" defined by one dominant type or style of governance? Or is IT governance best understood as a plural phenomenon where we find a variety of structures and practices, including the type of governance that Leavitt and Whistler destined for extinction? If so, what characterizes the different types of IT governance and how can we explain the variations?

In this article we argue that IT governance is indeed a plural phenomenon. Thus, it can be understood in light of four theoretical IT governance models that capture the essence of the variation that we find within central government in Norway. These IT governance models are inspired by similar but much more general governance models that appear in the public administration literature.

Furthermore, we argue that the technology itself, (or more precisely, the functions that ICTs fulfill within the ministerial areas of responsibility) is an important factor that must be taken into account when we seek to explain variations in IT governance. As we will see below, we have defined five different functions that ICTs may have.

In the rest of the article, we will address three questions:

1. What IT governance model is dominant within the different areas of ministerial responsibility?
2. What is the typical function that ICTs fulfill within the different areas of ministerial responsibility?
3. What sort of correlation (if any) do we find between the dominant IT governance model and the typical ICT function?

In discussing these questions, we must analyze the ministries policies regarding the use of ICTs. We must also understand the ministries need for interaction and cooperation, both within their own sectors and across spheres of ministerial responsibility. Finally, we must identify ICT functions and the amount of resources spent on IT management.

The empirical data that we base our discussions are (1) the ministries budget documents and the corresponding assignment letters to selected subordinate agencies, (2) relevant white papers and government reports and (3) interviews with key civil servants representing all the various ministries.

2 MANAGEMENT AND IT POLICY IN NORWAY

The political-administrative system in Norway, as in most other Western democracies, is based on a complex and often ambiguous set of norms and values concerning political-administrative control, codes of professional behavior, due process and the rule of law, democratic processes, public service ethics and civic participation [3]. The historical-institutional "climate" in Norway is characterized by homogeneity of norms and values, mutual trust between political and administrative leaders, the balancing of conflicting considerations, and a political style of extensive involvement and co-operation, all of which suggests that government reforms will be implemented in a slow, reluctant and modified fashion.

The first 30-40 years after the Second World War can be described as a period of bureaucratic expansion: government tasks and responsibilities increased dramatically [9]. In addition, civil servants, with a background from social sciences, economics and natural sciences, were recruited to government ministries and agencies.

During the 1980s, the political-administrative system came under increased pressure. And from the mid-1990s, Norway embarked on a gradual reform path that involved the implementation of performance-based management (Management by Objectives and Rules: MBOR). At the same time, Norway resisted much of the privatization and market measures that characterized public sector reform elsewhere, and adopted competitive tendering only to a limited extent [2, 5]. This period was also strongly associated with the massive adoption and use of ICTs. A series of studies proposed new initiatives that aimed at facilitating greater cooperation and coordination of the deployment of ICTs, but very few of the proposals were actually implemented [9,13]. Even so, a number of general measures (such as increased user orientation, new ways of funding ICT investments, outsourcing and changes in conditions of competition) have impacted on IT governance practices.

Table I: The relation between public administrative policy and IT policy 1950 – 2010

	Public Administrative Policy		IT Policy	
	Visions and goals	**Means and measures**	**Objective for ICT**	**Typical measures**
1955 - 1975	The growth of the welfare state, strengthening rule of law and equality	Rationalize and efficiency. Strengthen the political role of the ministries.	Rationalization through automating of routine task	Large computers and computer centers. Centrally developed systems
1975- 1990	Focus on a clear administrative policy, emphasize the division between politics and administration	Decentralization & delegation, developing regional and local administration. Introduction of MBOR)	Decentralization of responsibility for IT-systems. Efficiency improvements	Support for case handling etc. by the use of local computer systems. Acquisition is a local responsibility
1990- 2010	User orientation and freedom of choice. Make public services simpler & accessible.	Changes in budget regulation. Outsourcing increased competition. Improve public services	Growth of e-gov. Improve inter-action with citizens and private sector.	Integration of ICT in all work processes. ICT – architecture, standardization etc.

These developments underlined the need for a new type of IT-policy. Two recent white papers[1] clearly points in that direction: new initiatives, based on the need for greater harmonization of ICT solutions, have been taken and a set of common ICT architecture principles have been introduced [1],[12]. The development of public administrative and IT policies is summarized in table I.

However, the general picture is that most major public administration reforms have been initiated in order to fulfil other political goals, and that ICTs have primarily been seen as a tool for accomplishing traditional tasks rather than as an agent of policy change. The current IKT-policy may thus be described in this way:

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[1] St. mld. 17 (2006-2007): *An Information Society for All* , St.mld. 19 (2008-2009): *A Government for Democracy and Community*.

The overall government policy

National ICT policy

General regulations for financial management and

International trends: EU/ Information Society

General goals and framework for ICT-policies

Other policy areas

Principles and directions, organization mode of

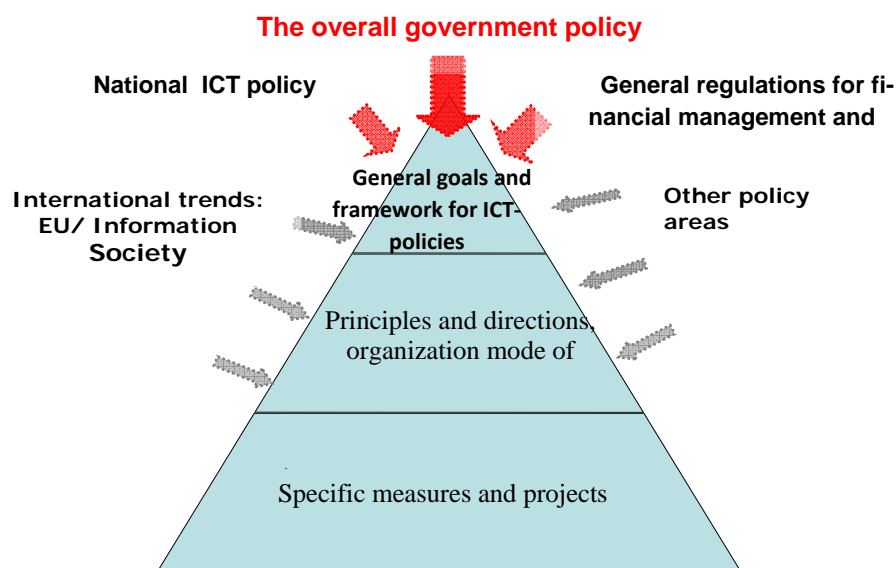Specific measures and projects

Figure I: The Norwegian IT policy framework

3 THEORETICAL PERSPECTIVES

Most comparative studies of IT governance in the public sector have analyzed differences and similarities at the national level. The assumption is that national approaches to IT governance can be described according to one distinct and "culture-specific" model (i.e. one nation, one model, see for instance [6-8]. In these studies, therefore, it is assumed that the interesting variations can be found across rather than within national political systems.

As already indicated, this article deviates from this approach. We hold that the IT governance is the product of ministry-specific management trajectories. However, the management trajectories may have been influenced by other factors. Consequently, all that is interesting is not national, significant variations can also be found on the intra-national level. True, the ministries IT governance springs from one particular and distinct political-administrative system. But within this overarching system, variations in IT governance may find fertile ground – there is no "one size fits all". In the next section we briefly trace the origin of variation: the development of administrative and IT policy.

3.1 IT Governance Models

It is these overall policy changes – past and current – that have spurred variations in IT governance: the changes have affected different ministries in various ways. In order to describe the nature of variation, we have constructed four IT-governance models. The models are (i) *the instrumental-structural model*, (ii) *the cultural-historical model*, (iii) *the network model* and (iv) *the market-oriented model*.

The instrumental-structural model promotes the view that the governance of public (and private) organizations can be understood as a top-down, predictable and controlled process. According to this model, what is being decided at the top of the political-administrative

ladder will determine how organizations evolve and change. This means that top management make decisions about how organizations should be structured based on well-defined goals and policy instruments, and that these decisions are implemented in a predictable and relatively frictionless fashion [3]. Top management, when deciding goals or changing policies, can be influenced by factors outside their control (public pressure, for instance). Even so, reform processes will generally be controlled by those at the apex of the bureaucratic chain of command. The oversight model, outlined by [11], is similar to the instrumental-structural model in the sense that the modification of administrative behavior is achieved by adhering to instructions handed down from "above".

The cultural-historical model assumes that public bureaucracies have long-lasting institutional features that shape administrative behavior. These features are conceptualized as relatively stable norms, values and practices that create a distinct and specific organizational culture. These norms, values and practices are shared by all (or the great majority of) civil servants and the "new recruits" soon come to accept them as "natural" [5]. An important aspect of this governance style, particularly for top managers, is to represent and maintain "the best of what we stand for". This implies that the cultural-historical style of governance is less based on hierarchy and control, and more on the ability to successfully mediate between the entrenched administrative traditions, on the one hand, and fashionable reform ideas that are held in high regard by "modernizers", on the other. The point is that reforms or changes will be adapted or brought in line (as much as possible) with the existing and entrenched institutional features.

Table II: Major features of the governance model

Governance models Features	The Instrumental-Structural Model	The Cultural-Historical Model	The Network Model	The Market-Oriented Model
Focus	Rational thinking	Maintain values and norms,	Reduce hierarchy, stimulate cooperation	Avoid monopoly, create markets
Structure/ Characteristics	Well-defined authority & responsibilities	Institutional, historical traditions	Interaction and collaboration	Decentralization
Decision-Making	Hierarchical, through authority	Guided by professional interests, consultation	Participatory, mutual influence, negotiations	Decentralized, create internal market.
Alignment	Centralized, top-down approach	Compatibility with existing values	Flexible adaptation	Ad-hoc, performance-driven
Formal communication	Hierarchical and centralised	"Business as usual"	Horizontal	Various patterns
Management type	By objectives and return (MBOR)	Path dependency; corporate society	Teams, TMQ, Internal quality management	Pay for performance, no specific
Control process	Obligatory return	Few	Few	Many

The network model draws on [16] notion of participative government. This model is characterized by a flatter and less hierarchical organizational structure, and the style of governance is based on consultation, negotiations and involvement (for instance, in relation to third parties like private businesses, interest-groups or individual citizens). Internally, governance is not so much about issuing orders and instructions, but is performed by adopting a "softer" and more participatory approach (by way of forming teams or project-groups,

for example). Moreover, the gradualist approach to reforms associated with the cultural-historical model is replaced by a greater emphasis on change and flexibility (often as a response to third party demands or pressure). This model corresponds, at least to some extent, with the mutuality perspective described by [11]. Here, administrative behavior is influenced by horizontal interaction and cooperation rather than command and control.

The marked-oriented model is based on devolution and decentralization of initiative and responsibilities – and an emphasis on greater individual incentives (particularly at the management level) for delivering above-average results. This style of governance emulates what is believed to be the essential features of the successful business company (or leader): inventive, risk-taking, mission-focused and performance-driven. Administrative behavior is controlled by exerting greater pressure on civil servants to "deliver the goods", typically by stimulating greater competition by the creation of internal market or through benchmarking (see [11], [17]). In this model, the critical management challenge is to define a framework for open, competitive and well-functioning public sector markets.

3.2   The Function of Technology in Governance Practices

None of the governance models takes into account the functions and roles that ICTs have and how they may influence IT governance. However, since we expect to find that ICTs fulfill different functions depending on the type and structure of the ministry, our assumption is that the way technology is utilized and perceived (by the ministries and their subordinate agencies) is a source of variation in IT governance practices.

This hypothesis is based on insights provided by a number of contributions to the IT literature. For instance, in their seminal article *"Desperately Seeking the 'IT' in IT Research—A Call to Theorizing the IT Artifact"* [15]] argued that ICT is not just a tool that we use: it is also the ensemble of equipment, techniques, applications and people that define the social context of use. In the corporate management literature, we find similar perspectives (see, e.g. [17]). This means that the technology itself is seen as an agent of change: it is one important factor that will influence how governance is organized and executed.

Below, we describe five different functions that ICTs may have within organizations – and that may be associated with (or underpin) the different models of IT governance.

ICT as a *tool*. This implies that we can select the appropriate technical equipment or system in order to carry out specific tasks. ICT, according to this view, is the engineered artifact, expected to do what its designers intended it to do. Tools are usually neither particularly complex nor very flexible. Thus, ICT is primarily understood as a technical matter, being separate from and controlled by human actors [14]. This may be exemplified by ordinary office automation support system or case handling systems, carrying out functions that are precisely specified.

ICT as *control and management*. Here, ICTs is used for reporting, monitoring and controlling purposes, i.e. the collection of data on performance or outcome, or for various surveillance purposes. This use of ICT is normally characterized by limited complexity, but there is a need for some flexibility and organizational integration.

ICT as support for *interaction and cooperation*. Strongly influenced by the development of the Internet, and particularly the World Wide Web, interaction and collaboration has become increasingly important. And not only within public institutions, but, perhaps more importantly, regarding the interaction between public agencies, citizens, businesses and the private sector as such. These effects of ICTs are less controllable than when they are used

as tools, and this use of ICT requires more organizational flexibility.

ICT as an *information infrastructure*. This means that ICTs is seen as the basic technical and organization capabilities that are necessary to support application systems and solutions. Similar to physical infrastructures, an information infrastructure must be open, standardized, evolving over time and flexible in order to support the large variety of systems and services that run on top of the infrastructure [10]. Thus, ICT as an infrastructure implies a high degree of complexity as well as a need for extensive organizational integration.

ICT as part of *core (business) activities*. In the public sector, core activities and products are by and large *information services* which is offered to individual citizens or actors within the private sector. These activities and services include both technical and organizational elements, including training, staffing and support. They usually imply a significant level of complexity and flexibility, and organizational integration is crucial for their success [17].

We may summarize these five understandings of the role and function of ICTs in organizations according to two important features: i) degree of complexity and dynamics/flexibility, and ii) their need for integration.(* = weak,** = average, *** = strong).

Table III: Features of the different ICT functions

Attribute ICT Function	Complexity and dynamics	Need for organisational integration
Tool	*	*
Control and management	*	**
Interaction & cooperation	**	***
Infrastructure	***	**
ICT as part of core activity	***	***

Since we expect to find that ICTs fulfill different roles or functions across the ministries, our assumption is that the way technology is perceived and understood by the various ministries and their subordinate agencies is a source of variation in IT governance practices rather than a source of uniformity. And since we assume that the existing governance structures and practices differ across ministries, it seems likely that we will find dissimilar governance models even in those instances where ministries use and perceive the role of ICTs in similar ways. This means that we identify three main sources of variation in IT governance models:

i. The ministries' existing management approach and practices

ii. The degree of external influence and interaction with external actors

iii. The functions and roles that are attributed to the use of ICTs, reflecting their core business activities

4   ANALYSIS AND DISCUSSIONS

Figure 1 above illustrates the overall policy framework to which each ministry has to adapt its IT governance policy. The framework defines few specific policy goals and instruments, and allows for significant variation when it comes to how ICT is governed. We find that that only a few ministries mention ICT explicitly in their budget document. Even

when we look at the assignment letters, the way ICT-related goals are operationalised (if at all) vary considerably. Less than half of the ministries specified measurement indicators for the use of ICT, and the indicators are for the most part rather vague. Based on the assessment on stated goals and outcome requirements, we can identify these dominant management approaches in the different ministries, as illustrated in table IV:

Table IV: Management Practices and External influence

Ministry	Management Approach
AD (Labour – Welfare)	MBOR, Citizens focus
BLD (Children, equity and social Inclusion)	Partly MBOR, traditional management
FAD (Government administration and reform)	MBOR, Technology and Infrastructure focus
FIN (Finance)	MBOR, technology and infrastructure focus
FKD (Fisheries and costal affairs	Traditional resource management,
HoD (Health and Care services)	MBOR, infrastructure agencies
JD (Justice and Police))	Partly MBOR, technology focus
KRD (Local government & regional dev)	Traditional management, no ICT-focus
KUD (Culture)	Some MBOR. Technology focus:
KD (Education and research)	MBOR, technology and Infrastructure focus
LMD (Agriculture and Food)	Traditional resource management, ICT-focus
MD (Environment)	Resource management ICT and Infrastructure focus
NHD (Trade and industry)	Significant ICT focus, infrastructure agency
OED (Petroleum and Energy)	Resource man. ICT focus security and
SD (Transport and Communication)	Traditional management, some ICT –focus,
UD (Foreign Affairs)	Traditional Management, ICT strategy

This table shows that a minority of the ministries explicit uses management by objectives and result in their IT governance, while only another minority make visible an IT focus in their management policies.

4.1 Plans, strategies and other policy instrument

We found that only seven ministries have defined a general ICT-plan or strategy that affected the whole sector. However, some of the ministries argued that a sector-encompassing strategy is not considered relevant, because the subordinate agencies have defined their own strategies which the ministries would follow up and monitor. It should also be noted that the usefulness of sector-encompassing ICT-plans is disputed.

Another (more soft) management approach is to establish forums or coordinating bodies, where the subordinate agencies can congregate and discuss issues of mutual interest, i.e. the harmonization and interaction of different ICT-systems. However, the formal status of such forums varies between sectors, i.e. whether or not the ministries themselves participate in the meeting and the forums ability to make binding decisions. Another interesting issue is the existence of agencies (or enterprises) that have specific responsibilities related to ICT developments or operations that support common ICT-function within the sectors (such as UNINETT in the educational sector, Norwegian Health Network, the Norwegian Mapping Authority/Norway Digital and the Brønnøysund Register Centre operating several registers related to business, trade and industries in Norway

We see from table V that the majority of ministries that specify ICT-goals for their subordinate agencies also use measurements indicators. Similarly, those ministries that have a coordinating ICT-body also stimulate sector-wide cooperation and coordination. This illustrates important differences between the ministries regarding their IT governance styles.

In order to explain these differences, we have analyzed the ICT governance patterns in each ministry along with their influence by and interaction with external actors.

4.2   Are the IT Governance Approaches Consistent?

Bellow we will discuss our research question:

1. *What IT governance model is dominant within the different areas of ministerial responsibility?*

The instrumental-structural model use measurable objectives (indicators) and obligatory returns as management instruments, and control processes are often supported by the use of ICTs. The Ministry of Finance seems to fit well into this governance model, since it is the initiator and driving force behind the use of Management by objectives and return, as do the Ministry of Reform, Ministry of Labour and Ministry of Health. The Ministry of Children and equity do also have some corresponding characteristics, although their IT governance approach includes elements from the cultural models as well.

The cultural-historical model assumes that public organizations have historical traditions that create a distinct institutional form (both in terms of behavior, norms and values). We find that this governance model is typical for the Ministry of Fishing and Coastal Affairs and also the Ministry of Agriculture seems to belong here (dominated by the agronomist profession, and having close relations to external actors within the agriculture sector). The same is true for the Ministry of Justice, the Ministry of Foreign Affairs along with the ministries of Transportation and communication as well as the Ministry of local government. The ministry of Justice and Police may also be associated with the instrumental model.

The network model assumes that interaction and collaboration with its environment is crucial, including building an open and flexible ICT infrastructure that can be used within the areas of ministerial responsibility. We find that the Ministry of Environment (MD) matches this model of governance. Other ministries that conform to this model are the Ministry of Education and Research (KD) as well as the Ministry of Culture (KUD), the Ministry of Trade and Industry (NHD) and the Ministry of Petroleum and Energy Policy (OED). These ministries have strong relations with the private sector, and are dominated by economist and civil servants with a technical or engineering background.

Regarding the market-oriented model, we find that none of the ministries have a governance approach that fits here, although we find that some ministries include some elements from this model. We can accordingly summarize these finding in table V below.

Table V: The relation between ICT management instruments, external influence and IT governance model

Ministry	ICT objective focus &means	External Influence	IT Governance Model
AD (Labour – Welfare)	Limited ICT focus, no specific goals or means	Some	Instrumental
BLD (Children, equity and social Inclusion)	No ICT focus, no specific goals or means	Limited, mainly with municipalities	Instrumental
FAD (Government adm. and reform	Well-defined ICT-goals, infrastructure focus, ICT agency & strategy	Significant	Instrumental /Network
FIN (Finance)	Well-defined ICT-goals, some infrastructure focus, ICT agency	Primarily with in the finance sector	Instrumental
FKD (Fisheries and costal affairs	Limited ICT focus, no specific goals or means	With private actors in sector	Cultural
HoD (Health and Care services)	ICT goals and strategy for interaction, also with private actor	Significant, with many actors	Instrumental/network
JD (Justice and Police)	Significant ICT and infrastructure focus, ICT goals and strategy	Some	Cultural/Network
KRD (Local government and reg. dev.)	Limited ICT focus, no specific goals or means	With reg. And local level	Cultural
KUD (Culture)	Significant ICT service and infrastructure focus, ICT agency	Significant internal interaction	Network
KD (Education and research)	ICT goals, Service and infrastructure focus, ICT agency	Significant (EU,OECD,..)	Network / Instrumental
LMD (Agriculture and Food)	Significant ICT and infrastructure focus, ICT strategy	Some	Cultural /Network
MD (Environment)	Significant ICT and infrastructure focus, ICT strategy and agency	External coop. dominating	Network
NHD (Trade and industry)	ICT goals. infrastructure and service focus, ICT agency	Significant interaction with industry	Network
OED (Petroleum and Energy)	Limited ICT focus, no specific goals or means,	Significant influence from industries	Network
SD (Transport and Communication)	Some ICT focus, an ICT strategy in the transport sector	Significant in some agencies	Cultural/Network
UD (Foreign Affairs)	Some ICT focus, no specific goals ICT strategy	With other ministries and abroad	Cultural

It is interesting to observe that none of the three models are dominating across the government. On the other hand, this picture is not static, but does only reflect the currents situation, where all ministries are involved in various reform processes. Assuming that the cultural-historical model is most similar to former management policies and practices, we would expect that either the instrumental-rational model or the network model become more typical in the future.

2. What is the typical function that ICTs fulfil within the different areas of ministerial responsibility?

We have identified the individual ministries' specification of ICT goals and means along with the general ICT focus, the existence of ICT strategies and/or ICT agencies etc. Furthermore, we have assessed the ministries view on the functions and role of ICT in their sector. In table VI, we summarize our findings in this way:

Table VI: Management practices and ICT functions in all ministries

Ministry	ICT objective focus, and means	3 dominating ICT function & roles	IT Governance Model
AD (Labour and welfare)	Limited ICT focus, no specific goals or means	Tool, Control, Interaction	Instrumental
BLD (Children, equity ..	No ICT focus, no specific goals or means	Tool, Interaction , Control	Instrumental
FAD (Government adm. and	Well-defined ICT goals, infrastr focus, ICT agency & strategy	Infrastructure, Interaction, Control	Instrumental /Network
FIN (Finance)	Well-defined ICT-goals, some infrastr. focus, ICT agency	Control, Infrastruct., Service	Instrumental
FKD (Fisheries and costal affairs	Limited ICT focus, no specific goals or means	Tool, Interaction, Control	Cultural
HoD (Health and Care services)	ICT goals, strategy for interaction, also with private actor	Interaction, Infrastr., Control	Instrumental/ network
JD (Justice and Police)	Significant ICT and infrastr. focus, ICT goals and strategy	Interaction, Tool, Control,	Cultural/Network
KRD (Local govern and reg. dev	Limited ICT focus, no specific goals or means	Tool, Control, (Interaction)	Cultural
KUD (Culture)	Significant ICT service and infrastr. focus, ICT agency	Service, Infrastruct., Interaction	Network
KD (Education and research)	ICT goals, Service and infrastr. focus, ICT agency	Service, Infrastructure, Control	Network /Instrumental
LMD (Agriculture and Food)	Significant ICT and infrastruct. focus, ICT strategy	Infrastructure, Interaction, Tool	Cultural /Network
MD (Environment)	Significant ICT and infrastr. focus, ICT strategy and agency	Service, Infrastr., Interaction	Network
NHD (Trade and industry)	ICT goals. infrastructure and service focus, ICT agency	Infrastructure, Service, Interaction	Network
OED (Petroleum and Energy)	Limited ICT focus, no specific goals or means,	Interaction, Control, Tool	Network
SD (transport and Communication)	Some ICT focus, an ICT strategy in the transport sector	Tool, Interaction, Control	Cultural/Network
UD (Foreign Affairs)	Some ICT focus, no specific goals ICT strategy	Tool, Control, Interaction	Cultural

We see from table VI that the tool function seems to be important in at least 7 ministries. The infrastructure function is important in at least 8 ministries while the same is true for ICT-based interaction and collaboration in 8 of the ministries. The control function is significant in 8 of the ministries and the service function is important in 7 ministries.

3. *What sort of correlation (if any) do we find between the dominant IT governance model and the typical ICT function?*

Our analysis indicates that the IT governance approach may be limited to three models: the instrumental-structural model, the cultural model and the network model. The market-oriented model may be more relevant for other countries. Table VIII summarize how the five ICT functions are relevant in relation to the governance models:

Table VII: Management practices and ICT functions in all ministries

Governance models / ICT functions	The Instrumental-Structural Model	The Cultural-Historical Model	The Network Model
Tool	***AD, BLD***	***FKD, FD, SD, UD, J***D, ***KRD***, LMD, UD	
Control	AD, ***FIN***, HOD, BLD, FAD	FD, JD, KRD, SD, UD	KD, OED,UD
Interaction	***HOD,*** BLD, Fad, AD	***JD, LMD ,*** FKD, (KRD),	KUD, NHD,MD, ***OED,***
Infrastructure	***FAD,*** FiN, HoD	FD, LMD, SD	*MD,**NHD,*** KD, KUD, OED
Service	FIN		***KD, KUD,*** **MD**,NHD

*) The most important function is written in bold italic.

Based on a theoretical assumption about the relationship between models and functions, it seems plausible that that the attribute "limited complexity and dynamics" (the tool and the control functions) is associated with the cultural-historical model. This assumption is supported by our data: the tool function is most typical for cultural-historical models. Furthermore, we expect that the control and management function would be mostly associated with the instrumental-structural model, which is not supported empirically, as it also is related to the cultural-structural model. We would on the other hand hypothesize that interaction and cooperation as well as the infrastructure functions is typical for the network model, which is strongly supported. We also see the service function is more dominating in these ministries. We thus find that the attribute "complexity and dynamics" is associated with the network model, as, the infrastructure function as well as the interaction and cooperation functions may be significant within ministerial sectors that are influenced by this model of governance.

When we look closer at the characteristics of the different ministries, there are clearly connections between its core activities and the dominating ICT functions, i.e. the tool perspective relates to the reporting and control functions. The infrastructure function support resource and environment management oriented ministries. These findings tend to support our initial assumptions that, as resource management in itself is shared or common facilities

However, this picture is somewhat ambiguous, which can be attributed to other factors as their existing governance structure as well as external influence. The governance structure is probably not static, either.

5   CONCLUSIONS

Our findings show that we can identify three of the IT governance models within the Norwegian ministries, while the (pure) market-oriented model seems to be less important. We also find some correlation between the IT governance models and the ICT functions, where the tool and control function seems to be associated with the cultural-historical and the instrumental-structural models, while the infrastructure and interaction functions are mostly related to the network model. However, our results are preliminary and further analysis has to be carried out.

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