From policy to design and effects:
A framework for e-government research

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Abstract

This paper presents a simple model for e-government research consisting of three notions: policy, design and effects. This model should be seen as programmatic statement for e-government research. Central in the model is design process and designed products of egov artefacts. Design is in the egov context considered to be a process of policy implementation. The policy background of egov systems are thus seen as pivotal to study. The use of egov systems by different types of users will lead to different kinds of effects. There might be positive and negative effects and the effects might be intended or un-intended. The model is grounded in earlier and on-going research in e-government. The model is also operationalised in different research themes, which can be interpreted as a research agenda. The model is also related to current discourses in information systems concerning the need to focus the IT artefact, practice theorizing and design research.

Introduction

Citizens and politicians raise high demands on the development of e-government. There are many, sometimes contradictory, expectations and goals about improved service responsiveness, transparency, efficiency, legal security, coordination, interoperability, privacy and free information flow. The development of e-government meets a *diversified value landscape*. This makes the development of public e-services and other types of egov applications often very challenging. There exist diversified knowledge needs as consequences of these demands. Research on e-government can contribute to the understanding and development of egov systems in such a complex value landscape.

There are many research publications that make important contributions to how to address the diverse challenges and demands. There exist policy studies and investigations on national and international e-government programs and plans. Legal analyses of possibilities and problems in egov development have been reported. There exist evaluations of different egov initiatives and systems. The different expectations and goals mentioned above have given rise to studies from different perspectives; e.g. an interoperability or a privacy perspective. From such different studies a *fragmented picture* of egov research may emerge.

The author has been researching e-government issues for several years. This has included participating in several design and evaluation studies. Based on these different studies a need for an overall frame has emerged. This overall frame has now evolved and been labelled "*From policy to design and effects*".

The purpose of this paper is to present a programmatic statement for e-government research. This programmatic statement can be used to create a more coherent view of e-government research; a move away from fragmentation and diversification to more coherence and integration. I do not claim that this framework is the only possible or the best one. There exist already general egov frameworks, as e.g. the Technology Enhancement Framework by Fountain (2001), the e-government value realization framework by Skiftenes Flak et al (2009) and the three-dimensional framework for e-government (Naarmala, 2004). However, my idea has been to present a very simple model, which should be seen as a way to structure and relate different phenomena to each other. The ambition is not to produce a model as a theoretic account as for example Fountain's model. The idea has rather been "less is more", i.e. a simple model with few contructs and not any complicated relations. There are no monopolistic ambitions behind this model, i.e. to create **the** e-government model. This is one model that can be used to structure research and discourses on research in e-government. It is created in a pragmatist spirit to be one possible conceptual tool. Its value lies in its possible use.

This conceptualisation is based on reflections and analyses on earlier and on-going research projects that the author has participated in. One aim has been to create an encompassing framework for these different research endeavours. This means that the research approach has been inductive. The research projects will be briefly presented below. The emerging framework is also based on other egov research (described in a "brief outlook" below). The framework (i.e. a programmatic statement) consists of a simple model. An operationalisation of this model is also made in terms of possible research themes. This can be interpreted as a proposal for a research agenda based on the outlined frame. The paper will be ended with some conclusions. The model is here related to current themes in the IS research discourse.

Knowledge basis

E-government research: A brief outlook

E-government consists of two words; e(lectronic) and government. Electronic means the use of information technology. Following the well-known claims for theorizing the IT artefact (Orlikowski & Iacono, 2001; Benbasat & Zmud, 2003), egov research should be centred on IT. We should avoid putting the IT artefacts in the periphery or black-boxing them. The egov artefact should have a central place in our research. Lenk (2007) states a demand in relation to egov research that "two black boxes have to be opened: the nature of 'ICT', and the nature of the work of public administration at its operative level where it 'executes' public policies and where the menial tasks of public governance are carried out" (ibid p 207f).

The governmental context means several things. One important part of it is the political governance (Peristeras et al, 2002; Grönlund & Horan, 2004; Fountain, 2005). What is done in public administration is based on legal regulations and policy declarations. The public agencies do not have commercial relations to its clients with choice, purchase and payment of products as a dominant logic. What is done to the clients spans from free services to coercive power.

E-government is often associated with the use of IT beyond the boundaries of a single public agency. There exist of course IT artefacts that are only related to intra-organisational tasks, but the advent of Internet and other types of telecommunication makes interaction with other agencies, citizens and companies as a dominant thread in modern e-government (Naarmala, 2004). From this follows a great interest for egov artefacts that moves beyond single services to integrated services (Layne & Lee, 2001; Belanger & Hiller, 2006; Siau & Long, 2005). G2G collaboration (e.g. Karacapilidis et al, 2005; Loukis, 2007) and interoperability issues (e.g. Scholl & Klischewski, 2007) are deemed important.

Egov systems are often "legal machines", i.e. they build on and work according to legal acts and other regulations (e.g. Allouache & Khadraoui, 2011). The use of IT is a process of policy implementation (Fountain, 2001; Virili & Sorrentino, 2009). Policies and values are realized through the design and use of IT artefacts (Skiftenes Flak et al, 2009).

Egov research is often concerned with studying different effects of such systems. As Heeks & Bailur (2006) state there is a diversification into optimistic views vs. pessimistic views. A diverse set of impacts can be studied, as for example economic effects, institutional and organisational re-arrangements and user reactions and their changed behaviour (e.g. Fountain, 2001; Kunstelj & Vintar, 2004; Irani et al, 2005; Reddick, 2005; Kanat & Özkan, 2009; Srivastava et al, 2011).

The quest for a focus on the egov artefact as stated above should not be confused with a techno-centric view. It is not an interest for the technology as such. I agree in principal with Taylor & Lips (2008) who state that e-government should rather be about "informational government", i.e. a move away from a techno-centric focus to an informational and social focus.

Experiences from several egov research projects

The author has participated in several egov projects during the last years. All these projects have been conducted according to a practice research approach (Goldkuhl, 2011a). This means that they all have, besides theory generation, a practical orientation. There has been work around existing or planned IT artefacts. I will go through these projects briefly as a basis for the programmatic statement below.

A. Inquiry of municipal e-services for companies

This was a project that investigated the need for e-services for companies in local governments. We studied four local governments of different sizes. A special focus was on how to support companies that needed several grants and permits from the local government. We were interested in issues of how to coordinate different municipal offices in their contacts with companies and handling of cases. What kind of IT system was needed in order to integrate different fragmented IT applications in different municipal offices in order to obtain more of joined-up government (Persson & Goldkuhl, 2009)? We also worked in a prototyping design of an e-service for food permit. One purpose was to create, apply and test criteria for public e-service design (Röstlinger & Cronholm, 2009).

We covered many areas of local governments which meant influences from many policies and regulations. We identified several conflicting regulations and policies. We studied the effects on companies of fragmented municipal case handling. The work with e-service was governed by the goal to create good communication between the company and the municipality. How could the company applicant be more knowledgeable in order to make a valid and complete application through the support of the e-service application? The food permit area is highly regulated and it was a great challenge to present regulative information to the company in intelligible ways.

B. Design of IT support for resource management in personal assistance for disabled persons

Local governments can deliver personal assistance to disabled persons. There needs to be a formal decision that the client has the right to obtain such a service. The financing of personal allowance is complex since the local government pays one part and the Social Insurance Agency pays one part. The administration in the local governments of different personal assistants and their reported time were very cumbersome. Two researchers participated in an action/design research project developing IT support for this work (Sjöström & Goldkuhl, 2009). The regulatory basis for personal assistance is fairly complex and we devoted much time to investigate this (Goldkuhl, 2009a; 2011b).

The different work processes were very complicated and through innovative IT designs we proposed radical re-designs of these work processes. One basic idea was to move away from accountability through personal signatures to the use IT systems based on the principle of social transparency (Sjöström & Goldkuhl, 2009). However, the main financer of personal assistance (the Social Insurance Agency) objected to this proposed solution with reference to extant regulations. This lead to deep inquiries concerning the possibilities to find regulatory bases for the proposal and how to balance different conflicting values in different regulations (Goldkuhl, 2009a).

C. Design of e-service and query application for social welfare allowances

The author has together with a research colleague participated in a longitudinal e-government development concerning social welfare allowances. The responsibility for social allowances resides within welfare boards of municipalities. In the case handling it is necessary for the municipal welfare officers to check the total economic situation including other allowances for an applicant. The social welfare officers need to contact different central agencies and inquire if other allowances are given to the client. In this project we developed a multi-query application that sends queries to two state agencies (the Social Insurance Agency and the Board for Study Support) and obtains immediate answers and exposes these answers to the social welfare officers. This new query application has simplified and decreased the time for the case handling. This development was possible due to a new legislation. However the new statute is

very detailed concerning which information items are permitted to deliver to the municipalities. This obstructs implementation of new information needs.

We have also been working with the design of an e-service for applications of social welfare allowances. This was not a straightforward task due to many legal restrictions. The design of the interaction process was done in special ways due to these legal restrictions.

D. Evaluation of the national business link website

An investigation has been conducted by three researchers (including the author) on the Swedish national business link website (www.verksamt.se). This portal should make it easier for companies to start and expand their businesses. All important governmental information should be collected at one place (the verksamt website) and most contacts with authorities should be possible to exercise through this website which comprised different e-services for this purpose. The business link website was seen as a single point of contact for the companies in their relations to the different public agencies. This was described in the legislation regulating the website. This research contained a legal analysis covering an EU directive and regulations on the national level (a legal act, a ministry regulation and an authority regulation). Inconsistencies and ambiguities in and between these regulations were discovered (Goldkuhl et al, 2010). It was also revealed that certain statements in the legal act put heavy restrictions on the way the website could be designed. This design led to more cumbersome work processes for the users from companies and municipalities.

E. Evaluation of an e-service for tax declaration

The National Tax Agency had several years ago launched an e-service for companies to every month declare VAT and staff taxes. This e-service ran in parallel with an old routine consisting of a paper form declaration. The Tax Agency had hoped that the e-service would have become very popular and that most companies would use this type of communication medium instead of the paper form. However, after several years, there were only about one third of the companies that used the e-service. The rest used the paper form. One researcher (the author) was assigned to conduct an inquiry in order to shed more light on why not more companies used the e-service. A thorough investigation was done comparing different service alternatives; the e-service and the paper form and different variants within these. The communicative affordances of the e-service were investigated and reasons for the companies to not use this e-service was revealed (Goldkuhl, 2009b).

F. Design of an e-service for request for change of taxes

This study is from a project working with a taxation e-service. Two researchers (including the author) have participated in this project as design researchers. The project has worked with development of an e-service for requests for a changed taxation. Every company has a decided taxation level based on earlier figures. The company pays taxes during the year according to this settled taxation level. A company can request a changed taxation due to changed economic circumstances. This request will be handled by the Tax Agency and a decision will be made about a changed or retained taxation level. It is a fairly complex task to fill out a form for changed taxation. The transition from a paper form to an e-service has been governed by thorough analysis of legal and policy conditions. The aim has been to design an e-service that simplifies the task to apply for a changed taxation. This means high ambitions for the user-interface design. A special knowledge interest has been for quality criteria of user-interfaces in public e-services.

From policy to design and effects

A programmatic statement

When looking back on the different research projects described above a common thread appears: *From policy to design and effects*. All studies involved an interest for the IT artefact; an already designed artefact in use or an artefact under design. Different policies, regulations, values that govern the studied workpractice have also been studied. The concept of policy includes laws, regulations, policy declarations, workpractice goals and other statements of normative kind. In these studies actual and/or anticipated effects of the IT use have also been considered. This conceptualisation of e-government research has been depicted in figure 1 as a simple model. It is of course a main line of influence from policy to design and further to effects. There are, however, repercussions back from effects to design and from design and effects to policy. Unintended negative effects or absent anticipated effects may give rise to re-design of the IT artefacts. Such problems of not reaching desired effects might also influence the policy process. If the policy implementation process through design is not successful this might lead to reformulation of policy. Policy makers might realise that other strategies can work better. It is also important to take into account the insights from implementation research (Hjern & Hull, 1982) and program evaluation (Scriven, 1991) that policies may be adjusted during the implementation process and that also other informal policy elements and use-values emanating from implementers (designers) and users will be override formal policy elements. Policy implementation is not only a top-down process. Policy is what is shaped in implementation and use processes.

**Figure 1. From policy to design and effects:
a simple e-government model (PDE)**
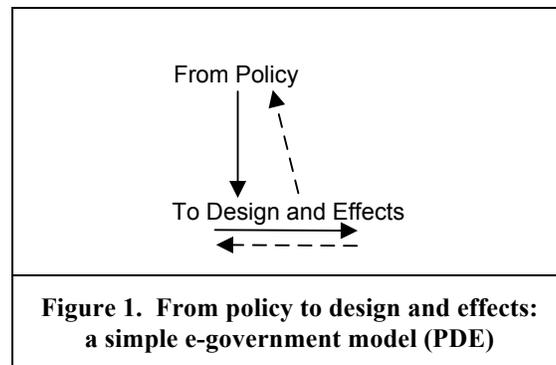
The concept of design in this model is equivocal. Design can mean design process, i.e. design activities. Design can also mean design product, i.e. the created IT artefact and other intended design products. This means that the statement "from policy to design and effects" is an abbreviation of the longer statement "from policy to design process, design products and effects". Effects do not occur directly from the designed product, but rather from the use of the products/artefacts. An even more comprehensive statement reads as follows: "from policy to design process, design products and their uses leading to effects". This unfolded chain of logic is depicted in a conceptual model (figure 2).

**Figure 2. From policy to design and effects:
Conceptual model of unfolded structure**
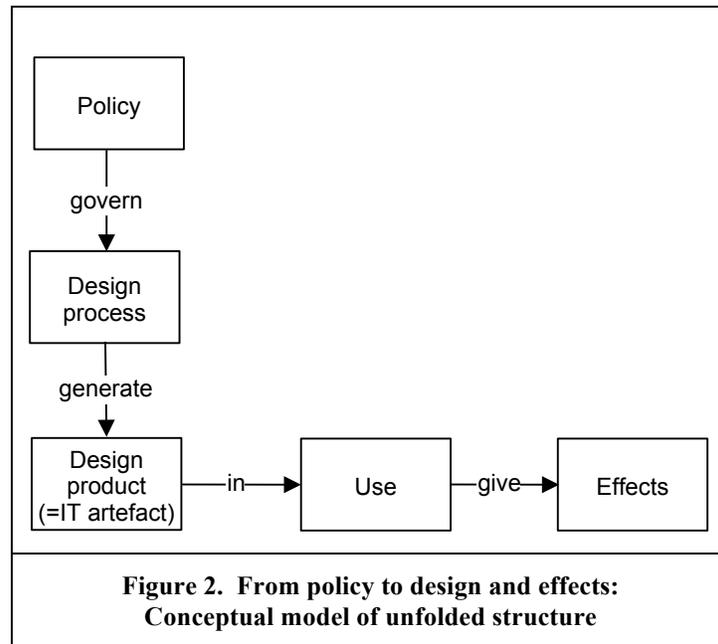
The main and simple idea of this framework is that an egov artefact (as a designed product) always should be related to its design process and the underlying policies (which should be implemented in design) and to its possible and actual effects in use situations. Does this programmatic statement mean that e-government research always should cover these three notions of policy, design and effects? It is not my claim that all egov studies should explicitly deal with all these three notions. One or two can explicitly be addressed and the other(s) can remain in the background (context). What is in the background can be taken into account if found important during the study (figure 3).

**Figure 3. Shifting between main focus
and background focus**
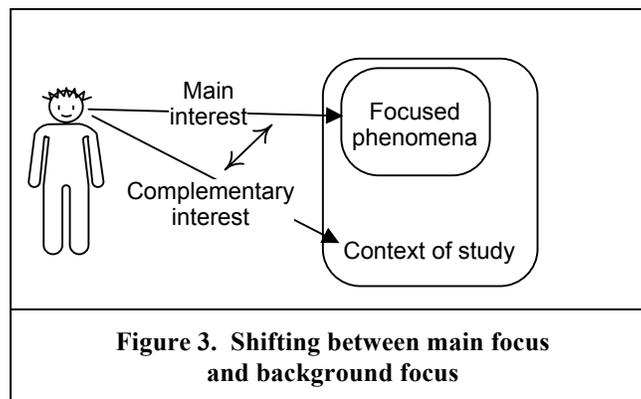
A consequence of this focus – context reasoning is that several different constellations of policy, design and effect studies can be conducted. For example a policy study means that different policies as such are studied and that their possible implementations in design and subsequent effects are bracketed and put in the background. Seven different constellations can be stated and these are found in table 1.

Table 1. Different types of e-government research		
Type of research	**Focus**	**Context**
Policy studies	Policy	Design, Effects
Policy-based design	Policy, Design	Effects
Design studies	Design	Policy, Effects
Design evaluation	Design, Effects	Policy
Effect evaluation	Effects	Policy, Design
Policy and effects studies	Policy, Effects	Design
Integrated studies of policy, design and effects	Policy, Design, Effects	

Ontologically, there is a chain from collective values (policy) via design activities to designed artefact that can give rise to effects through use (figure 4). Policies exist as inter-subjectively agreed values concerning states in the world. Values exist often both as inter-subjective elements in human minds and as expressed in written statements (e.g. statutes, policy programs). Such values designate desired effects. In order to reach these desired effects, humans need to intervene in the world. In this case (egov), such intervention is done through the design of IT artefacts and other related actions. The use of such artefacts leads to actual effects of diverse kinds. These actual effects may deviate in different ways from the desired effects (policies).

Figure 4. From policy to design and effects: Ontological chain
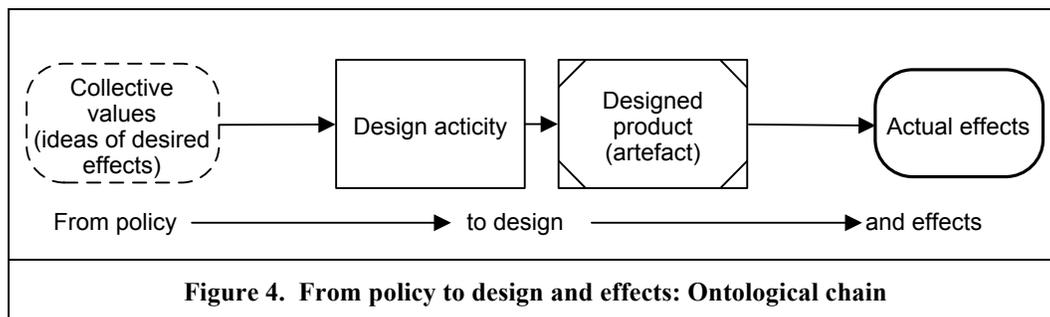
Research themes

The programmatic statement of "from policy to design and effects", which was articulated above, can be used to generate different research themes. These research themes can together constitute a *research agenda* for e-government. The generated research themes appear in table 2 together with a clarification of focus (cf. table 1) and an annotation in what of the described research projects the specific themes were topical. Through this generation of research themes the programmatic statement has proven to be useful. It has generative capacity. This can be said to be one way of grounding the usefulness of the framework.

Table 2. Research themes within "from policy to design and effects"		
Research theme	**Focus (P, D, E)**	**Research project (A-F)**
What ambiguities, inconsistencies and uncertainties exist in the (different) policies?	P	A, B, C, D
How are formal regulatory policies related to professional standards and criteria (e.g. usability)?	P	A, B, C, D, E, F
How to balance the various (sometimes contradictory) policy components prior to and during design?	P, D	A, B, C, F
How to operationalise abstract policy components (values) to the practical design ideals?	P, D	A, B, C, D, E, F
How to carry out design based on formal policies and situational use values?	P, D	A, B, C, D, F
What kind of emergent value development occurs in the design process?	D, P	A, B, C, F
How will abstract policy components (values) be expressed and manifested in concrete design products?	P, D	A, B, C, D, E, F
What are the intended and non-intended effects resulting from the use of design products?	E, D	C, D, E
What are the intended and non-intended effects resulting from the use of design products made in a policy-based design process?	E, D, P	C, D, E
How do practical use effects relate to formal and other policies?	E, P	C, E
How can formal policies be changed based on practical design innovations and identified use-values?	P, D, E	B, D, E
How can policies be critically examined from the perspective of practical realizability?	P, E	B, C, D, E
How do we understand the differences between rhetoric (policy level) and practice (design, use and effects)?	P, D, E	B, C, D, F
In what ways are policy processes also design processes?	P, D	B, C, D
How is explicit (= intentional) and implicit (= unconscious) design pursued in policy processes?	P, D	C, D
What are the intended and unintended design limitations of policies?	P, D	B, C, D

Conclusions

This paper has presented a simple model for e-government research based on the three notions of policy, design and effect. This PDE-model has been articulated and arguments have been put forth. The model has been grounded in earlier egov research that has been conducted by the author. Through the generation of a research agenda consisting of different research themes (table 2) a generative capacity of the PDE-model has been demonstrated.

I will end this paper with relating this model to general discourses on information systems (IS) research. In section 2.1 above I started to relate to the claim for focus on the IT artefact (Orlikowski & Iacono, 2001;

Benbasat & Zmud, 2003). This means a focus on egov systems as designed artefacts. Benbasat & Zmud (2003) have presented a nomological net for IS research (figure 5). How is the PDE-model related to this nomological net? The IT artefact is in the center; so is the corresponding notion of design in PDE. The design notion in PDE emphasises the IT artefact as a designed product with certain features due to its design. The design notion (in PDE) embraces the designed artefact and the design process. The right side of the nomological net consists of "usage" and "impact". This corresponds directly to "effects" in PDE. As shown in figure 2 above, the notion of effects implies the existence of use.

Figure 5. IT artefact and its immediate nomological net
(from Benbasat & Zmud, 2003)
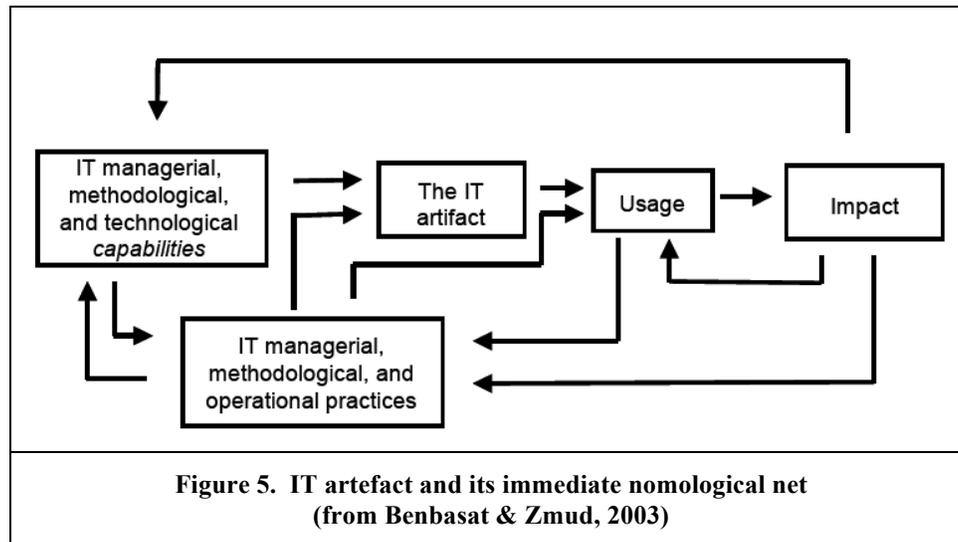
In the left side of the nomological net we find IT capabilities and practices. These constructs are not included as explicit notions in the PDE-model but rather seen as implied constructs within the design notion. This opens for another current issue within the IS discourse: A more explicit practice orientation (e.g. Orlikowski, 2000). There does not seem to be any practices in the PDE-model. Practices are not explicit in the model, but they are implied. Actually, the model can be seen as a way of relating three practices of public administration: policy practice, design practice and use practice.

In the nomological net of Benbasat & Zmud there is no notion of policy. In the IS sub-discipline of e-government I find it necessary to include policy besides design and effects. Most, if not all egov systems are suffused with public policy of diverse kinds. The basis for development of information systems with public administration is policy. I claim that it is not possible to understand *egov* systems without considering them as expressions of policy. If we would exclude policy, we would empty them on their basic meaning. Without policy, egov systems become meaningless as study objects.

Finally I would like to make a reference to the growing research orientation of design research within IS (Hevner et al, 2004). This is a research orientation that emphasises knowledge production through the design of artefacts. Central in design research is a cycle of build and evaluate (ibid). Artefacts should be designed and afterwards they should be evaluated concerning effects. In design research there is an evident focus on design and effects. Through the PDE-model, I add policy. Egov design research should be concerned with policy in design, how policy is transformed into design. In several of the described egov research projects a main knowledge interest was how policy influences the design process.

Future research will show further usefulness of this model. Is it considered too simple? Or is the simplicity of the model a strength as has been claimed?

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