Chapter 3
How Can Information Systems Help to Make Policymaking Be More Sensitive to Global Long-Term Perspectives?

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3.1 Introduction

In the last decades several positive world trends have indicated that, in general, the world is getting healthier, better educated, richer, more peaceful, and better connected. However, many major global challenges remain, including climate change, organized crime, terrorism, corruption, the widening gap between rich and poor, and increasing economic insecurity. According to the Millennium Project, one way to tackle these problems is to improve decision-making on the individual, group, national, and institutional levels (Glenn et al. 2011). Governments and politicians play a major role in achieving long-term global goals by setting and implementing the right policies on a global scale, so the Millennium Project asks, "How can policymaking be made more sensitive to long-term global perspectives?"

Technological developments like the ongoing evolution of information and communication technology (ICT) and expansion of the Internet have accelerate the complexity of these issues, along with the number and extent of changes and globalization. Therefore, it is important to understand how technology, especially information systems (IS), can be used to inform policymaking and improve its long-term perspective.

This chapter focuses on the research question, "How can IS help to make policymaking more sensitive to long-term global perspectives?" and addresses, among other questions, how *e-participation* can be used to make policymaking more sensitive to long-term global perspectives, how IS can support *global cooperation in policymaking*, and the chance that such ongoing research topics as *resilience thinking* and *collective intelligence* will affect policymaking. In addition to summarizing the topic-related concepts identified in the literature, this study proposes a research agenda.

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3.2 Research Method

The research question (RQ) for our literature review was derived from challenge number five of the Millennium Project (Glenn et al. 2011) and adapted to the context of IS. The process by which papers were selected consisted of four steps, in accordance with the methodologies proposed by Randolph (2009) and Vom Brocke et al. (2009).

In the first step, we defined the search terms and created a mind map on the RQ, where we summarized our ideas. As a result, a set of thirteen search strings related to IS and policymaking resulted.

In the second step, we defined the scope of our search. We used such academic journal databases as Google Scholar, EBSCOhost, and Springer Link to perform the search and chose not to limit our search to top-ranked peer-reviewed IS journals because of the interdisciplinary nature of our RQ.

Next, we defined the population of results in order to make the overall number of articles for reviewing manageable. We evaluated the first twenty pages of Google Scholar and Springer Link and the first ten pages of EBSCO Host to limit the hits for each keyword to 700.

Table 3.1 Selected papers focusing on the IS-supported concepts contributing to making policymaking more sensitive to global long-term perspectives

Paper	Paper Nr.
Braess et al. (2005)	[P1]
Cockerill et al. (2009)	[P2]
Dolowitz and Marsh (2000)	[P3]
Edwards (1996)	[P4]
Gordon (2003)	[P5]
Gordon (2009)	[P6]
Guiraudon (2000)	[P7]
Keen (1981)	[P8]
Kreileman et al. (1996)	[P9]
Lampathaki et al. (2010)	[P10]
Larrain et al. (2000)	[P11]
Leach (2008)	[P12]
Lempert et al. (2004)	[P13]
Lempert et al. (2009)	[P14]
Macintosh (2004)	[P15]
McCartney (1988)	[P16]
Misuraca et al. (2011)	[P17]
Parr et al. (2003)	[P18]
Phang and Kankanhalli (2008)	[P19]
Rotmans et al. (2001)	[P20]
Tumer and Wolpert (2000)	[P21]

Finally, we evaluated the literature, identifying the potentially relevant papers as those that dealt with the RQ. We assumed that the term "long-term perspective" referred to "a time frame of one, two or three generations" (Rotmans et al. 2001), as even 30 years might not be long enough for our purposes. In the first round of the literature evaluation process, we read the papers' titles and, when a title was promising, we read the abstract. If both the title and the abstract suggested a paper's inclusion was justified, we read its conclusion as well. We excluded many papers that addressed policymaking from a long-term global perspective because they did not consider IS's contribution to the challenge. The papers we selected in the end either stated explicitly how IS contribute to the challenge or derived IS's contribution indirectly. We also extended the literature through a backward search of the articles chosen. The resulting list of twenty-one papers is presented in Table 3.1.

Analysis of the selected articles included identification of the papers' central issues and examination of the authors' lines of argumentation. As a result, we found seven IS-supported concepts that contribute to making policymaking more sensitive to long-term global perspectives. These concepts and related papers are presented in Fig. 3.1.

The next section discusses each concept in detail.

Paper	E-participation in e-democracy	Counter-counter-implementation	Policy transfer	Cooperation in policymaking	Resilience thinking	Collective intelligence	Predictive methods			
							Policy context analysis	Policy modelling	Policy simulation	Policy evaluation
[P1]						X				
[P2]								X	X	
[P3]			X	X						
[P4]								X	X	
[P5]							X			
[P6]							X			
[P7]			X	X						
[P8]		X								
[P9]								X	X	X
[P10]							X	X	X	X
[P11]		X								
[P12]					X					
[P13]							X	X	X	X
[P14]							X	X	X	X
[P15]	X		X							
[P16]		X								
[P17]	X					X	X	X	X	
[P18]					X					
[P19]	X									
[P20]			X	X		X				
[P21]						X				

Fig. 3.1 IS-supported concepts contributing to making policymaking be more sensitive to global long-term perspectives and the related papers

3.3 Results and Discussion

The first IS-supported concept that contributes to making policymaking more sensitive to long-term global perspectives refers to *e-participation*, the inclusion of the general public into the policymaking process with the help of IS. A growing number of government organizations use technology for this purpose, providing access to policy information and requesting comments from the public about it (Macintosh 2004). In order to ensure that a policy fulfils the requirements of as many people who are affected by it as possible, policymakers must reach the targeted group. IS offer a broad variety of solutions to meet this need (e.g., e-participation in online communities) by removing time and space constraints (Phang and Kankanhalli 2008). Such solutions should take into account how deeply citizens should be involved in the policymaking processes (be informed about a policy or be actively involved in its creation or implementation) and what information policymakers need from citizens and within what time frame. It is also important to evaluate the outcome of each e-participation project (See the passage on *Policy evaluation*, below).

The second IS-supported concept that contributes to making policymaking more sensitive to long-term global perspectives deals with policy *counter-implementation* (CI) and *counter–counter-implementation* (CCI). CI occurs when a policy implementation is sabotaged. As policymaking is deeply linked to political decisions (in both the public and the private sector), there will always be some kind of resistance. In relation to IS, counter-implementation might happen if, for example, people involved in policy implementation feel threatened by the change (Keen 1981). CCI is the tactic used to combat CI by analysing the scenarios of potential CIs and how they can be avoided before a project breaks down. Information is the key element of CCI, and IS can be assist considerably by reducing communication costs and enhancing information flow (Larrain et al. 2000). Setting up knowledge bases, which include the best practises on measures that have been applied successfully, can also help.

The third concept is related to *policy transfer*. Before introducing a policy, decision-makers usually determine whether a comparable policy in a similar environment (e.g., another country with a similar political and/or economic background) already exists, in which case all or part of it can be transferred and used. Technological developments make such a policy transfer process easier by offering new ways of communication and storing and accessing information, which has already resulted in increased occurrences of policy transfer (Dolowitz and Marsh 2000). Since such policy transfer can also fail, as there are many internal and external factors that influence its potential for success, the important questions concern which factors influence a policy's outcome and who should be involved in implanting a policy. Information can reduce the risk of policy transfer failures significantly, so the contribution of modern communication technologies supported by IS to the exchange of information on a global scale should not be underestimated.

The fourth IS-supported concept that contributes to making policymaking more sensitive to long-term global perspectives is that of *cooperation in policy-making*. One example of a Europe-wide long-term-oriented policy is the Schengen agreement. This agreement not only facilitates the creation of a single European market and travelling without border controls but also introduces within the agreement the Schengen Information System, which contains information about people who have violated the law (Guiraudon 2000). The availability of the system in all member states significantly eases the process of catching criminals. Other technological cooperation delineated in the agreement includes the finger-printing of asylum-seekers, which the IS-supported means of world-wide communication makes easier. The Schengen Information System, which does not require large investments of effort and money investments, helps to make cooperation in policymaking easier and cheaper by, for example, providing opportunities to conduct virtual meetings, which allows geographically separated teams to work together.

The fifth concept is *resilience thinking*, which refers to a society's resilience or response to shocks and ability to face change and reduce such uncertainties as risks, ambiguity, and ignorance (Leach 2008). Resilience thinking includes policies that affect how a society deals with natural disasters, catastrophes, and crises from a long-term global perspective. One important aspect of this concept is the need to raise society's awareness about the environmental change caused by humans and the need for more sustainable production and consumption. Here, IS can reveal the consequences of society's behaviour by means of rapid analyses of huge data sets and communication of the research results to policymakers and the wider public (Parr et al. 2003). Advanced IS tracking tools can also help to prevent or manage disasters.

The sixth concept considers *collective intelligence* (COIN), which refers to a large system that includes many connected actors with no centralized communication and control but a utility function that rates the histories of the full system (Tumer and Wolpert 2000). The goal of the COIN approach is to determine how the people involved should update their behaviour in order to get the best results possible (e.g., to avoid traffic jams). By using mass collaboration platforms and real-time visualisation, policymakers can create, learn, engage, and share group knowledge and adapt policies to make them more efficient. A good deal of information is already available, but it remains to be mapped to usable applications, and this is where IS can be of help in supporting global sustainable policy development.

The last concept reviews *prediction-based methods* that are relevant to (1) *policy context analysis,* (2) *policy modelling,* (3) *policy simulation, and* (4) *policy evaluation* (Lampathaki et al. 2010). These four domains were proposed within the CROSSROAD project, a support action project funded by the European Commission that is aimed at determining the key research challenges in the field of ICT for policy modelling and governance. The concepts of resilience thinking and COIN rely on real-time information that, when combined with information about the past, can be used to predict the future.

(1) *Policy context* analysis focuses on analytical and descriptive analysis of policy or analysis for the formulation of policies and proposals. IS facilitates such statistical methods as foresight, forecasting, and backcasting, which can analyse the past in order to develop short-term forecasts. One useful approach for policy analysis on issues within a 10-year horizon is the State of the Future Index (SOFI), which forecasts the results of today's actions (Gordon 2003) with the goal of improving the sensitivity of decision makers at the local, national, and global levels to long-term global perspectives.

The Real-Time Delphi Method is another forecasting approach for analysing policy contexts. In contrast to traditionally expensive and time-consuming Delphi studies, the Real-Time Delphi Method uses software to provide each participant with the responses of other participants and the reasoning for these responses in real time. This method supports mass collaboration and can be used to evaluate policy options from remote locations without unnecessary expenditure of time. Such IS tools play an important role in future policymaking, as IS facilitates policy intelligence (comparable with business intelligence), IS-driven decision analysis, gaming-based simulations in the context of policymaking (Misuraca et al. 2011), and process optimisation and control. Lempert et al. (2004) pointed out that long-term policy analysis using IS tools should help policy-makers to make systematic, grounded decisions.

(2) *Policy modelling* is another method that help to increase policy-makers' sensitivity to long-term global perspectives. Policy-makers can use models (made by researchers working with policy-makers) as simplified, abstract views of reality. Several studies have mentioned the importance of such collaboration for the success of policy-modelling (Cockerill et al. 2009; Kreileman et al. 1996; Lampathaki et al. 2010). Edwards (1996) suggested that such comprehensive modelling informs policy-makers about the structure and the extent of global problems, thereby supporting the decision-making process.

(3) The aim of IS-supported policy-making in the context of *policy simulation* is to gain feedback from artificial, yet realistic tests in order to choose the best policy option. For example, computer-based simulation models enable policy-makers to play 'what if' games, where they can evaluate various scenarios related to policy implementation (Cockerill et al. 2009). Simulation of social and political systems can be done via agent-based modelling, where agents are (for example) governments (Lempert et al. 2009).

(4) Several IS tools that support qualitative and quantitative methodologies for *policy evaluation* have already been developed. Policy evaluation uses scenario techniques to support the policy-making process at a strategic level (Lampathaki et al. 2010). Robust decision-making (RDM) refers to the practice of policy simulation and policy evaluation, where computers are used to create plausible long-term paths (scenarios), after which robust short-term policy options are identified using statistical computer algorithms. As a result of RDM, policy-makers are able to gain a systematic understanding of various scenarios so they can consider the differing consequences of feasible paths before they decide on a policy (Lempert et al. 2009).

3.4 Research Agenda

The literature review process made clear that the proposed concepts cannot address our main RQ fully (although they still provide valuable ideas on how IS can contribute to making policy-making more sensitive to long-term global perspectives). As a result, we developed additional RQs from the literature.

To what extent is the integration of population into political decisions beneficial for the policy-making process? E-participation in *e-democracy* is important for integrating the population into political decisions, but with the help of IS, such integration can become so easy that too many participants in policy-making would lead to endless debates. Another challenge arises with the need to ensure the security of IS that supports online voting during governmental elections.

Can policy transfer be simulated using (for example) modelling techniques? Further reviews on the best practices supported by IS are needed for such areas as *counter–counter-implementation* and *policy transfer*. Creating a policy-transfer database might be a reasonable idea, but we found no such idea during the literature review. However, several other IS for political cooperation have already been implemented, among which is the Schengen Information System. Since policy transfer can be misleading, prior *simulation* might be useful.

Can a global IS that supports politics and is implemented in multiple countries become a basis for making decisions in the context of global resilience? Our main finding from the literature is that cooperation between governments with the help of IS yields significant possibilities. IS can be of great value in the communication and coordination of policy-making between countries. As a next step, we suggest implementation of a global IS to support policies that are useful for groups of countries. However, further research is required on how to collect and integrate data from multiple countries into a single IS. A global IS could be an integrated collective intelligence system that supports cooperation in politics and policy-making. However, data security and the influence of national cultures remain problems and require further investigation.

We found four sub-areas of research on using IS to make policy-making more sensitive to long-term global perspectives in the literature: *policy context analysis*, *policy modelling*, *policy simulation*, and *policy evaluation* (Lampathaki et al. 2010).

Policy context analysis deals with predicting the future and evaluating its impacts and implications using such methods as foresight, forecasting, and backcasting. *Policy modelling* incorporates findings from various scientific domains and research areas related to the creation of computer models. It usually refers to specific fields of application (e.g., climate change) and uses such approaches as system dynamics, game theory, and mathematics. *Policy simulation* is a powerful method for making short- and long-term predictions. It involves the creation of computer models that stand in for social systems in order to evaluate social interdependencies. Such computer-assisted social simulations are influenced by physics, computer science, and mathematics. Finally, *policy evaluation* involves the

assessment of policy impacts in order to explain why policy instruments perform differently than they were supposed to perform. Policy evaluation can be used to derive best practices or feedback for policy-making. There are several frameworks on how policy evaluation should be implemented (e.g., Mark et al. 2000), but research on policy evaluation is still in progress (Lampathaki et al. 2010).

We believe that predictive methods supported by IS can be a powerful driver in making policy-making more sensitive to long-term global perspectives. The ongoing research in such fields as mathematics and computer science regularly delivers new prediction-based methods. Now it is important to identify which of them predict the future in the context of policy-making in the most accurate way.

3.5 Conclusion

A long-term perspective and a global context are the two most vital aspects of modern policy-making. There are numerous challenges associated with these requirements, and it is important to know whether IS can support the concepts that are intended to address these problems. This study analysed several areas of global and long-term policy-making and the role of IS in their support in order to derive three primary conclusions.

First, IS can support global and long-term policy-making that deals with particularly complicated issues, such as disasters and climate change. *Resilience*, one of the keywords proposed in this paper, shows how policies influence how society deals with unexpected situations. Resilience requires deep insights about the future, and IS can enhance prediction-based methods for *policy context analysis, policy modelling, policy simulation,* and *policy evaluation*.

Second, until now policy decision-makers have been a small group of people. We propose that approaches like *e-participation* could help decision-makers to get feedback from all relevant target groups on various policy activities, which would ensure that a policy meets the requirements of those who are most affected by it.

Third, there are few areas in which no policy has been established in at least one country. It is logical to reuse or adapt these policies in a process called *policy transfer*. One example of how IS support the use of a policy in many countries is the Schengen Information System developed within the Schengen agreement. The core idea of the Schengen Information System is to help all of the signatory countries to know what the others are doing in certain areas (e.g., what criminals they are looking for), which makes the decision-making process more efficient. Such *collective intelligence* helps security organizations but can be also applied in areas like transport organisation and optimisation.

We find the creation of one integrated IS for several countries to be the most exciting topic for future research. We believe that integrated policies are needed in order to face long-term global problems. These integrated policies can be created only if there is an integrated view on the world, which can be facilitated by IS.

By using IS for cooperation and coordination, the time and space usually required for policy-making can all but disappear. Thus, IS can be of great value in making policy-making more sensitive to long-term global perspectives.

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