

Evaluating trends of spatial data sharing policies in Uganda

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Abstract

Public organizations in Uganda have individually adopted different spatial data sharing policies. Recommendations on the development of the Spatial Data Infrastructure (SDI) in Uganda invite public organizations to harmonize spatial data sharing policies. The study uses isomorphism theory to investigate if those organizations tend to harmonize spatial data sharing policies. The theory is applied in public administration sciences, and used in explaining how organizations adopt and diffuse similar behaviour when they cope with environment influences pushing them to adopt similar practices. The study uses interpretative techniques in analyzing data obtained from field work and existing literature on spatial data sharing in Uganda. It assesses whether spatial data sharing policies followed by public organizations in Uganda change over time and reflect any pattern of isomorphism namely coercive, normative and mimetic. Findings show that, initially, there exist two different policies followed by public organizations in Uganda in spatial data sharing cooperation. Some organizations follow the pricing policy and charge fees in sharing spatial data with public and private organizations and individuals, while others follow free access policy and share spatial data free of charge. Organizations which follow pricing policy face coercive forces resulting from regulations and requirements pushing them to charge fees in spatial data sharing. Since 2000, those organizations have adopted new behaviour and started to share spatial data free of charge with other government organizations. Change in behaviour reflects the normative process and relates to an increased awareness about the appropriate ways for the cooperation in spatial data sharing between government organizations as stipulated in the decree related to the development of the Spatial Data Infrastructure (SDI) in Uganda. The decree recommends the adoption of the principle of free exchange of key spatial datasets between government organizations. In similar way, normative forces shape the behaviour of organizations which have adopted free access policy. Sharing spatial data for free allows the optimal use of spatial data for meeting organizations goals.

Keywords: Public organizations, spatial data sharing policy, free, fees, isomorphism theory, Uganda

1. Introduction

In Uganda there is a governmental awareness to foster the development of the Spatial Data Infrastructure (SDI) with the aim of solving the problems related to spatial data availability, access and sharing, duplication in spatial data collection, and diverse spatial data standards (Karatunga 2002). In the process of implementation of the SDI in Uganda, some organizations have come up with their own policies and different approaches in sharing spatial data.

SDI and spatial data sharing policies prescribe the harmonization of access to governmental spatial data. In European countries the INSPIRE directives propose access and use of spatial data in harmonized ways (European Commission 2007). In the United States, the policy on the National Spatial Data Infrastructure (NSDI) recommends harmonized free access to spatial data held by government agencies (Maitra 1998). In Australia, SDI policy suggests a common provision of fundamental spatial data free of charge, over internet or with a marginal cost of transfer if spatial data are distributed as packaged product (Interdepartmental Committee on Spatial Data Access and Pricing 2001). In East African countries, spatial data users' community recommends the harmonization of spatial data sharing practices and conformity to SDI policies (GSDI 2007).

In Uganda, within the public sector, terms on spatial data access are initially different since spatial data sharing practices have been developed out of the control of the mandates that ought to coordinate spatial data sharing cooperation between public organizations (Musinguzi 2004). However, the decree on the development of SDI in Uganda recommends the adoption of common policies on spatial data access (Swedish consortium 2001; Nyemera 2008). The aim of this study was to investigate and explain how spatial data sharing policies were adopted, and to examine whether spatial data sharing policies tend to be harmonized as recommended in SDI decree, and thereby converge to similarity. The factors that may push public organizations in Uganda to homogenize their practices in spatial data sharing were analyzed to assess whether those organizations propagate isomorphism behaviour, and solve the institutional disparities existing in spatial data provision as observed in public sector in Uganda (GSDI 2007; Nyemera 2008; Chaminama 2009).

2. Methodology

2.1. Study area

The research was conducted in Uganda. Primary data and secondary data were collected from public organizations distributed in the three zones: Kampala City, Entebbe City and Mukono town (figure 1).

Figure 1: Location of the study area

Source: (Broere and Vermaas 2005)

2.2. Sampling

The survey was conducted within 10 organizations. Those organizations operate in different sectors, namely public administration, land administration and management, water resource management and utilities. All visited organizations hold different spatial datasets of which they are custodian and maintain. Purposive sampling was deployed in this case to determine the organizations to survey. The major criteria set for the case study selection were the involvement of organizations in spatial data sharing cooperation for more than 15 years. The study targeted organizations which had been participating in such cooperation for a long time frame during which the researcher could investigate the change over time in the organizations behaviour.

2.3. Data collection

Primary data about spatial data sharing policies adopted by public organisations in Uganda were collected through interviews, surveys by questionnaires, and direct observations in September and October 2009. The interviews were based on structured and open-ended questions and unstructured questions to enable respondents to narrate spatial data sharing policies and practices within their respective organizations.

Interview and survey questionnaire were designed following the perspective of isomorphism theory. The investigation aimed at finding out whether the behaviour of target organizations shows any patterns of isomorphism. The key areas covered in surveys and interviews included organizational policy and approaches followed in deciding on spatial data sharing policies: free access or access for fees. The indicators of isomorphism behaviour in spatial data sharing which were addressed in data collection are presented in the table 1.

Table 1: Spatial data sharing policies and isomorphism trends

Concept under the study	Indicator	Source of evidence	Criteria for interpretation
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Isomorphism between spatial data sharing	Spatial data sharing policy	Questionnaire; Interview; Memorandum of understanding on spatial data sharing; client charter; spatial data dissemination policy	- Degree to which organizations adopt similar pricing or no pricing policies - Degree to which organizations place similar price on GI products - If organizations follow any laws or directives to decide on spatial data sharing policies
	Change in conditions placed on access to spatial data: from fee of charge to frees or vice versa	Questionnaire; Interview; Memorandum of understanding on spatial data sharing; spatial data dissemination policy.	- Degree to which organizations' spatial data sharing policies change and are aligned to each other - If there are any laws or directives that push organizations to change spatial data sharing policies
	Format of shared data: maps, vector, raster	Questionnaire; Interview; Memorandum of understanding	Degree to which organizations place similar terms on access to similar geoinformation products
	Coordination of data sharing activities	Questionnaire; Interview; internal regulations on spatial data provision	Degree to which regulations on spatial data provision look alike
	Inter-organization consultation on Geoinformation development	Questionnaire; Interview; Agreement on spatial data collection and dissemination	- Degree to which organization face similar uncertainty in spatial data sharing cooperation - Degree to which organization adopt each others' spatial data sharing policies

Beside the survey questionnaire and interviews, secondary data source including books, scientific articles and conference papers served to review the literature related to spatial data sharing cooperation between public organisations in Uganda and the theory of isomorphism with focus on drivers of change in organizational practices.

3. Conceptual framework and rationale

The study uses the isomorphism theory to investigate whether public organizations in Uganda show any behaviour vis-à-vis the recommended harmonization of spatial data sharing policies. The theory is used in explaining change in organizational behaviour and inter-organisational relationships when they cope with uncertainty or constraints existing within their environment. It is also used to explain how, through cooperation, organizations conform to procedures and legitimate rules and thereby become similar (DiMaggio and Powell 1983; Powell and DiMaggio 1991). Nowadays, the aspects of organizational behaviour in spatial data sharing need to be addressed because *“the technical issues of spatial data sharing are well studied and largely resolved, but institutional and individual behaviour aspects are less well studied and require more attention”* (Harvey and Tulloch 2006). In Uganda, spatial data sharing cooperation between public organizations has been developed on basis of individual arrangements. There has not been a national established inter-organisational

collaboration framework, and spatial data sharing has been characterised by the lack of uniform conditions on spatial data access (Musinguzi 2004). Therefore the research aims at explaining the nature of individual spatial data sharing policies followed by public organizations in Uganda and their future trends as the government tends to develop an SDI for solving the complexity observed in spatial data sharing policies as individually adopted by data producers (Muhwezi 2004) . The corner point for this study is that the adoption of the common policy on spatial data sharing is a key factor for the development of SDI (Nebert 2004).

4. Review of isomorphism theory

Isomorphism theory addresses the research question of why organizations behave homogeneously, and adopt very similar structures, strategies and practices. This theory is used in explaining the behaviour of organizations towards the adoption and diffusion of similar practices within an organizational field (DiMaggio and Powell 1983; Powell and DiMaggio 1991). A central tenet of the isomorphism is that when organizations share the same environment they employ similar practices and thus become similar with each other (Kostova and Roth 2002).

Isomorphism is a constraining process that forces one unit in a population to resemble other units that face the same set of environmental conditions. There exist two types of isomorphism, namely competitive and institutional isomorphism (DiMaggio and Powell 1983). Competitive isomorphism involves pressures towards similarity resulting from market competition (Mizruchi and Fein 1999). Institutional isomorphism induces organizational change for political and institutional legitimacy as well as market position (Frumkin and Galaskiewicz 2004; Freitas and Guimarães 2007). A fundamental outcome of institutional isomorphism is organizational legitimacy, which guarantees acceptance of the organization by its external environment (Powell and DiMaggio 1991). In this study we focus on institutional isomorphism as the aim is to investigate if organizations show any isomorphic behaviour towards adoption of common work practices with regard to the societal expectations and not for competition. The theorists of isomorphism process assert that within the same organizational field, organizations follow an evolutionary path from diversity to homogeneity. There exist three processes of institutional isomorphism: mimetic, coercive and normative forces.

Coercive isomorphism takes place when organizations are submitted to external pressures, formal or informal rules or regulations, originating from other organizations of which they are dependent or owing to the cultural expectations of the society in which the organization is inserted. The common mechanism through which coercive isomorphism happens, is the action of the government on organizations, by compliance to laws, norms and demands concerning production patterns, and organizational behaviour (Freitas and Guimarães 2007). Coercive isomorphism also results from regulations, law requirements, rules and standards imposed outside the governmental arena, such as less explicit pressures coming from stakeholders constituting the community surrounding the organization (Salvato 1999).

Mimetic isomorphism occurs when environment forces compel organizations to copy or emulate other organizations' practices, activities, processes or structures. They reflect the adoption of innovations that are deemed to be successful or to enhance legitimated practices that are seen as desirable (DiMaggio and Powell 1983; Powell and

Mimetic	DiMaggio 1991). The process of imitation can occur through information exchange and inter-organization cooperation. Organization X may follow spatial data sharing policy adopted by most of other organizations, because it perceives that the policy adopted by other organizations drives from a social constructionist role, called obligatory action, described as follows: “ <i>once enough social actors do things a certain way, that particular course of actions becomes taken for granted or institutionalized and thereafter, other social actors will undertake that course of action</i> ” (Haveman 1993).
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Normative isomorphism results from the effect of professional standards and the influence of professional communities on organization. These communities describe the ways that organizations are expected to conform to standards of professionalism and techniques and processes that are considered as legitimate by relevant professional groupings (Powell and DiMaggio 1991). From the influences of the professional communities, organizational decision makers learn appropriate techniques and adjust their practices accordingly (Calhoun, Gerteis et al. 2002). Norms and standards are communicated through workshops, seminars, training sessions, trade magazines, and through personnel moving from office to office (Galaskiewicz and Wasserman 1989) Normative isomorphism can also result from the necessity of conformity to norms that are applied in organizational fields and derives from a desire to comply, for example in order to avoid conflict (Brandesen, Munckhof et al. 2007).

5. Data analysis

Primary and secondary data for this research were analyzed using qualitative and interpretative methods for deriving the similarities or dissimilarities between organizations that constitute the unit of analysis. The analysis was done following the principles of isomorphism process to assess if the organizations in the study tend to adopt similar policies or practices in their cooperation towards spatial data sharing. The analysis was done taking into account the following assumptions which may lead to isomorphism in the field of geoinformation.

Table 2: Preliminary assumptions on isomorphism behaviour in spatial data sharing cooperation

Isomorphism process	Spatial data sharing policy or practices
Coercive	<p>Organization A, which provides spatial data to organization B, can compel B to follow its policy on spatial data sharing when B shares spatial data acquired from A with other users: Organization B is forced to adopt the policy of organization A.</p> <p>The provider of the budget used in spatial data collection may have influence on organizations behaviour when deciding on spatial data policy. Those organizations adopt spatial data sharing policy according the requirement of the budget provider.</p>

Mimetic	<p>Organization X may follow spatial data sharing policy adopted by most of other organizations, because it perceives that the policy adopted by most of organizations may be appropriate.</p> <p>Organizations may mimic spatial data sharing policy adopted by the leading body for geoinformation activities. Those organizations may believe that the policy adopted by the leader is legitimate.</p>
Normative	<p>If organizations cooperate in network for spatial data collection or exchange, they may formulate and adopt similar policies related to spatial data distribution. New organizations may model themselves after other organizations in spatial data sharing network and then adopt similar policy on spatial data access.</p> <p>Government organizations may adopt similar spatial data sharing policy if they share similar beliefs on the ways to share government data.</p> <p>Spatial data sharing policy adopted by most of organizations within geographic area prescribes the common norms to follow. It may be taken for granted for all organizations in that area, and implemented through organizations routines of sharing spatial data in similar ways.</p>

6. Results and discussion

6.1. Organizations engagement in spatial data sharing cooperation in Uganda

The cooperation and partnerships for spatial sharing between public organizations in Uganda started many years ago. The practices of sharing spatial data started at the same time organizations initiated the mapping and or GIS activities. Once the organization started to collect spatial data, the cooperation for spatial data sharing started voluntarily or involuntarily. Either individuals or other organizations needed to use those spatial data, or organization itself felt the need to use spatial data from other organizations to fulfil its mission.

Organizations operating in the field of land administration and management have initially embarked on spatial data sharing at early stage when compared with other organizations. These organizations, representing only 22% in the study, started to share spatial data in 1960s when the Government of Uganda initialized the process of land registration and mapping (Uganda 1964). Most of other organizations (78%) started to collect and share spatial data in 1980s, with respect to dates they were created or at the time they incorporated the mapping/survey unities within their structures.

6.2. Spatial data sharing policies in Uganda: pricing policy versus free access policy

In Uganda, there is no specific legal framework for spatial data sharing (Kalanda and Ondulo 2006; Nyemera 2008). There is no national law on spatial data sharing, although an access to information act was issued in 2005 (Schwarte 2008). The act provides the procedures on access to data held by public organizations, but it does not prescribe the terms on access to spatial data when the cooperation involves public organizations (Kalanda and Ondulo 2006). The law does not include the standards prices for spatial data in the case the users have to pay fees for access to spatial data held by government body, and data producers still set their own prices when access fee is required. Thus, the access to information act needs more amendments (Kalanda and Ondulo 2006; Schwarte 2008).

As there is no national law on spatial data sharing government organizations in Uganda have individually initiated the cooperation in spatial data sharing from many years ago. Most of organizations have developed unwritten informal policies that they follow, while few organizations like MEMD (Ministry of Energy and Mineral Development), NEMA (National Environment Management Authority), NFA (National Forest Authority), UBOS (Uganda Bureau Of Statistics) have the written policies guiding spatial data sharing and dissemination (Muhwezi 2004; Tukugize 2005; Nasirumbi 2006; Schwarte 2008). Those policies prescribe the procedures to have access to spatial data, the format of accessible spatial data, copyright issues and the price of spatial data and the procedures of payment in the case the users have to pay the access fees.

Two spatial data sharing policies are distinguished in this study. Some organizations share spatial data for fees, whereas others share spatial data free of charge. Various factors pushing organizations to adopt any spatial data sharing policy are explained according to survey responses.

6.2.1. Pricing policy

Pricing policy is adopted by 40% of organizations under the study. They initially charge fees for access to their spatial data (in form of map, shapefile or raster) for all users, including government and private organizations and individuals. Organizations that follow pricing policy were classified in this study under the category A. According to the survey responses, there are different reasons for charging fees in spatial data sharing. Those organizations operate in land sector, at both national and local levels, and charge fees for spatial data access in compliance to the registration of titles acts and land sector strategic plan which prescribe that the public have to pay fees for access to land information and cadastral data. Other motives for charging fees related to the revenue generation purpose, in relation with the requirements from the Ministry of Finance. Organizations operating in both land and water resource management at national level, charge fees for access to spatial data because they report every year to the Ministry of Finance how much money they collect from the services they provide to the public. The Ministry expects from government bodies to generate revenues in return to the budget they receive every year for the achievement of their missions. In the annual assessment, government organizations in Uganda report how much money they collect and the budget plan is approved taking into account the expenditure and the expected revenues in terms of fees. In this context, some organizations include maps sales, as one of sources of revenues, in their annual strategic plan. In this line, the pricing policy is practised for meeting the expectations of the Ministry of Finance.

6.2.2. Free access policy

60% of visited organizations have adopted free access policies and share spatial data free of charge in all formats: paper maps, shapefile and raster. Those organizations were classified under the category B and operate in different domains, such as public administration, water supply and sewerage, natural resources and environmental management at national, regional and local levels. Within these organizations, spatial data are considered as a resource to share with other stakeholders, and a freely sharable good for the public. Spatial data are shared for free because the information is for the public, and free access to spatial data is a mechanism allowing its optimal use for the public interest and meeting organizations goals.

6.3. Isomorphism trends in spatial data sharing policies in Uganda

In regard to the conceptual framework of this study, two mechanisms of isomorphism were observed in the behaviour of public organizations in spatial data sharing in Uganda: coercive and normative processes. There was no evidence that shows that public organizations in Uganda copied or emulated spatial data sharing policies adopted by other organizations. Respondents from the organizations in the study negated to mimic other organizations' spatial data sharing policies.

6.3.1. Coercive and normative isomorphism in adopting spatial data sharing policies

Coercive forces push organizations under the category A, to adopt pricing policy in spatial data sharing as follows: In land sector, organizations operating at national and local level behave according to the registration of titles Acts and land sector strategic plan which prescribe that the users of land information and land related data have to pay access fees. They have adopted pricing policy to comply with regulations guiding their activities within the sectors they operate. The titles registration acts and land sector strategic plan constitute the sources coercive forces and shape the behaviour of these organizations to decide on spatial data sharing policy as predicted in table 1.

Organizations that operate in both land and water resources management sectors, at national level depend on the budget from the central government. They adopt pricing policy in spatial data sharing due to the requirements of the Ministry of Finance which compel them to sell spatial data for the collection of fees that go to the public treasury. The Ministry of Finance expects from government bodies to generate revenues in return to the budget they receive every year for the achievement of their missions. The requirements of the Ministry of Finance shape the behaviour of those organizations following top down relations as coercive forces and relates more to resource dependency than legal requirement as predicted in table 2.

Another mechanism leading to isomorphism in spatial data sharing in Uganda is the ways organizations share similar beliefs towards adopting spatial data sharing policy. Normative forces shape the behaviour of organizations under the category B. They have common belief that sharing data for free is appropriate way to promote the access and the use of spatial data for all users (table 2). They converge in similar direction and this reflects an isomorphism process, resulting from the common social belief affecting the behaviour of those organizations assuming that sharing spatial data for free increases its optimal use and helps organizations to meet their goals.

6.3.2. Normative isomorphism and changes in spatial data sharing practices or policies

The results of the research show that the organizations in category A have adopted new behaviour in data sharing policies since 2000. Before that year, government organizations as well as private organizations and individual had to make a request for spatial data and pay access fees, before they could be provided the requested spatial data in any format. In the current practices, government organizations make a request for spatial data or spatial data providers and recipients make an agreement on spatial data exchange, and then spatial data are provided without any payment conditions. As a result, Government organisations do not charge fees for other government organizations for access to their spatial data. They have started to exchange spatial data with other government organizations and the access to each other spatial dataset is for free charge. Charging fees is still practiced when spatial data are provided to private organizations and individual as shown on figure 2.

Figure 2: Comparison of spatial data sharing policy and practices before and after 2000

Figure 2 shows change in the payment conditions placed on access to spatial data when spatial data sharing cooperation involves government organizations. This change is driven by the awareness on free exchange of spatial data between government organizations. Stakeholders perceive that it is not relevant to charge fees on spatial data access for government organizations. They support free access policy when government organizations cooperate with each other and when the shared spatial data are used for the public interest, and not for generating any financial benefit. In their opinions of most of the respondents (92%) to the survey questionnaire supported the free access policy when sharing spatial data involves government agencies, and fees should be charged for the private users who add value to spatial data and use them for commercial purpose.

The current policy on spatial data access when governments bodies cooperate in spatial data sharing give insight about the new behaviour and change in organizational practices towards spatial data sharing. The general trend is the convergence for all public organizations towards adoption of similar data sharing policy when they cooperate with other public bodies as illustrated by the table 3.

Table 3: Changes and convergence in behaviour of organizations in spatial data sharing policies

Table 4 shows that, before the year 2000, organizations under the category A behaved differently (as illustrated by diverse colours) from the organizations under the category B. They adopted diverse policies on spatial data access as organizations under category A charged fees for spatial data access for both public and private organizations. After the 2000, there is change in spatial data sharing policies and organizations under the category A tend to adopt similar behaviour as organizations under the category B through sharing spatial data for free when they cooperate with other government organizations. The complete change of spatial data sharing practices is not yet reached as organizations under the category A still charge fees for spatial data sharing with private organizations and individuals, while organizations under the category B do not charge any fees for any users.

The common cause for organizations under the category A to behave like the organizations B is the awareness on the principle of free exchange of spatial data between government organizations. Awareness on sharing spatial data free of charge between government bodies in Uganda derived from three main influential factors:

Cooperation under EIN- Informal agreement on spatial data sharing

In 2000, under NEMA (National Environment Management Authority) initiative, an Environment Information Network (EIN) was established. It comprises organizations producing main spatial datasets like agricultural, meteorological, topographical and other spatial data related to forests, soil and biodiversity, and have signed the memoranda of understanding on free spatial data exchange. The aim of the network was to exchange geoinformation in compatible formats at minimal cost, to solve problems related to spatial data access, and to promote the management of natural resources and environment. The constitution of the network was a decisive step for those organizations to start sharing spatial data for free charge with each other, while initially spatial data were shared upon the payment of the access fees.

Through interviews, respondents from the organizations under the category A agreed that their organizations share spatial data for free charge with other members in the network from the time they started to cooperate under the EIN. These arguments confirmed the ideas of Schwarte (2008) who stated that organizations which initially had pricing policy in spatial data sharing and had to charge fees for access to spatial data have started to share spatial data for free charge since the time the EIN was created. Working under a framework is recognized as a driver for change in organizations behaviour and adoption of similar practices (see table 2). When organizations are tied through network, they adopt and share similar norms and thereby behave alike. The organizations network constitutes a normative template facilitating the diffusion of appropriate norms that organizations have to follow in discourse of their missions. It is in this context that public organizations in Uganda which are tied by the EIN adopted new norms related to spatial data sharing cooperation. The Cooperation under the network was a normative mechanism that shaped the behaviour of organizations because they decided on the appropriate norms to follow in their activities and then became similar.

Formal and informal agreement on spatial data sharing

Since the year 2000, organizations under the category A, which initially followed pricing policy and charged fees for spatial data access for all users, including government bodies no longer pose the payment conditions to other government organizations when they access to their spatial data. Respondents from those organizations stated that, when there is an official request for spatial data, they are provided for free. Moreover, spatial data are provided for free charge if there is a formal or informal agreement on spatial data exchange between the managers from spatial data provider and spatial data recipient.

Current practices of sharing spatial data for free charge reflect change in behaviour of organizations towards spatial data sharing policies. They resulted from the awareness to free exchange of spatial data between government organizations as stated by interviewees. The general argument is that government bodies should share spatial data for free if they are used for the public interest. This argument constituted the corner points of the discussions held from 1995, when organizations producing and using spatial data started to meet through workshops and or conferences and discussed the mechanisms that should foster the access spatial data held by each other. The underlying principle for an efficient cooperation was the free exchange of the main spatial datasets as stated in the SDI decree as enacted in 2000.

SDI decree

The current change in spatial data sharing policy reflects the response to different directives (table 2 inviting public organizations in Uganda to adopt similar norms in sharing spatial data with other government bodies like the Swedish Consortium report on development of SDI and GIS in Uganda. The report recommends the adoption of the principle of free exchange of key spatial datasets within the government organizations to promote a further development of GIS in Uganda. Furthermore, the SDI decree states that government organizations should contribute to the development of the SDI through the documentation of geospatial data they collect or produce and the use of the standard set by the Spatial Data Infrastructure Committee. Moreover, they are invited to freely distribute the key spatial data to other government agencies on request.

Based on change observed in current spatial data sharing policies, public organizations tend to behave according to the SDI decree and other directives regarding spatial data sharing, rather than the regulations or other requirements which had compelled them to charge fees for spatial data access.

6. Conclusion

The aim of this study was to examine if spatial data sharing policies followed by public organizations in Uganda change over time and reflect a certain pattern of isomorphism. The results allowed to distinguish two categories of organizations with regard to the spatial data sharing policies: organizations under the category A which initially charge fees for spatial data access and organizations under the category B which share spatial data free of charge.

Some organizations under the category A charge fees for access to spatial data in compliance with the rules and regulations guiding the activities within the sector they operate. Others which specifically depend on the government budget for spatial data handling, charge fees in spatial data for collecting fees that go the public treasury in accordance to the requirements from the Ministry of finance. All those organizations face coercive forces which push them to adopt a pricing policy and thus show isomorphic behaviour, the coercive pattern, towards spatial data sharing.

The behaviour of organizations under the category B which share spatial data for free charge reflects another instance of isomorphism, the normative template. Those organizations consider spatial data as a resource to share for free charge and input for the achievement of their missions. They share similar believes about the appropriate ways to share spatial data and accordingly adopt similar policy on spatial data access.

Since the year 2000, organizations under the category A, which have initially adopted pricing policy in spatial data sharing, have changed their behaviour and adopted the principle of free exchange of spatial data when cooperating with other government organizations. They tend to behave as organizations in category B. Change in behaviour resulted from the increased awareness about appropriate ways to share spatial data with other government organizations as recommended by SDI decree, and other recommendations aiming at promoting the development of SDI in Uganda. The convergence of the behaviour of organizations under category A to the behaviour of organizations under category B, relates to normative process, and let to predict that public organizations in Uganda will adopt similar spatial data sharing policy as public organizations in other countries like the USA, European countries, Australia, Canada and South Africa where policies on spatial data sharing provide free flow of geoinformation between government bodies.

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