A Framework for Developing an ICT Strategy in Cadastral and Land Registration Organizations

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Key words: ICT, Strategy, Strategic Alignment Model, Good Practices, User Requirements, Cadastre

SUMMARY

Accelerating development of the Information and Communication Technologies (ICT) are pushing many Cadastral and Land Registration organizations towards organizational changes in order to meet challenging user requirements. Appropriate use of ICT improves the performance of these organizations and facilitates their way of becoming cost recovery. The purpose of this paper is to provide a 'Conceptual Framework for Developing ICT Strategy' for Cadastral and Land Registration organisation.

'Good Practices' from the experience of similar organizations in other countries are of importance, and their lessons learned are very much helpful while developing ICT strategy for particular Cadastral and Land Registration organizations. Identifying and satisfying 'System and User Requirements' are recognized as a critical success factor, specific attention to this issue has to be dedicated when developing strategies of this kind. The new developed framework is based on the 'The MIT Strategic Alignment Model' which presents how the functional integration, *the link* between the Business and ICT domains and the strategic *fit* between the strategic and operational level could be accomplished. Recognising ICT as discipline and considering the MIT model as a foundation, this paper presents a 'Conceptual Framework for Developing ICT Strategy' including its elements and their correlation within the framework. Under this framework, it is strongly recommended to use 'Manageable and Sustainable ICT', Database driven, web enabling, following (open) standards. This framework could be replicated and used as a basic model when developing ICT strategies in other industries, aligned with their business strategies.

This paper argues that appropriate and increasing use of ICT, implemented trough adequately developed ICT strategy, combined with institutional development, business alignment, etc., results with development of the organizations with efficient and effective way of doing business. As soon as Cadastral and Land Registration organizations recognize ICT as a discipline properly aligned with their businesses, they improve their business, business performance, quality of output and all this with return of investments in ICT.

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1. INTRODUCTION

Accelerating development of the Information and Communication Technologies (ICT) are pushing many Cadastral and Land Registration organizations towards organizational changes in order to meet challenging user requirements. Development of the ICT and ICT strategy within these organizations is often underestimated. In many cases, its role as discipline is not recognised as a driving factor for the organisational development. In the developing countries, the need of ICT discipline is often based on market trends and not optimally aligned with the business needs.

From its traditional position 'back office' in the past, ICT evolves toward 'strategic role' with the potential not only to support chosen business strategy, but also to shape new business strategies. ICT is more seen as a driver for a change of the today's businesses and a tool for creating new businesses.

Experience acquired by many organizations has revealed that appropriate support from ICT is essential to the achievement of the business objectives. On the symposium at ITC, in Enschede 2003, it was concluded that a strategy for change management and business re-engineering (there are cases where this approach failed!) is strongly related to the capacity of the organization, e.g. staff in IT department. A strategy should be developed for a big time frame (think big), but work small and act quickly (Molen and Lemmen, 2003).

The 'MIT strategic Alignment Model' gives good basics and shows on very simple way how a modern organizations business in alignment with ICT should be set up for a work in a digital environment. Elements like: 'Good Practices', 'User Requirements', 'Manageable and Sustainable ICT' and having a clear pictire of a 'To-Be' ICT situation should be explored and analysed, and their results should be incorporated in appropriately developed ICT strategy.

This paper provides a 'Conceptual Framework for Developing an ICT Strategy' for Cadastral and Land Registration organization with its main elements and their corelation. Each element has its unique value and deserves its place in this framework. Elements in the framework cover the main domains which are required to be included when developing an ICT strategy.

2. IMPROVE ORGANIZATIONS PERFORMANCE BASED ON STRATEGIC ALIGNMENT MODEL

Like in many other industries, Cadastral and Land Registration Organization search for various methods, models or techniques of doing business to improve their performance.

Living in the era when ICT develops very fast and it is more present in every segment of human existence, these organizations are focused on more practical way to using these technologies for their development. Intensive and efficient use of ICT in every day working activities facilitates organizations to ease and improve their performance in order to meet more demanding user requirements and to facilitate their way towards cost recovery.

From its traditional position 'back office' in the past ICT evolves toward 'strategic role' with the potential not only to support chosen business strategy, but also to shape new business strategies. ICT is more seen as a driver for a change of the today's businesses and a tool for creating new businesses. One of the models where business and ICT are in alignment and supporting each other in harmony, on strategic and on operational level is the Strategic Alignment Model. This model gives a good basics and shows on very simple way how a modern organizations business should be set up.

Strategic Alignment Model was originally presented in 1992 at Massachusetts Institute of Technology (MIT) by J. Henderson, J. Thomas and N. Venkatraman. Since 1992 the MIT model was accepted by many different domains which are ICT depended. ICT involvement nowadays in all domains is with raising dimensions which implies with more frequent usage of this model or similar by transforming organizations with progress and development in perspective, and for alignment of their businesses with ICT.

The model, termed the Strategic Alignment Model, is defined in terms of four fundamental domains of strategic choice: business strategy, information technology strategy, organizational infrastructure and processes, information technology infrastructure and processes-each with its own underlying dimensions (Henderson and Venkaterman, 1993).

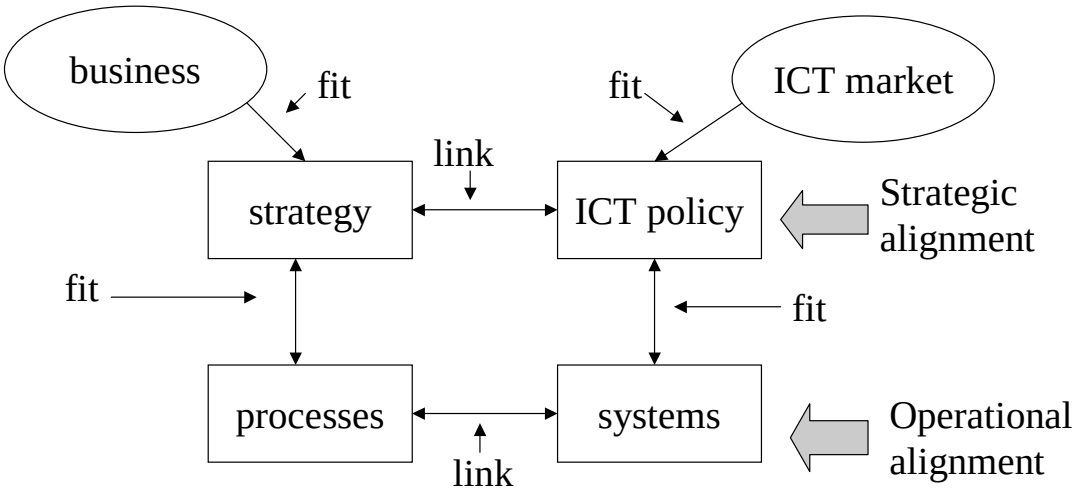

Figure no.1: The MIT Model adopted by prof. v.d. Molen (Henderson and Venkaterman, 1993)

This model implies that effective and efficient utilisation of information technology requires the alignment of IT strategies with business strategies, and reflects the view that business success depends on the linkage of business strategy, information technology strategy, organizational infrastructure and processes, as well as IT infrastructure and processes (Burn and Szeto, 2000).

The strength of this model lies in its ability to establish a relationship between the strategic and operational aspects of the organization's objectives and its ICT policy (Molen, 2003).

Since 1992 when the MIT model was originally presented, markets become more demanding and expansion of technological and ICT development occurs. Many examples in the different industries but also Cadastral and Land Registration organizations shows that as soon as they recognise the need for aligning their business strategy with ICT strategy both on strategic and operational level sooner they could realize the value and the benefits of investments in adequate ICT domain. Acceptance of this model would provide organizations flexibility to change business strategies where ICT domain would follow, in order to meet more demanding user requirements, in their transition towards cost effective and for achieving efficient solutions.

3. GOOD PRACTICES

What constitutes a 'Good Practices'?

There are many successful researches and efforts in order to define good practices. United Nations (UN) formed working groups for different domains to create guidelines for good practices. Following this direction, UN's 'Guidelines and Criteria for Good Practices' (UN, 1999) were observed and explored. These guidelines, adapted to the needs of this paper, are also applicable and could be utilized. Here follows a list of conditions and actions which constitutes good practices:

- led to an actual change or breaks new ground in non-traditional way of performance, using advantage of options and opportunities,
- had an impact on the policy environment, to create a more conducive or enabling environment; impact on legislation, the regulatory environment, or resource allocation,
- demonstrated an innovative and replicable approach; this implies the capacity to demonstrate what is new or unique about the initiative and offer opportunities for the initiative to be replicated in other countries and contexts,
- demonstrate sustainability; the commitment of mainstream or institutional sponsors or participants in the initiative (whether Government, academia, media, the UN, NGOs, etc.) needs to be a component of the best practice.

Special interest exists in good practices that: emerge from a participatory process, involving a range of actors (civil society, private sector, Government, etc.); have significant scale or 'reach'; involve inter-agency collaboration; demonstrate Government commitment to further action and resources.

Another critical moment is working in isolation. This doesn't mean that it is wrong or it cannot bring e benefit to a particular organization. Experiences from other countries, *'Lessons Learned'*, are very useful and they should be utilized while developing ICT strategies. Sharing the knowledge, experience and learning from each other would result with avoiding repetition of the same mistakes and development of better ICT strategies.

Cross border solutions will be of importance in the future, this should be included in IT strategies (Molen and Lemmen, 2003).

4. ANALYSES OF SYSTEM AND USER REQUIREMENTS

Efficient and effective performance or doing business of one organization lies down in optimal use of skilled human resources and availability of the well organized and institutionalized technology in order to best identify and meet system and user requirements. Meeting these requirements is becoming a critical success factor and it is more recognised as such by different businesses. Well performing Cadastral and Land Registration Organizations, world wide, also consider achieving user requirements as a critical success factor and analyses of these requirements becomes a regular practice in their every day working activities. Dutch Kadaster is very good example regarding this issue. Last survey conduct by Dutch Kadaster, examining users wishes on information, showed that customers would like: digital, up to date, reliable and legal certainty, complete, rapidly accessible, tailor made and quality assured information**.**

A land administration system is in part an administrative system that must meet the needs of good government. It must also address the requirements of non-governmental institutions and the general public. Before altering an existing system or introducing a new one, it is essential that the requirements of those who will use or benefit from the system are clearly identified (UN/ECE, 1996).

In the near future, customers want to have access to information 24 hours a day, 7 days a week, at home, in the office, and in the field. They want to be served in a professional way, trough a user-friendly tools to information that is timely, up to date, reliable, complete, accurate, relevant, if necessary customised, well integrated with other relevant data sets of other suppliers, good value for the money by systems that are compatible with customer's working procedures (Oosterom and Lemmen, 2002).

Recognised accomplishment of the 'system and user requirements' as a critical success factor, it is one of the main elements of the conceptual framework for developing ICT strategy within this paper too. Specific attention should be put on analysing user requirements in the period of development of business and ICT strategies and in regular working activities of particular Cadastral and Land Registration Organizations. Internal and external users should be analysed with respected relevance within their own domain.

Results from the analyses of user requirements - current and possible future requirements - should be used as an important input while practically developing ICT strategy for a Cadastral and land Registration organization.

5. MANAGEABLE AND SUSTAINABLE ICT

ICT advanced technologies are more present in our every day life, trough a mobile telephony equipped with GPS, internet, smaller in size laptops and PDA, access to the data and information on big servers is easy and fast. Future developments are expected to be: Distributed Computing, Blade Servers, Grid Computing, Large Data Repositories and this progress will not stop here, it will even increase faster and in bigger dimensions.

Technology is there, present on the market. But, what to choose for our businesses? Latest, most advanced servers with newest versions of DB's equipped by fastest communication capabilities? The choice of ICT should be in direction of answering these questions: What are our real needs? Can our company afford it now and in the future?; Do we have enough and adequately skilled staff to handle and maintain it? Will it bring profit to our organization? Will our digital products and services be accepted by the market and will they satisfy our user requirements?

Recent developments in geo-ICT have important implications for the development of cadastral systems and NSDI surrounding cadastral systems. The development in ICT in general, and specifically the Geo-ICT can improve the quality, cost effectiveness, performance and maintainability of cadastral systems (Aleksic et al., 2005).

When choosing hardware and communication components it is recommendable to acquire newest, from point of view of the fast development of technology but always be sure that provider of this equipment has experience and resources for after sales support. These components are followed with software application. If one organization has well developed ICT department/sector with part dedicated to development which follows and expects possibilities to utilize latest versions of data bases and big servers operating systems then go for *latest* versions. In case when a particular Cadastral and Land Registration Organizations does not have adequately developed ICT department it is recommendable to go for *proven technologies*, then they could use the lessons learned from organizations in the same branch using these technologies. Another very important point is introduction and implementation of international standards. The choice of adequate ICT utilized with all available standards (ISO, OpenGIS, etc.) is only the first, but very important step of the long way towards improvement and development of organization.

Following the above statements, when choosing what kind of technology to use for development of one organizations performance current, but also trends for the future are:

- *manageable and sustainable ICT, DB driven and Web enabled, utilized with all available standards.*

Technology in itself is not a problem anymore, there is a need for more integrated work processes and services, eventual leading to more integrated organizations, supporting automated transactions (Lemmen et al., 2004).

6. VISION: 'TO-BE' SITUATION

Strategy: It is a course of actions involving logical combination of actors, factors, and action chosen to reach a long-term goal or vision. Strategy incorporates a logical sequence of steps (ISNAR, 1998).

A strategy can also be defined as description of the path from the 'As-Is' situation where particular organization or domain currently is, to the 'To-Be' situation or desired improved future state.

Current ICT situation Desired future ICT situation

Figure no.2: ICT strategy: description of the path from "As-Is" to the "To-Be" ICT situation

It is very important initially to make an overview and inventory of the current and present ICT within one organization. Cadastral and Land Registration Organizations have their branch offices, this equipment should be included too. This overview including type of telecommunications should be made for: hardware, platforms and no. of licences, software with additional applications and no. of licences, servers and no. of licences, network, cabling, telecommunication connections, internet availability and other present ICT.

Estimation of the consistency and operability of the LAN network and updated inventory of the ICT within one organization would be significant input when defining the "To-Be" situation regarding further improvement of the ICT infrastructure and its management.

It is required to have a clear picture of the 'To-Be' situation – in this case future ICT situation – for better determining the directions and the way how to accomplish the desired future. It would determine in which direction improvements and development of ICT within the organization should go. Defining the 'To-Be' situation should be based on the good overview of the "As-IS" ICT situation and knowing the possibilities that technology and standards are offering nowadays and future developments in this area. Another input would be trough analyses of the system and user requirements, both internal and external. Also lessons learned or 'Good Practices' from similar organizations from other countries could be helpful while formulating vision statements.

6. CONCEPTUAL FRAMEWORK FOR DEVELOPING AN ICT STRATEGY

Following the analogy of the explorations done so fare, for achievement of developing such a strategy, main elements which should be used for development of ICT strategy are identified. Illustrating these elements and their relation with the basic domain in a model - ICT Strategy - reveals a "Conceptual Framework for developing an ICT strategy" as represented in the figure no. 3.

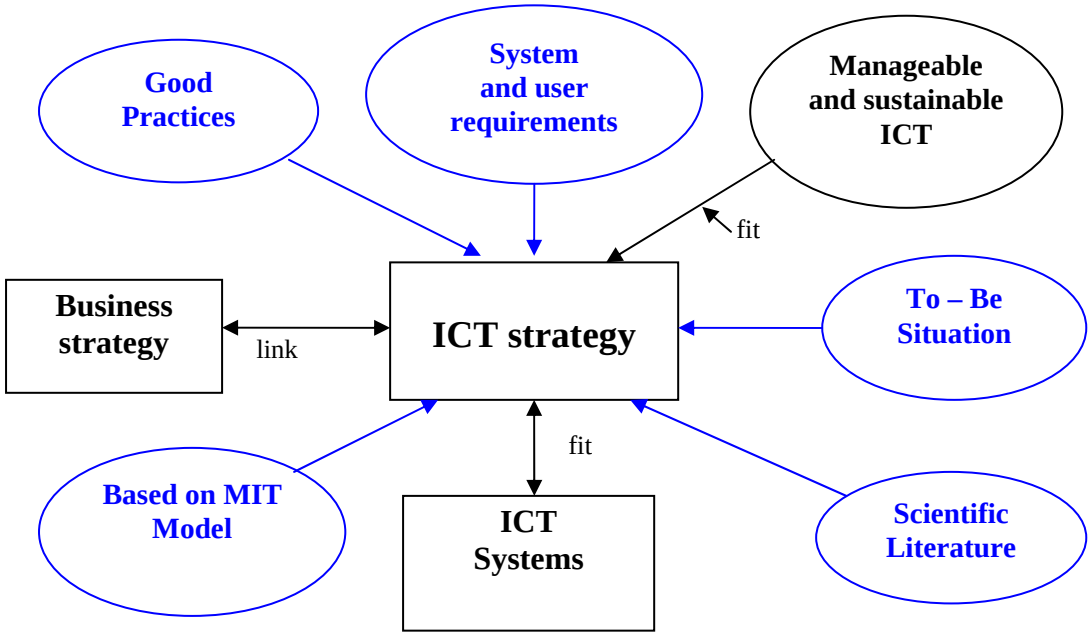

Figure no.3: Conceptual framework for developing an ICT strategy

Elements in the conceptual framework cover the main domains which are required to be included when developing ICT strategy. Each element has its unique value and deserves its place in this framework. They should be analysed in respected manner and after the results about each element are derived and integrated in respect to the real situation of one organization a concrete basics for development of ICT strategy are accomplished.

The ICT should be recognised as *a discipline*, as a respective strategic domain, within the organizations. If this is not a case a big effort should be made on promotion and recognition of ICT as such a discipline. Examples from many organizations shows that as soon as ICT is recognized as a discipline aligned with their businesses, sooner they could realize the value and the benefits of the investments in adequate ICT. Development of ICT should be combined with institutional development in alignment with the business and success for this development would strongly depend on ICT capacities of the organization (skilled ICT staff, ICT tools/components, ICT management, ICT organization, etc.).

The ICT strategy itself should be developed after getting and including the results of the analyses for all the elements from the Conceptual Framework. It is recommendable to start

with articulating the Vision statements for the main four strategic domains from the MIT Strategic Aligment Model from ICT perspective (example (Aleksic et al., 2005)).

Approach for implementing the ICT strategy should be the so called ”step-by-step” approach. The strength of this approach is a growing process following a ‘road map’ and it allows gaining experience with parts of the new system. These experience influence the development of the next steps and inapplicable developments can be avoided mostly. The ‘step-by-step-approach’ has been chosen by most of the countries present at the symposium held in ITC (Hawerk, 2003).

Main steps in the ICT strategy should include all required activities for achieving the future improved desired situation. This could be represented in a diagram of steps, it gives a good overview, becouse a lot of activities could be done in parallel and some in specific time period. It would be good if short-, mid- and long term objectives are clearly defined in the startegy and the ICT organizational and management structure indicating who will be responsible for its implementation.

7. CONCLUSIONS

Only with recognised ICT as a fundamental strategic domain/discipline, further developments of ICT strategy fitted in harmony with business strategy and by linking strategic and operational level could be accomplished. The MIT is adequate model to be adopted for achieving desired performance of one organization and its business objectives.

Having the MIT Strategic Alignment Model as foundation an ICT Strategy should be developed utilizing the results from the analyses and explorations from other elements of the Conceptual Framework presented in this paper.

Appropriate and increasing use of ICT, implemented trough adequately developed ICT strategy, combined with institutional development, business alignment, etc., results with development of the organizations with efficient and effective way of doing business.

Finally, as soon as Cadastral and Land Registration organizations recognize ICT as a discipline properly aligned with their businesses, they improve their business, business performance, quality of output and all this with return of investments in ICT.

The conceptual framework presented in this paper could be replicated and used as a basic model in other businesses as a guideline for utilization of the ICT in particular organization in alignment with its business objectives.

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