

Designing knowledge sharing systems to support integrated eco-city planning and management

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Abstract. The local government of a city as an organization depends on decision makers in government management to support the vision and mission of the city to achieve eco-city goals based on data and information from several knowledge domains. Knowledge management is seen as an increasingly important scientific discipline that encourages the creation, sharing and utilization of knowledge in an organization. Knowledge management is also related to the concept of intellectual capital, the most valuable organizational resource. Knowledge sharing systems are designed to help decision makers and stakeholders share their knowledge. Most knowledge management systems in organizations are designed to share the explicit knowledge of individuals, organizations and finally distributed to the community. This research is the approach in the development model that can be used in the governance to achieve eco-city goals. Complex knowledge about eco-cities requires policies that are based on current knowledge and can be implemented immediately with a thorough understanding of all aspects. The results of this study are understanding the problem of knowledge sharing as a valuable organizational asset, designing a knowledge sharing systems model, and improving systems to improve the quality of knowledge.

1. Introduction

Organizations rely on decision makers to make decisions in order to achieve the vision and mission of the organization based on input from various domains. The following four factors must be understood and considered in a knowledge-based decision making scenario (1) Increasing the complexity of the knowledge domain, (2) Accelerating environmental change, (3) Speed of decision making based on changes in and across domains decreases, (4) Substitution of people. Planning and managing a city that becomes a dwelling place for cohesive communities requires the right knowledge and decision making.

This research reviews and integrates literature from several disciplines that investigate the characteristics of organizations, community and individuals influence the sharing of knowledge used for eco-city planning and management.

"Knowledge" is very different from "data" and "information". Data represents raw numbers or statements and can therefore be without context, meaning, or purpose. Knowledge refers to information that enables actions and decisions or information of interest [1]. Knowledge will include explicit knowledge and tacit knowledge. Explicit knowledge usually refers to knowledge that has been expressed into words and numbers, can be shared formally and systematically in the form of data, specifications, manuals, images, etc. Tacit knowledge includes insight, intuition, and premonition, is more likely to be personal and based on individual experiences and activities. Encouraging collaboration between novice



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and experienced individual through shadowing and collaborative problem solving is one way to encourage the transfer of tacit knowledge [2].

1.1. Information systems

Information systems are important supporters of an organization's business processes. Information systems facilitate communication and coordination between different functional areas, and enable the exchange, easy access of data between processes. Information systems play an important role in running processes, capturing and storing process data and monitoring process performance [3]. Information systems help organizations carry out processes efficiently and effectively. Information systems help carry out the process by telling people when to complete tasks, providing the data needed to complete tasks and the means to complete tasks [4].

1.2. Knowledge management and knowledge sharing systems

Knowledge management is planning, organizing, motivating and controlling people, processes and systems in an organization to ensure that assets related to knowledge are enhanced and used effectively. Knowledge management processes involve mastery of knowledge, creation, refinement, storage, transfer, sharing and utilization [1,5]. The ability of organizations and individuals within organization to share knowledge is identified as one of the factors that contribute to organizational competitiveness. Sharing knowledge helps individuals and organizations build knowledge and ultimately increases the company's competitiveness and allow organizational members to obtain knowledge and be explicit from one another [6]. The main purpose is to promote knowledge sharing for reuse by other members of innovation, technology and strategic management. Knowledge owners will (1) share their knowledge with a controlled and trusted group, (2) decide when to share and the rights conditions for sharing, and (3) seek a fair exchange to share their knowledge [5,7].

1.3. Eco-city

Urban planners and managers sought to draw attention to the deterioration of urban conditions, particularly public health and realized the necessity for alternative living environments [8,9]. Urban Ecology set forth ten principles for creating ecological cities or "eco-city": (1) revise land use priorities, (2) revise transportation priorities, (3) restore damaged urban environments, (4) create decent, affordable, safe, convenient, racially and economically mixed housing, (5) nurture social justice and create improved opportunities, (6) support local agriculture, urban greening projects, and community gardening, (7) promote recycling, innovative appropriate technology, and resource conservation while reducing pollution and hazardous wastes, (8) working with businesses to support ecologically sound economic activity while discouraging pollution, waste, and hazardous materials, (9) promote voluntary simplicity and discourage excessive consumption of material goods, (10) increase awareness of the local environment and bioregion through activist and educational projects. For cities to effectively provide reliable, consistent and affordable services to their citizens, we need to have strong policies and an economic model [3]. First, policies which drive towards the sustainable or optimal scale need to address the limiting of previously free natural resources and services have to be declared scarce economic goods. Second, as sustainability is the criterion for scale [10].

2. Research methods

The methods to be carried out in this research is as follows (1) Study of the literature relating to knowledge management systems, knowledge sharing systems, city management and eco-city. (2) Analysis of knowledge, governance for planning and management in eco-cities. (3) Designing a knowledge sharing system model in eco-city based on the results of the analysis to determine the processes and components in the development of the model (4) Implementation of a knowledge sharing system management model in eco-city using information technology and computers that are appropriate and affordable.

3. Results and discussions

The design of knowledge sharing systems will include analysis of the actors involved, data stores used in the system, the process of planning and managing knowledge and the construction of information systems models [11].

3.1. System actors analysis

Analysis of the system actors will do a description of those who have an interest or importance in eco-city development. Actors in the system will give and get feedback from the system regularly, both directly and indirectly. Actors of the system are as follows:

3.1.1. Regional government. The regional government is the head of the region which become the authority of the autonomous region. The role of the regional government such as: (1) decentralization, for carrying out all functions that were originally the authority of the government to be the authority to regulate and manage government matters, (2) deconcentration, for accepting delegation of government authority and (3) co-administration tasks, for carrying out all assignments from the government. In eco-city development, local government also functions as the party issuing policies and administration of eco-city government, carrying out decision making on the knowledge of plans and implementation of eco-city activities including costs and evaluating the implementation of activities.

3.1.2. Government service. City Regional Office is the implementing element of a regency or city government that has the task of decentralization authority (the transfer of part of the authority of the Central government to local governments). In planning and management of eco-city, the local government service also functions as an extension of the government that issues policies and the administration.

3.1.3. Community. Community is a part of society that has the attention and ability to be involved as an object of the implementation of eco-city, like most people, but also the subject of development that can be actively involved. Community development is further complicated by the accelerating pace of economic, political, and technological change, which can drive transformations to social systems and culture. The work to improve communities is cross-sectoral and multi-disciplinary and involves people, organizations, and institutions. Success depends on the effectiveness of the various parties and their ability to work together to define and solve complex problems [9,12].

3.1.4. Experts and scientific community. Experts and scientific communities are part of the community who have the attention and ability in various scientific disciplines to be involved as objects of the implementation of eco-city but also to be the subject of development that can be actively involved. Experts and communities have the responsibility to study eco-city plans and management, they get information from the system, manage the information for example in the form of research, seminars, hearings or other activities that are sources of knowledge for every eco-city implementation activity. Each expert has their respective expertise in accordance with their scientific fields who can carry out their own activities or multi-disciplinary cooperation performance to consult with decision makers and additional knowledge for the system.

3.2. Knowledge resources

Sources of knowledge are various sources of knowledge with primary sources from experts and the scientific community as well as other sources such as international seminars, scientific publications, universities, industry, books, internet and other sources.

3.3. Knowledge analysis

Knowledge that is managed by the information system is any data and information that enters the process and comes out with the value of information that is more useful, more valuable and becomes an asset

for each party in need [13]. Knowledge will be stored in a data store in an information system consist of (1) Indicators are tools for (a) specifying urban sustainability, (b) defining related targets in measurable ways, and (c) performance monitoring. (2) Standards are commonly agreed norms, based on the aggregate assessment and integration of various indicator measures. (3) Frameworks are schemes combining sets of common targets and indicators under an overarching program. Their purpose is: (a) defining urban sustainability in eco-cities coherently and comprehensively; (b) providing a more standardized approach to implementing urban sustainability across initiatives; and (c) offering integrated management packages, in the form of either open-source or certification-based step-by-step guides. (4) Report of indicators, standards and frameworks of eco-city activities used. Policies, regulations or regulations improvements and funds issued by local governments.

3.4. Process analysis

The processes designed in the knowledge sharing system are intended to support (1) autonomy, which is given freedom, independence and discretion in accordance with its assessment to carry out work scheduling and ways to complete its responsibilities, (2) identification, which is to give full responsibility to the executor to carry out the task from start to finish and (3) feedback, which is how each party (actor) with an interest in the system gets clear direct information about the performance of the implementation of the activity or work [14]. The following are the main processes:

3.4.1. Analysis of eco-city activities. This process will ensure that the status of the previous activity will be continued with the setting of targets to ensure the improvement and achievement of eco-city targets for the benefit of the community based on the feedback of the system actors. Increased activity targets in certain capacities will be utilized in as new knowledge. This process will support autonomy and identification of tasks.

3.4.2. Design of eco-city activities. The activity design process is a continuation of the activity analysis which identifies new activities, conducts supervision and feedback for the implementation of activities and carries out evaluation of activities. The design of activities will ensure the right activities for the background of the interests and welfare of the community, government, environment and other aspects. The design of activities will support task identification and feedback.

3.4.3. Sharing of design and results of activities. The process of sharing the results of activities will distribute the design of activities, progress of activities, community participation, the results of activities in various fields that support eco-city, internal and external systems. This process is in accordance with the results of the design of activities with a complete record of activities up to the results of the assessment and feedback obtained from knowledge sources that are in conformity with the framework, standards, indicators and previous activity reports. This process supports task identification and feedback.

3.4.4. Reporting the implementation of eco-city activities. The reporting process activity is making a report that can be used as a reference for knowledge sharing activities or stored as an archive for the benefit of system administration. This process is the documentation of all study program activities in the development of knowledge, especially informatics that can be utilized as organizational knowledge. The activity reporting process will support feedback.

3.5. Design of knowledge sharing system models

The design of system model refers to the processes in eco-city planning and management, the process models of this information system are displayed in the form of Data Flow Diagram (DFD) in Figure 1.

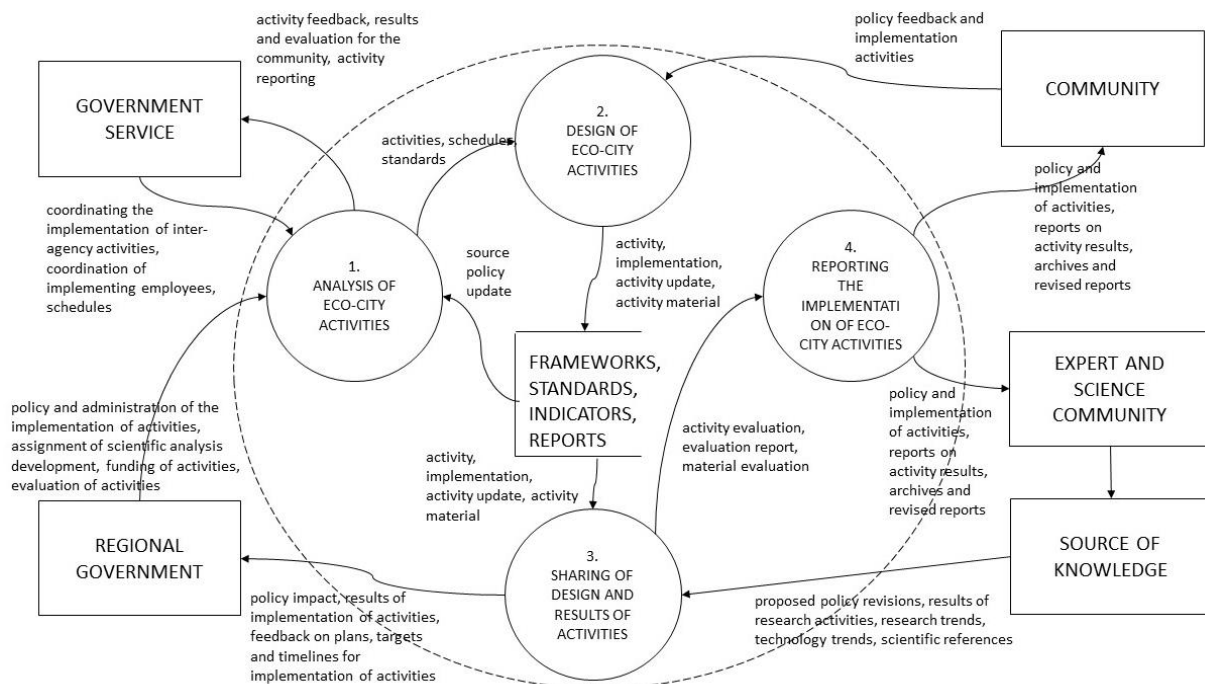


Figure 1. Data of flow diagram knowledge sharing systems.

Each external entity in the systems is related to information systems in giving and obtaining information in sharing knowledge where the main objectives is to provide the latest knowledge information from knowledge sources and scientific communities. The process of Design of Eco-city Activities will support autonomy by obtaining data on eco-city activities including the activities of each external entity and their assessments. Coordination of eco-city activities is obtained from local governments and government agencies where the results of this process will be given to the Design of Eco-city Activities process to determining activities according to the scope of work of government agencies, setting targets and clear feedback and supervision aimed at facilitating the development of knowledge.

The process of Design of Eco-city Activities and Sharing of Design and Results of Activities will support the identification of tasks by getting information from the Analysis of Eco-city Activities process where the results of the design will be stored in a data store. Sharing of Design and Results of Activities utilizes the data store to produce information about the results of the evaluation of activities and knowledge gained. These processes will ensure the identification of clear assignments and complete activities from beginning to end and ensure all parties benefit from knowledge from the scientific communities, sources of knowledge and feedback from the community. The Reporting the Implementation of Eco-city Activities process will support feedback where the information generated will be channelled to an external entity.

3.6. Application of knowledge sharing system technology

The application that can be used in this system is information technology that can support Lesson Learned, knowledge gained from experience. That experience can be positive, such as in the implementation or evaluation of successful eco-city activities, or negative, such as getting bad feedback from the community or the failure of the activity to achieve maximum results. The aim of Lesson Learned is to capture and provide lessons that can benefit all parties who face situations that are very similar to previous experiences in the same situation. Lesson Learned can be managed in database, will then be examined by expert reviewers through the use of the internet and then distributed to other parties in the system quickly.

4. Conclusion

The research approach uses Knowledge Sharing Systems cannot be separated from management factors in government. This management in particular is the personal management of the actors who will be the source of knowledge and who benefit from sharing knowledge. This design is expected to integrate the knowledge of various interested parties in an eco-city, especially in planning and management to achieve its goals. Research can be continued by conducting a more in-depth analysis of the conceptual model of Knowledge Sharing Systems to support integrated eco-city planning and management by reducing the design of information systems to a more detailed and specific level of the results of the process analysis that requires improvement. The use of the internet with various information sharing applications can be used not only as a repository but as a reference for the knowledge base of the system.

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