SOS-ware [Strategic Open Software] Perspectives

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Certain types of software play a strategic role in the development of the various aspects of organizational life. One of these roles is knowledge development that can act as a facilitator of economic diamonds.

We review the characteristics of strategic software and we try to answer the question whether there can exist open software development that would be able to incorporate these characteristics. Based on this review, and on certain case studies, we present a theory, on how open software might be able to close the gaps in knowledge creation and usage - or the reverse, ie. to become a vehicle for an acceleration of this hysteresis. Finally, we identify the areas where research is considered to be urgently needed.

Keywords: Strategy, open, software

1. Introduction

With the term strategic software in an industry we mean the kind of software that is extremely important for the operation and management of core processes in that industry. There are special software categories that play a strategic role in more than one industry, like the operating systems and the internet technologies. It is well known that open software has been developed mostly in these special categories, and there is a need for the identification and development of open software in all industry fields.

Strategic software is characterized from the creation of dependencies. The functionality of other software depends on its characteristics. A core characteristic of strategic software is its ability to act as a facilitator for the creation of value (Porter & Cramer, 1999).

In the next section we examine a framework for quality information systems development. Following that section will follow an analysis of a node for strategic software development in the case of OSS.

A review of the existing strategic software in operation will reveal that there is minimal development in almost all industry areas except computer science where operating systems, systems software and internet software seems to outperform closed source software (Johnson, 2002).

2. FINE - Framework for Information Network nodEs

Blanas (2003) has developed a general framework on the quality of information systems development. The framework is based on the networking paradigm and focuses on the operation, management and evolution of a network node (Fig 1)

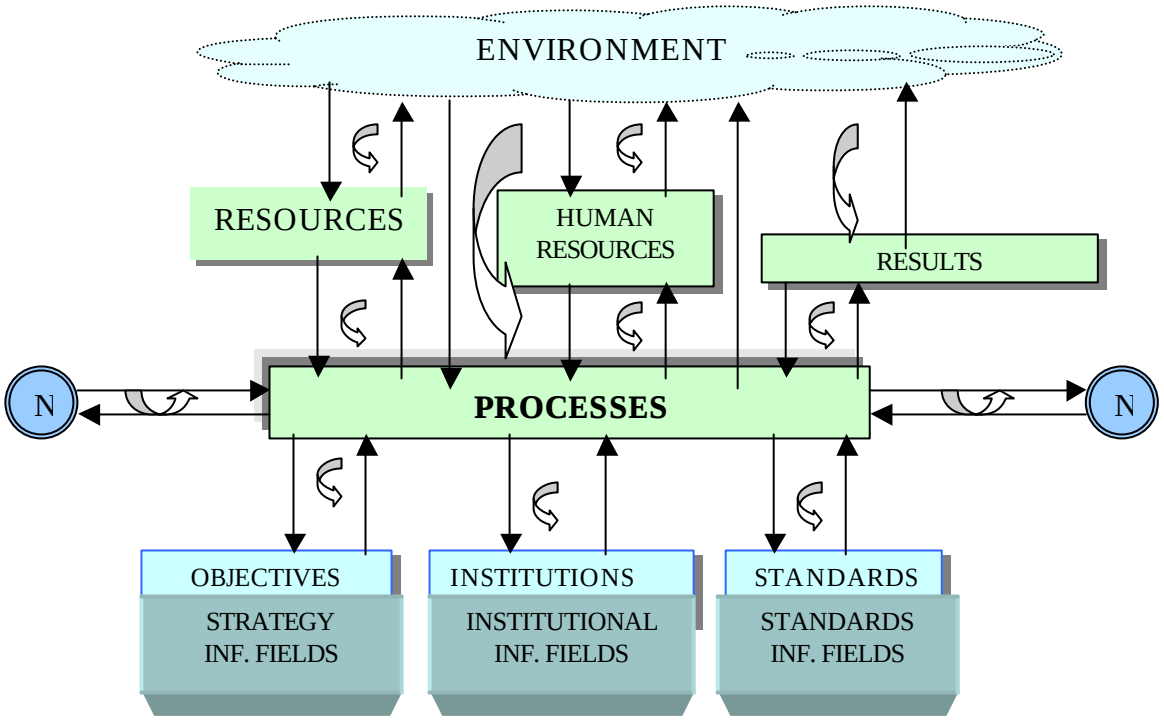

Figure 1 INFORMATION NETWORK NODE (Blanas, 2003)

The basic element of an information system described as a network is the node and the connections to and from it. The recognition and description of the processes in an

information system is important in order to understand the operation of the information network.

The node is able to enclose a number of capabilities and quality characteristics in various extents and intensities. In figure 1 we can distinguish first and second level feedbacks.

The first level feedbacks are the following:

[1.1] Processes → Human Resources → Processes

Human resource management on the development of leadership and motivation, evaluation, education, and training.

[1.2] Processes → Resources → Processes

Algorithm application, processing, storage requirements, access, evaluation, can be of strategic, managerial, administrative, operational type in respect to the value of information, level of automation, disaggregation and security, processing speed, storage capacity, and cost. Information has immediate relationship to the storage media and the access mechanisms.

[1.3] Processes → [Results →] Environment → Processes

Interface processes with shareholders, clients and citizens, operations, also on processes of service, evaluation, and development of new products and technologies. The level of understanding of the interface information depends on the level of asymmetry between institutional structures for the communication and processing of information.

[1.4] Processes → Objectives → Processes

The processes (conformance, participation, evaluation) refer to the level of recognition of environmental problems or chances, and the adaptation of the node to them, and they contribute to the acceptance, development and application of strategy. The configuration of objectives can become the main second level process for a strategic information field.

[1.5] Processes → Institutions → Processes

Processes of institutional-managerial type (compliance, participation, evaluation) related to policy making, compliance nad participation to existing institutions and recording of any adaptation difficulties.

[1.6] Processes → Standards → Processes

Organization, operation, administration, assurance, logistics of projects and procedures, based on compliance, use and evaluation of standards. The standardization of information flows reflects the regulations and conventions of management. Many standards are immediate results of political-legislative instititionalization..

[1.7] Processes → Node → Processes

Outsourcing of subprojects and procedures, access to information residing in other nodes (networking) and on the interactions with other nodes' processes.

The second level feedbacks are the following:

[2.1] Results → Environment → Results

Environmental evaluation of node results to the environment.

[2.2] Resources → Environment → Resources

Environmental evaluation of procurement management and environmental issues management.

[2.3] Human Resources → Environment → Human Resources

Environmental evaluation of human resource management criteria and processes.

[2.4] Objectives → Strategic Information Fields → Objectives

Configuration of information field strategies.

[2.5] Objectives → Institutional Information Fields → Objectives

Configuration of information field institutions.

[2.6] Objectives → Standards' Information Fields → Objectives

Configuration of information field standards.

In the proposed framework, we consider that problems are developed in cases of loss of equilibrium or asymmetry in communication across mechanisms. Equilibrium can be lost in cases of lesser capabilities or lost opportunities for learning or adaptation. Asymmetry can be developed from incomplete information or from control of the information flows. The capabilities of the various feedback mechanisms configure the capability maturity level of the node.

The first level feedbacks continuously improve the processes that comply to the current objectives, standards and institutions, using the evaluation processes and collect meta-information for the evaluation system.

The second level feedbacks use the meta-information from the first level and the existing environmental knowledge with probable use of benchmarking and propose the development of new objectives, institutions and standards.

If some feedback falls behind, that is an indication of a deficiency in resources, institutions, capabilities, environmental scanning, or will.

It is profound that the ability of a node to selectively diffuse or protect the information residing in its local memory depends on the corresponding abilities of the related nodes within the network

In the following section, we examine the strategic open software perspectives under the FINE framework in order to detect the losses of equilibrium or the asymmetries expected in OSS evolution.

3. SOS-ware perspectives under FINE

We examine the perspectives for SOS-ware development under the FINE descriptions.

Human resources: Analysts - programmers required for the development of sos-ware in an industry field must have exceptional knowledge of the industry management and operation processes plus excellent programming skills on top of the special quality characteristics possessed by OSS programmers contributing to the development of projects for free. It seems that there is a shortage of such people in almost all industries today. The perspectives for development of SOS-ware in most industries look pale unless sos-ware identification and development is supported externally. The

network externalities and the dependence on certain strategic software like operating systems make the development of SOS-ware more difficult. Cases for OSS support by large private corporations like IBM and SUN could probably be extended with unknown strategic consequences since private corporations' interests in developing sos-ware may not coincide with user expected values. There is probably an urgent need for public support not only in market creation, but also in human resource management and development.

Resources: Open source is a 'weak' openness. Programmers cannot develop effective applications or evaluate code without open documented designs. The cases of such developments in certain areas relates to deep common knowledge shared from participants. If we want to have sos-ware in all industries in time, we need open designs and we need modern common development tools. While many researchers predicate that the OSS model is governed by distributed, voluntary, philanthropy participation, it is also true that major achievements like X-windows and Linux were not created under this model. The first was a traditional mainly academic research project with open design and traditional project structure, while the second was a traditional academic application project. The evolution and penetration of the above projects is an unimaginable story if they had been given the right support. Formal methodologies need to be addresses and standards put forward for SOS-ware development, otherwise this is going to be a slow process with conditional success.

Results: Evaluation of results by the environment was attainable for some time in very few OSS projects due to critical masses of human resources with deep knowledge of the subject matter. Even for these few cases, the complexity and size of these developments make evaluation impossible to the greater environment. In fact, only very few specialized groups that have developed around the companies-distributors of OSS and are currently working on these projects have this capability. But even for these groups, there are questions of limited time. So, who is going to evaluate sos-ware? If evaluation fails, then malicious control cannot be avoided in OSS, like it is the case with closed source. In fact, it may be worse because of uncontrolled points of distribution on the internet. There is an urgent need to support the development of critical independent environmental evaluation groups. Otherwise, only a few cases of inflicted damage to the economics or the security of organizations will be a sufficient blow to dissolve the OSS development paradigm.

The nature of OSS development leads to the cooperation of very few international experts. This may have negative results to the development of knowledge vortices that constitute prerequisites for the development of economic diamonds. The best project will be developed by the best programmers and all the others may be potential users. There is an urgent need for standardization on outputs and inputs by designs – not code - that support multiple approaches, so that people would be able to experiment using different code

Objectives: The recognition of environmental problems or chances is normally a managerial process that incorporates economic value. The translation of objectives to sos-ware is of strategic importance to all industries, but is not happening in any systematic way. The delay accelerates the gap between open and closed source applicability. Strategic planning is easier and less risky in an open environment and should be organized. It cannot happen by itself. If we wait for chaotic effects, we may face realities that find equilibrium in unwanted states, economic or others. One such state would be full control of information fields by oligopolies involved in either closed or open source development and distribution. Academic institutions are expected to come in the forefront of these developments, to evaluate strategies and to research and propose courses of sos-ware development.

Institutions: Policy making requires continuous improvement processes that will facilitate strategy and standards' development. Licensing is a critical institutional issue that requires special and continuous attention by specialized law agents dedicated to societal betterment. Licenses and policy making on licenses are the stronger weapons for the protection of information fields. Licenses are the weak link that may result in the premature death of OSS or its dominance. The danger exists that if the case of licenses is lost, there will be minimal chances to get rid of controls, which will be very difficult to understand, not to fight.

Standards: Standards have the capacity to enforce competition based on merit – rather than politics. Standards give the chance to less equipped developers to participate in sub-projects of lower importance. Standards save time and money. While the closed source software oligopolies do not want the standards, it seems that the open source distributors have the tendency to differentiate too. And some of this differentiation is based on the dangerous play with 'viral' code. The ISO has started an effort in this area that would probably be able to alleviate the foreseen problems.

4. Conclusions

From the above analysis we gather that the OSS prospects cannot be good unless we decide to develop and apply development strategies of priority sos-ware in a formal way.

A research project is running under the direction of the author at the TEI of Larissa in order to clarify some of the above problems.

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