GISOS: A Model for Rectifying Complexities and Mitigating the Risks of Global Information System Development

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Abstract. A global information system (GIS) connects companies in various countries. Although GIS professionals have produced many facilities for connectivity, only a few have developed a comprehensive GIS model to overcome the obstacles. Complexities, ambiguity as well as other risks are among GIS development difficulties. To develop an efficient and effective decision-making process, critical performance is essential. This article presents a comprehensive model to concur with the GIS development obstacles. The model is based on satisfying GIS critical factors and consists of four components. GISOS covers a large spectrum form global feedback processing to global maintenance facilities. Applying GISOS model facilitate GIS development and improves the performance of global systems.

Keywords: Global Information System, IT risk management, GIS model, Software development process.

1   Introduction

According to Turban, Rainer, and Potter [1], International information systems that connect companies in various countries is referred to Global Information System (GIS). In one look each global organization requires a powerful GIS to satisfy the information requirements. Scholars' studies showed that many types of organizations such as Multinational Companies (MC), International Companies (IC), and Virtual Global Companies (VGC) need GIS. The latter case refers to joint ventures with different places of business partners. The non-physical nature of VGC (the magic common acronym for Virtual Global Companies and Virtual Global Communications) provides the flexibility to follow one-time mission such as efforts to control the Gulf of Mexico oil spill after failure of controls in last year [2].

2   Global Information System Critical Factors

Kadiyala and Kleiner [3] stated that a global information system with the permanent improvement feature and continuously upgrade the technologies, provides competitive

advantage to a business. In addition, a well designed decision-making has significant positive effects on process performance improving in a global organization. To develop an efficient and effectiveness decision-making process, considering critical performance critical factors is essential. Figure 1 shows some common critical factors of GIS. Costs, culture, location, and strategic emphasis are some critical factors for improving performance [4].
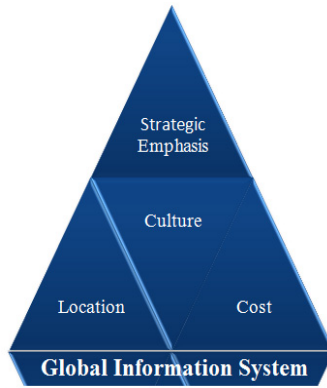

Fig. 1. GIS Critical Factors

3   World Wide Web a Common Solution for GIS

Manu [5] states that from the storage, retrieval, and global accessing perspective, WWW provides a common solution for making a global information system. According to Raisinghani [6], global organizations need incorporating new applications and adapting to new business requirements. Web services, besides providing rapid connection ability, enable the organization to access a variety of communication devices as well as using existing infrastructure. Gerth and Rothman [7] believed that accessing to global markets and the global workforce made the world flat. From another point of view, Zwass [8] stated that Web provided new opportunities in digital democracy but its capabilities are not discovered nor used yet.

4   Global Information System Obstacles Simplifier (GISOS) Model

Global organizations are facing many complex issues [9]. The complexity of GIS has root in Cultural Differences, Economic, and Political Differences, and transfer of data across international borders [1]. Environment, culture, and structure are three dimensions in each business. Every problem in aforementioned dimensions influences the business performance and each potential solution a problem in one dimension has to consider the possible impacts on other dimensions [10]. According to Laurentiu,

and Tantau [11], the critical IT risks has a significant direct relations with the size of processes. Therefore, many of potential risks in GIS development process have roots in complexities. GISOS is using an ambiguity rectifying approach to reduce the complexities as well as risk consequences.
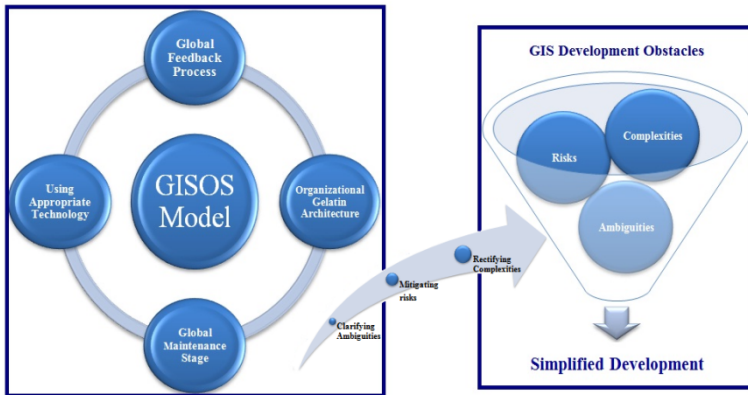
Fig. 2. GISOS Model

Figure 2 is a pictorial view of the GIS Obstacles Simplifier (GISOS) model proposed in this article. The GISOS model in this article focused on core applicable technologies as well as the strategic decisions to facilitate the GIS implementation. Gehaniand Gehani [12] believe that two innovative wings of each organization are employees' competencies and external strategic alliances with supplier and distributors. According the Nielson [13] familiarity with values, customs, and the local regulations is mandatory for understanding a specific culture. From another point of view, Performance improving has significant positive effects on decision-making process in a global organization. Developing the GISOS model with the aforementioned features will satisfy the critical factors for improving performance [4].

5   GISOS Components

The proposed model in this article has four important components. The collaboration between components make a significant effects on reducing ambiguity, complexity, and potential risks of GIS development. GISOS components influence each other in a bidirectional approach and facilitate the complexity rectifying as the main common task.

5.1   The Appropriate Technology

The segmentation is an appropriate strategy to reduce the complexities in a global organization. By segmentation roles, duties, and responsibilities would be cleared.

Therefore, one of important mission of the GIS is classification the responsibilities of each segment and providing the necessary informative resources. Another mission of the GIS likely is mapping the segments in the correct way. The aforementioned mapping will share the knowledge and experiences as well as information between segments and will fill the possible technological technical, structural, and technological gaps.Designing decision making process in organizations has a strong relationship with objective satisfaction [14]. Opposite the decentralized process for decision making in multinational organizations, the main control in global organization is placing in parent organization [9]. Therefore, providing technological environment for concurrent centralized and decentralized decision-making is mandatory.

5.2   Global Maintenance

GIS needs Maintenance stage is the most important phase of each IS development methodology [15]. Spokoiny, and Shahar [16] stated that in a large scale, manipulating data is a complex domain-meaningful concept. Changing data set in a real-time manner and through a knowledgebase active time-oriented database, likely is one important part of every GIS. The freedom in decision making by local offices of a global organization is not a reasonable cause for ignorance in maintenance stage of GIS development.According to Biehl [17], at the global level and to provide organization services such as finance and supply chain management, companies require robust GIS with a flexibility characteristic. A reliable maintainable ICT backbone, well-designed communication and interaction as well as Internet-based information technology [18].Failure in meeting objectives in organizations, likely has root in ineffective communications [19].

5.3   Global Feedback Process

Based on scholars' studies, developing a global feedback control system is an essential part of a GIS. Neth, Khemlani, and Gray [20] explained that a global feedback controller will aggregate the individual feedbacks and cover their gaps. Therefore, an integrated feedback system provides the flexibility as the major characteristic of a GIS.Global feedback system makes a GIS empower to adapt with global changing through providing global information about the current situations of each region as well as successes or failures of managerial decisions and procedures. Magniez, Brombacher, and Schouten [21] emphasized that an efficient feedback system is an indicator to reveal the GIS innovation abilities.

5.4   Organizational Gelatin Architecture

Finally, Global sourcing has major impacts on GIS, and its mobile nature forced global organization leaders to prepare their enterprise form all related aspects [22]. In this way, enabling the GIS structure capacity to accept, analyze, and use the feedback to shift in totally new state is so important. Gelatin architecture that mentioned in current subtitle refers to capability of structural changes of a GIS[23].

6   Conclusion

Solving complex problem requires simple approaches. Using complicated tools or methods likely will increase the complexity degree The GISOS model provides a clear roadmap to concur the complexities and potential risks of global information system development process.. In a global information system development paying attention to appropriate methodology, especially maintenance phases, is too important to neglect. The adequate maintenance stage supporting the rapid change in GIS configuration, even the structure of the global organization could be applicable in the global level.Global feedback process is another essential suggestion of the proposed model in this article to improve the GIS performance and productivity. Each feedback process in a GIS requires a prior design in GIS development stages. Based on flexibility nature of global organization a global feedback process, as a self-instrument will empower GIS to reassess as well as improve the capabilities.

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