IMPLEMENTING GLOBAL INFORMATION SYSTEMS IN SMALL AND MEDIUM ITALIAN MULTINATIONAL CORPORATIONS

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ABSTRACT

Introducing a Global Information Systems (GIS) and changing the IS paradigm from local to global are not always straightforward processes. The heterogeneity of the business and the technology environment, cultural barriers, resource quality and availability are all factors that challenge GIS implementations. GISs can be studied along different dimensions, the path toward the globalization of the information systems is one of them. There are two important aspects concerning the implementation path: one is related to the technological components, the other is related to the order with which subsidiaries enter into the GIS framework.

It has been noticed that the implementation of certain technology components on an international basis may influence the attitude toward future implementations while the characteristics of the subsidiaries may cause unwanted and relevant mismatches between the desired implementation path and the real implementations. Resource shortage seems to be an important factor that exacerbates various issues.
INTRODUCTION

Multinational corporations are complex organizations that face operational diversity and environmental complexities that are not faced by other organizations (Roche, 1996).

The globalization of competition forces multinational corporations to rethink their global strategic approaches (Bartlett and Ghoshal, 1989; Karimi and Konsynski, 1991; Roche, 1996). The organizational structures of multinational corporations may change according to the strategy and this in turn has effect on the information systems configuration (Clemmons and Simon, 2001; Gibson, 1994; King and Sethi, 1999). If IT configuration is influenced by strategic choices, the opposite is also true, in fact, the availability and enhancement of the information technologies supply the tools to support the globalization processes. Information technology is an important ingredient for business expansion, providing strategic competitive advantage in worldwide markets (Ives and Jarvenpaa, 1991) and facilitating globalization (Palvia, 1995). IT has been hailed as the mechanism that can enable multinational corporations to rethink their traditional control and coordination mechanisms (Karimi and Konsynski, 1991; Roche, 1996).

The implementation of global information systems is becoming a key ingredient to support global operations and strategies, but it is also source of uncertainty and issues that may influence and may be influenced by specific implementation strategies.

LITERATURE REVIEW

A global information system may be defined as "a computerized system which supports the business strategy of a multinational organization and deals with the components of the international market as a single market and not individual markets" (Palvia 1992).

A GIS is a concept associated with companies physically present in different countries with, for example, production plants, subsidiaries, branches, sales offices. In general, these companies are indicated as multinational corporations (MNCs). But multinational corporations may have different organizational, marketing, financial and IS structure. Different authors (Bartlett and Ghoshal, 1989; Karimi and Konsynski, 1991; Roche, 1996) proposed categorizations for companies that operate across
national borders and others (King and Sethi, 1999; Clemmons and Simon, 2001; Gibson, 1994) had studied the corresponding IS configurations, finding that different organizational styles of multinational corporations lead to different IS configurations. Regardless the organizational configuration of the multinational corporations, several issues may arise during a GIS implementation. Much attention has been devoted to the detection and categorization of the issues that can be grouped in cultural aspects (Ein-Dor, Segev, Orgad, 1993; Sauter, 1992; Yellen, 1997), human resource management (Agocs and Suttie, 1994; Boudreau, Broderick, Pucik, 1994; Harrison and Deans, 1994; Niederman, 1994; O’Connell, 1997; Pucik and Katz, 1986), individual countries and regions (Palvia, Palvia, Zigli, 1992; Watson, Kelly, Galliers, Brancheau, 1997), business strategic planning (Cheung and Burn, 1994; Ives, Jaevenpaa, Mason, 1993; Gibson and McGuire, 1997; Kesner and Palmisano, 1996; Minor and Larkin, 1994; Neo, 1991; Palvia and Saraswat, 1992; Sethi and Olson, 1992), technology (Klein, 1999; Passino and Severance, 1990; Sankar and Prabhakar, 1992; Waples and Norris, 1992).

From an architectural point of view, the GIS concept has often treated as homogeneous, while in other studies specific technologies had been considered. Infrastructural level GISs, that represent the global technology platform supporting the global operations, have received attention in the balance between standardization and personalization (Rolland, Monteiro, 2002; Ciborra, 2000), while Ciborra (2000) highlighted that the main purpose of GIS implementations, that is the gaining of major control over the subsidiaries, in reality is a never ended task mainly because of the unexpected way technologies can be implemented and used. Transaction level GISs have been studied (Carton and Adam, 2003; Krumbholz, M., Galliers, J., Coulianos, N. and Maiden, N.A.M., 2000; Olson, Chae, Sheu, 2005; Sarkis, J. and Sundarraj, R.P., 2003; Sheu, C., Chae, B. and Yang, C-L.,2004; Sheu, C., Yen, H.R. and Krumwiede, D.W.,2003) and also at the executive level we can find some specific contribution (Watson, 1995; Iyer, Schkade, 1987; Palvia, Kumar, Kumar, Hendon, 1996; Kumar, Palvia, 2002).

The distinction between different GISs, however, even if permits a deeper understanding of the globalization of a specific part, does not permit to appreciate the dynamics of different GISs in the same company, dynamics that are relevant for the transition from a local IS paradigm to a global one.
Apart from the focus of the different studies, the transition toward a GIS has been seldom explored. Cavaye (1997), based on two case studies, used a project life cycle approach and underlined the challenges encountered during the different GIS project phases; Lan (2004) proposed a transition framework based on previous literature. Kumar and Palvia (2002), in their study concerning the development of Global Executives Information Systems, approached the problem underlining the key facts or decisions along the project; Braa and Rolland (2000) and Rolland and Monteiro (2002) analyzed a case study in the globalization of information systems starting from the local IS situation to the global one. Moreover, the literature is mainly focused on big multinational corporations, especially US based, with dozens of subsidiaries around the world. Italian multinational corporations seldom may be confronted to such big companies. Smaller dimensions may pose several difficulties in GIS projects: the scarce availability of human and budget resources limit the set of viable choices and augment project difficulties that in other domain may be easily solved. When compared with large enterprises, SMEs usually have a simpler structure with less specialised tasks (Carson et al., 1995; Mintzberg, 1979) and poor human, financial and material resources (Welsh and White, 1981). Since they are likely to have less resources and also less ambitious objectives, SMEs tend to have more limited use of information technology (IT) and less IS capabilities.

**METHODOLOGY**

The research approach chosen was based on case studies (Yin, R., 1984, 1994). The case studies were conducted by means of questionnaires manly based on open questions. The questionnaire had been used during face to face interviews. Each interview took approximately 3 hours. The target person had been identified by means of previous telephone contacts, asking for a person that had the whole view of the GIS planning and/or implementation projects. For all the companies the CIO had been indicated as the right person to interview. The main research questions had been presented by phone and then emailed. The questionnaires were not given to the interviewed, but used as a guideline by the researcher. The choices concerning the open question structure and the use of the questionnaire only by the researcher was based on two considerations:
• normally Italian top managers, even if working in small and medium enterprises, do not appreciate to fill structured questionnaires or follow a rigid path, they prefer to answer to a few questions in a broader way, for the researcher is better to pose detailed questions only if during the discussion the key information are not fully expressed;
• giving the questionnaire would generate the risk to orient the interviewed toward a time efficiency attitude, exacerbate in case of structured response formats. On the opposite, broader questions tend to better involve the respondent and to generate a less time sensitive situation.

In order to appreciate the different facets and complexity of GIS planning and implementation projects, we posed some constraints to the research sample:
• Italian multinational corporation must be involved in GIS projects, in this way we can interview only companies with a direct experience;
• Italian multinational corporations must have more than 5 subsidiaries both in developed and less developed countries, giving thus the opportunity to study articulated decisions and major cultural differences;
• Simple sales offices where not considered subsidiaries, due to their technological and organizational simplicity;
• Italian multinational corporation must have a turnover up to 500 million euros.

The last constraint necessitates a better explanation. We would exclude from our research big multinational corporations that were not representative of the local economic situation. We than posed a limit at 500 million euros that represents the upper turnover limit for a medium enterprise (Corbetta, G., 2005). Normally dimensional limits are also related to the number of employees. But we did not set a constraint for the employees because subsidiaries in different countries have different capital/labor cost structures, thus, similar companies with similar turnovers may have completely different number of employees depending on the location of the subsidiaries.

The resulting list was composed of 477 companies. For each one we searched information regarding the multinational presence. In this way we started to consider the constraints concerning the subsidiary number and types. We found than 30 companies suitable for the interviews.

Our target was between 8 to 10 case studies. We performed 9 full interviews.
The main questions posed to the interviewed are shown in table 1. The main objectives of the research were to study two implementation paths:

- The path toward the globalization of the information system components;
- The path concerning the transition of the subsidiaries into the GIS framework.

| Description of the various GIS projects and their lifecycle status. |
| GIS paths based on strategic motivations. |
| Changes in the GIS paths during the planning and implementation phases. |
| Reasons for the path changes |

Table 1. Main questions submitted during the interviews.

The first path permits to consider the different approaches that the Italian MNCs have used to implement information systems with a global or international reach and, in addition, to appreciate the technological scope of a GIS. In effect, a GIS may comprises different technologies, applications and procedures and the degree of standardization on a global dimension may vary from company to company. The second path highlights that the implementation of a GIS cannot be represented by means of a single, international coordinated go live of a new information system. Instead, a GIS implementation is composed of a set of different projects, whit different schedule and complexity levels. Thus, every subsidiary may influence the global outcome and what for simplicity is presented as a single functioning information systems, in reality is the result of a series of implementations occurred in different time. As a result, while some subsidiary is running under the GIS framework, others may be still non integrated. These asynchronies in the GIS implementation path may have strategic implications.
RESULTS

The globalization of the information system components
A GIS is an information system that crosses the national boundaries. But an information system is not an homogeneous concept, it is composed of different parts with different linkages.

The transition from a local information system to a global information system interests both the technology dimension (data, applications, equipments) and the organizational dimension (people, procedures, processes).

Three main paths have emerged as suitable for GIS transitions.

The first is based on the leverage of infrastructure level information systems. With this approach, the Italian Information System Department may begin to standardize, with a multinational scope, infrastructure level information systems such as network equipments, network communication protocols, network security applications and devices, basic communication applications and protocols such as email and Voice over Internet Protocol (VoIP).

This approach is based on the following justifications:

- it offers the possibility to test and to train the international competencies of the Italian IS department on relatively low complexity projects;
- it permits to improve the reputation of the Italian IS department in the different subsidiaries.

The second advantage derives from the infrastructure projects characteristics, that normally have low task impacts and fast and easy measurable returns. Starting with these projects may create a better disposition of the subsidiaries for future GIS initiatives because the Italian IS department has demonstrated the ability to improve the IS service level with little or none organizational impact.

Given the nature of the infrastructure projects, that do not impact on core business processes, this approach is mainly IS driven, in other words, the IS department understands the trend toward the major control and coordination of the subsidiaries and tries to move in that direction with projects that normally are under the IS decisional autonomy.

The second path consists in the offering of IS information and advice services to the subsidiaries. For example, advices inherent the appropriateness of supplier offerings and contracts or for technology choices may be considered valuable from the
subsidiaries and helps the Italian IS department to build better relationship and progressively enter even more into their decisions.

The third path is completely different. In this case the approach is more business driven and the IS department is involved in projects that tend to standardize business processes and data base in different subsidiaries. The IS department will support the technology/supplier choices and will be directly involved or will coordinate the implementation activities. These kind of projects can be very different, in some case only few users will be impacted, in other cases many users will be affected by changes. Given the high impact on users’ tasks, these projects are also complex from an organizational perspective. Sometime they also need to be supported by infrastructure level projects, that in this case are considered as mere enabler and not as a first step toward the IS globalization.

It must be clear that the Italian IS department alone cannot propose itself as a global IS department, especially when other local IS departments are present. The infrastructure driven approach and the counseling activities tend to lower the resistance barriers of the users, but when the local IS structures have to be modified, the top management must intervene on the organizational structure.

The three different paths can be related in different ways. The first and the second, if used as a mean to start to legitimize the Italian IS Department as a Corporate IS department, can be used in conjunction or can be independent but they both can be preparatory for projects that can be found in the third path, because of their positive effect on organizational resistances. But it is also possible to start from the third path, in fact, for some company the implementation of a GIS is a mere answer to a specific and explicit business need, thus the GIS project scope is directly related to a request for global standardization in specific business areas.

The transition of the subsidiaries into the GIS framework
One of the main findings of this research is that the transition of the subsidiaries into the GIS framework is not a smooth processes, instead, remarkable misalignment between the company needs and the feasible GIS implementations can be found. This result is peculiar, because the previous literature exposes the issues concerning GIS projects but little is said about the consequences of these issues. We found that the
final result can be a mismatch between the strategic needs and the implemented solutions. More in detail, subsidiaries with high priority in their adherence to the integration framework could be shifted for years or even considered out of GIS scope for an unidentified period.

The transition into the GIS framework, and the factors that have contributed to different implementation sequences, can be studied along three dimensions:

- The strategic dimension, that proposes the business needs;
- The feasibility study, conducted mainly by the IS department, that may pose some constraint to the previous choices;
- The information system department preferences, that can be expressed where the proposed pattern has a certain flexibility.

The strategic desired path
Since we interviewed the CIO of the corporations, we did not have a clear understanding of the motivations for a certain desired integration path of the subsidiaries into the GIS framework. However, the CIOs reported that the decision was based on the balance between the benefits obtainable with the GIS implementation and the costs caused by the shift of the GIS project on a specific subsidiary. For our purpose, relevant is to recognize that a specific input was given to the IS department.

The path resulting from the feasibility study
When the desired path has been better analyzed, especially by the Italian IS department, it could emerged that the characteristics of the subsidiaries matched with the characteristics of the GIS project, produced different issues, thus suggesting to rethink at the integration sequence.

The cited variables that influenced the rethinking of the GIS integration sequence has been:

- Competence in the subsidiary to deal with the project;
- Characteristics of the international telecommunication network;
- Local attitude toward the GIS implementation;
- Previous local IT investments;
- Local IT level;
- Subsidiary performances;
- Functional fit with the existing GIS configuration;
- Geographical distance from Italy.

*Competences in the subsidiary to deal with the GIS project.* The local competence level related to the GIS implementation and usage may impact the implementation path. Very good competences tend to lower the project risk while inadequate competences may complicate the effort. In an interviewed company, the lack of the proper mindset of the final users has caused the shift of a subsidiary from first to last in the implementation path, with more than two years of delay. In addition, the understanding that the situation would not change in the future without specific actions, the company studied an original way to prepare the subsidiary to the future transition. Specifically, they implemented a local information system similar to the GIS but with a simpler logic, with the purpose to replace it after the employees have reached the necessary competences. On the other hand, in other cases the strong competences of the local employees have permitted to anticipate the implementation. But too strong competences could emerged as an impeding factor. For example, when the proposed GIS is under the local expectancies in term of technology innovation, a technological refusal may happen. The local opposition related to the higher technology expectancy has been found in developed countries while the lack of adequate competences has been noticed in less developed countries.

*Characteristics of the international telecommunication network.* A GIS may require a great amount of information exchange between the corporate and the subsidiaries. This means that an adequate telecommunication network can be necessary. Adequate has two meanings:

- The availability of technologies with desired technical characteristics and performances;
- The availability of technologies with affordable costs.

The first still plays a negative role in less developed countries, in fact, it can be an impeding factor for the implementation of a GIS that requires strong data exchange between subsidiaries located in different continents.
The second does not absolutely impede the GIS implementation, but in a resource limited situation has the same impact of non available technologies, because budget constraints impede the technology adoption.

*Local attitude toward the GIS implementation.* Every project may have opponents and supporters. In the GIS domain, local opposition is cited in previous researches. We found that a strong local opposition may impede the GIS implementation, thus causing a shift in the implementation sequence. The acceptance of this abnormal situation by the Italian managers has been explained as the rationalization that the benefits of a GIS cannot be obtained if the local personnel is not aligned with the corporate decisions. In fact, the relative high importance that a local subsidiary may have for the group, suggests to avoid the direct opposition of local managers and employees that can result in economic worsening and can undermine the future growth. Oppositions come from local managers, that mainly feel a loss of freedom; local users, for the same reason and for the effort required to learn the new systems and the new processes; and the local IS departments, that undoubtedly feel that they would loose their role or even their job. It has been noticed a difference in the local attitude toward the GIS between developed and less developed countries. While in less developed countries the IT and user knowledge is lower compared to developed countries, the bigger change management problems, in term of opposition against the new IS implementation, came from the developed countries. In the less developed countries users seemed to have a positive attitude toward new technologies pushed by the Italian holding, because they felt these projects as a mean to improve their working conditions and status. On the contrary, users in the developed countries were less attracted by the new technologies and tent to value more the organizational aspects (loss of freedom) and to underline the additional effort required by the new projects (working time and stress).

*Previous local IT investments.* The level of investment on a local system has been taken into consideration for the implementation path. Big recent investment on the subsidiaries has suggested to shift the implementation. A recent local IT investment rises change barriers because the management prefer to amortize the investment and
not to afford a new one, while users prefer not to invest time and cognitive effort for a new implementation.

**Local IT level.** An high technology level in a subsidiary may cause an implementation refusal that can lead to an open ended shift when the proposed GIS solution is under the expectancies of the subsidiary. A strategy used in this case is to implement the GIS in the other subsidiaries and then leave the subsidiary in a sort of “technology isolation” that impact its status among the different company entities and then causes the convergence toward the GIS. On the opposite, a very low technology level, that does not properly support the local operations, may turn in a urgency for the GIS implementation.

**Subsidiary performances.** This factor has been found in relation to subsidiaries that over perform the others and that are important contributors for the group turnover. The worry to alter the subsidiary performances with a GIS implementation has caused a prolonged sequence shift, with the intent to acquire GIS knowledge and competences during previous implementation, thus lowering the expected impact. This factor has been found to be related with local opposition. In effect, it seems logic that the case for change is less convincing when the performances are positive.

**Functional fit with the existing GIS configuration.** Local needs very different from the Italian ones or from the other subsidiaries may change the GIS project implementation order; while similar GIS needs may facilitate serial implementations in subsidiaries with these characteristics. Different local needs may ask for local partners and frequent travel. In this case, a strategy has been to postpone the implementation of the subsidiary at the end of the path, concentrating the available resources on a single problem and thus not affecting the other implementations. This decision has also another explanation: in situations where corporate implementation are not very welcome, an implementation pitfall may generate oppositions in the other subsidiaries because of the fear to enter in a problematic project.

**Geographical distance from Italy.** In a situation with limited resources, the geographical closeness facilitates continuous support to the subsidiaries. In addition, closeness gives an idea of cultural similarity, even if only supposed, that depicts the
GIS project as less complex. Thus, near located subsidiaries may be the first to be incorporated in the GIS framework. In reality the closeness has demonstrated facilitations in the continuous communication, due to similar work shifts, but the implementation difficulties were not lowered. For particular implementations that would necessitate ongoing support from the corporate, the geographical distance has represented a true impeding factor because of the impossibility to supply the GIS support with so different working shifts.

The information system department preferences

The outcome of the feasibility study may thus have a direct impact on the implementation sequence. It has emerged that where there is a certain flexibility in the implementation order, the Italian information system department expresses new preferences in the implementation sequence that tend to lower the project risk. The variables taken into consideration for this sequence fine tuning are those previously exposed. The difference here is that the path can be changed only marginally and in a way that has no strategic relevance.

CONCLUSIONS

The forces that conduct toward the implementation of Global Information Systems are present on a worldwide basis. Many Italian multinational corporations are facing this challenge, in the attempt to have better information and better coordination and control mechanisms for a more effective management of the worldwide operations.

The path toward the globalization of the information systems reflects different choices and it is affected by various issues and constraints. A GIS represents a part of the various information systems implemented in the different subsidiaries. The GIS coverage, from a functional and a technology point of view, depends both from the emergence of specific business needs and from the IS department orientation. In fact, an IS department that considers the whole information system as subject to globalization may independently push the internationalization of some components while for other IS departments the globalization is only a pure reaction to explicit business needs.

In approaching various GIS implementations, Italian companies found several factors that may help or obstacle the GIS projects. Sometime the effect of these factors may
result in project prolongations or shortens, but other times the effects are more notable, resulting in temporary project shifts or even in open ended shifts. Resource shortage and cultural values seem to be the first elements that lead to the modification of the GIS implementation path and thus to sub-optimal results.

In addition, the situation is complicated by the fact that subsidiaries are not static entities. During GIS projects the characteristics of a subsidiary may change due to market difficulties or fast growth, new subsidiaries may be acquired and other sold or dismissed. These facts have a direct impact on GIS projects because new priorities could be set and considerable changes need to be implemented. It thus emerges a very turbulent and dynamic environment that asks for prompt reactions and changes.

VALIDITY, LIMITATIONS AND FUTURE RESEARCHES

This research has been conducted in Italian multinational corporations. Most of the results were obtained since the first four interviews. During the following interviews the first evidences were confirmed and new details were added. This fact is a basic confirmation of the significance of the findings.

The results have different degree of generalizability.

The findings related to the transition of the technology components toward a GIS paradigm need more attention but the first results are very logic and independent from national or dimensional boundaries. In effect, it is not odd to affirm that infrastructure level GIS, given their small impact on users’ tasks, can be pushed and managed directly by the IS department and can be a way to train the resources in an international context. This approach, however is not always feasible, it presupposes the presence of a growing and recognizable trend toward global activities.

Regarding the GIS implementation path, it is useful a distinction between factors and specific outcomes. While factors contribute to the project complexity and can be common to all the companies, regardless the corporate nationality or dimensions, outcomes are country and company specific. For example, the attention paid to the local opposition may differ from company to company but also from country to country. In a country with high nationalism one can expect a minor attention to this factor.

This research presents some limitation.
The first derives from the partially new topic that has been considered. In effect, it is the first time that small and medium multinational corporations have been selected as target for GIS studies. Thus, even if results seemed to be consistent during the study, other researches may challenge in some aspects this work.

The second limitation concern the completeness. Even if the final interviews confirmed the first findings, broader studies may add new details.

This research can supply the input for other researches.

Among them, two appears relevant:

- A comparison of the factors that affect the GIS implementation path in MNCs with different dimensions and/or different nationalities;
- A comparison between the different roles played by the subsidiaries in GIS projects.

**BIBLIOGRAPHY**


