

SUSTAINABILITY FACTORS IN INTERNATIONAL PROJECT TEAMS

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Abstract: *Today almost all organizations, according with their business specificities, support their business activity within the Information Systems. In this sense, the most common business processes of organizations are supported by generic software products, also called Enterprise Resource Planning. In this paper are referred a set of good practices for the implementation/configuration of generic software products, in international projects. The methodology adopted focuses on the literature review in the thematic of Sustainability factors in International Project Teams, as well as on the presentation of good practices based on the lessons learnt from proven methodology. The contributions of this work focus on considerations in the area of project implementation procedures, and requirements of the business processes, the system configuration, as well as training. The paper's conclusions emphasize the importance of applying good support management in international project teams, including concerns of sustainable development objectives in the economic, technical, social, human/individual and environmental aspects.*

Keywords: *Sustainability, ERP, Implementation, Configuration, Requirements, Knowledge transfer-ence, International project.*

1. INTRODUCTION

The main motivation of this work is the incorporation of the principles and commitments of the Karlskrona Manifesto of sustainability (Becker, et al., 2015) in the optimization of good practices instituted in the field of implementation and configuration of software products, in the context of international projects. These products are developed for an understandable application domain and then configured to meet the specific needs of each customer/organization.

In this sense, the paper has the purpose to present a description of a set of experiences acquired in an international context in the level of team building, necessary documentation and implementation processes. It is, also, intended to incorporate concerns in the tropes of sustainability underlying the theme under study. The paper is structured in five sections: introduction, state of the art, good practices, future research directions and conclusion.

2. STATE OF THE ART

Generic software products support business processes of the organization and are characterized by high modularity and configurability. These products are developed for a comprehensive application domain, after which they must be adapted/ configured/parameterized to the specific needs of each customer (Silveira, 2006).

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The research conducted by (Ahmad & Cuenca, 2013) on the implementation of ERP in small and medium-sized enterprises, highlighted the interrelation of ten main critical factors of success, which were classified as basic, critical and dependent. Analyzing these interrelationships indicates that as the implementation process progresses, the number of factors involved in the implementation and its interaction also increases. Also, (Thew & Sutcliffe, 2018), refer to „socio-political” issues, such as people’s emotions, values and feelings, which influences the requirements gathering process. These authors define values, such as personal attitudes or long-term beliefs that can influence the functional and non-functional requirements of stakeholders; motivations, such as psychological constructions related to personality traits, that can be seen as long-term goals of the stakeholders; emotions, such as tips for stakeholder reactions due to value/motivation conflicts.

Projects for the implementation of generic software products are considered knowledge transfer initiatives (Daneva & Wieringa, 2008), as the team’s knowledge and experience are transferred to existing customers resources, and vice-versa (Figure 1). (Figure 1). The authors (Dittrich, Vaucouleur, & Giff, 2009) also mention the importance of cooperation and knowledge sharing with regard to the customization of ERP systems. For (Jones, Cline, & Ryan, 2006) knowledge sharing is critical during the implementation of ERP systems, identifying actions to facilitate this sharing: collaboration-oriented teams avoiding isolation, bonus-grant programs for teams and more imposing motivated teams.

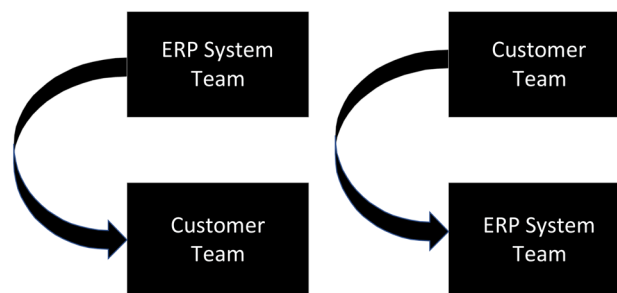


Figure 1. Knowledge transfer between teams

Source: (Duarte, Silveira, & Reis, 2020)

In software engineering, sustainability can be defined as the „ability to support” and „preserve the function of a system for a long period of time” (Lago, 2019). This definition points mainly to technical sustainability over time. However, sustainability involves other dimensions, such as: economic, social, human and environmental dimensions. Sustainability is multidimensional, so it is required to include the economic, social, environmental, technical and human dimensions to understand the nature of sustainability in any situation (Becker, et al., 2015). It is observed that there is a lack of adequate instruments to design and confiscate sustainable software systems that allow sustainability objectives.

To fill this gap, it is necessary to include sustainability concerns (Becker, et al., 2015), (Reis, Silveira, Carvalho, & Mata, 2020), (Reis & Silveira, 2020), (Venters, et al., 2018), in configuration/implementation projects. This lacuna is a motivation for the development of the present study. It corroborates the perspective of (Lago, 2019) so that sustainability is a software quality property at any stage of the software development process.

As stated, (Becker, et al., 2015) in the principles and commitments of the Karlskrona Manifesto, sustainability requires action at various levels: some interventions have more influence on one

system than others. Whenever we take action for sustainability, it should be considered that actions at other levels can offer more effective forms of intervention.

In this sense, human needs must be present in the sustainability policy of organizations (Reis & Silveira, 2020) and in the organizational culture, in face of the Sustainable Development Goals (SDGs), namely in SDG 8 - Gender Equality (UNDP, 2015), to promote equality between men and women and the reconciliation between professional activity and personal life (Silveira, Duarte, & Reis, 2020).

3. GOOD PRACTICE

The success of these projects, (Khang & Moe, 2008), determines the socioeconomic progress in the recipient countries but, also, the effectiveness of the contribution of the donor countries and agencies. Understanding the critical factors that influence project success enhances the ability of donors and implementing agencies to ensure desired outcomes. In addition, it helps them forecast the future status of the project, diagnose the problem areas, and prioritize their attention and scarce resources to ensure successful completion of the projects.

In this study, a set of good practices that are considered relevant in the context of the implementation and configuration of ERP products and that interrelate in Table 1, where they are identified.

Table 1. Good practice

Good Practice	Advantages
Team with elements of different specialties, project manager with cross-cutting knowledge and strong leadership.	It examines/presents several points of view and each participant provides a distinct opinion/vision of the system. Improvement in product quality.
Participation in the process of elements with practice in conducting tests.	Identifying/predicting any problems early on.
Involvement of customers, users and other stakeholders in the process.	Better identification of real needs, motivational component and sense of belonging.
Conducting workshops to identify and negotiate requirements.	Sharing of information and knowledge. It generates consensus for different points of view.
Document meeting decisions.	Avoids a second analysis and discussion. Supports evaluation and validation.
Use a tool like “Idea Organizer”.	Helps document meeting decisions.
Use of various non-technical capabilities.	Improvement in the relationship and communication with stakeholders.
Definition of a normalized structure (templates) for documents.	Simplifies reading and understanding.
Consultant who has the assumption to devote time to explain the features and processes embedded in the software product.	It promotes the sharing of knowledge from consultants to clients.

Source: (Duarte, Silveira, & Reis, 2020)

A careful selection of project team members (Mohan, Kumaraswamy & Anvuur, 2008), supported by demonstrated capacity and commitment to collaborative approaches based on relationships, is considered fundamental, and one of the main drivers of the projects.

Thus, and having as desideratum the implementation of a project of a generic ERP system, should be adopted a set of good practices in order to enhance the results. These good practices can be divided into three categories that are considered as main, and are exemplified in Figure 2: team; documentation and implementation.

In terms of **teaming up for implementation/configuration of ERP** systems in international projects, this should: be multidisciplinary and have the necessary knowledge within the project; master the English language; be prepared to be away from their normal environment (including traveling to foreign countries); check whether it is necessary to involve a local partner: you must master the English language beyond the native language; have knowledge of the cultural and organizational reality; have knowledge of the legal aspects; always be on the side of the ERP Implementation Team and communicate, all conversations from the client to the implementation team.

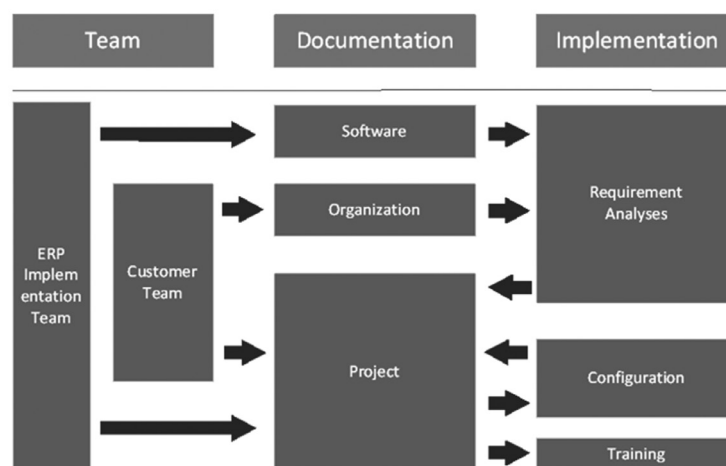


Figure 2. Categories of good practice

Source: (Duarte, Silveira, & Reis, 2020)

In regard to the establishment of communication with the **Customer Team**, the following best practices are proposed: having knowledge of the English language (sometimes pronouncing it makes communication difficult); master existing processes (sometimes knowledge is superficial on the part of key users); be prepared for change (sometimes only key users are aware of this); be available, practically in full, throughout the project implementation period. From the perspective of [1] implementation processes should be carried out without affecting day-to-day operations across the enterprise. This can only be achieved by understanding the key elements that make up the organization's infrastructure, an effective plan for implementation, and procedures for measuring and evaluating the project throughout the implementation process.

Documentation can be provided by the ERP System Implementation Team (in detail in the figure 3) and by the customer.

The **customer** must send the documentation in English (preferably); prepare and provide the information, including internal and external documents used (sometimes this information is only prepared when requested and takes a long time).

With regard to project implementation we can divide it into the following points: the **Requirements Analysis** should take into account the following aspects: must be done in an office/ in partnership with the project manager, key users and end users (when necessary); the processes supported by the ERP System may be submitted; or the presentation of the processes supported by the client may be submitted; all decisions taken should be documented. **Setup** has implied the following aspects: be done in an office/ in partnership with the project manager (and key users when necessary); be used the general template; use the requirements documentation as a guide to the process and make presentations to key users for each configured process. The **Training**

shall take into account the following aspects: it should be done in an office / in partnership with key users and end users; carried out, as a complement, at the end-user's workstation; provide the end-user with their Mini User Guide; the user is given a period of time to carry out the tests.

Documentation provided by the ERP System Implementation Team, must:

1. provide documentation of installation/configuration of server and client stations;
2. provide process diagrams (sometimes there are several scenarios);
3. have general configuration templates;
4. provide documentation in Mini User Guides (MUG) format: they are the substitutes for how-to documents and FAQs;
5. be made daily record of the work performed, explaining the main decisions taken, always with the agreement of the client;
6. be used an Integrated Project Management software in order to record and document all interactions performed, in order to allow the whole team to have access in an integrated and dynamic way to all project information;
7. provide the so-called "User Manual" (preferably online).

Figure 3. Documentation provided by the ERP Team

It is recommended that setup/training only ends when the following aspects are checked by the end user at the workstation: the ERP system should be tested/used; printing documents; sending emails; import/export of data; interaction with other specific devices. It is, therefore, considered that the good practices, described, constitute added value into the context of international projects.

4. SUSTAINABILITY AND TELEWORKING

In the previous point, we analyzed the good practices of implementation in international projects, in a presential aspect and without taking objectively into account the dimensions of sustainability. Then in this section analyzes sustainability from different perspectives, such as: economic, social, technical, individual and environmental (Becker, et al., 2015).

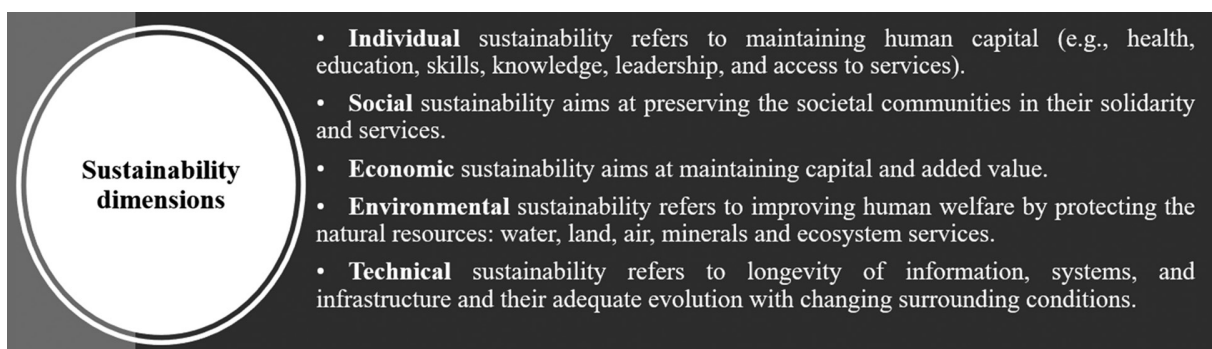


Figure 4. Sustainability dimensions

The details of the five dimensions are shown in figure 4. Analyzing teleworking in international teams in view of the various dimensions of sustainability becomes a challenge in the current situation of the pandemic.

The term telework or teleworking is an umbrella for the use of information and communication technology to perform work 'at a distance', as well as after-hours work activity by commuters

(Mokhtarian, Collantes, & Gertz, 2004). Telecommuters, or paid employees who work from home instead of commuting daily, are a subset of teleworkers and are the focus of current attention (Moos, Andrey, & Johnson, 2006). The social sustainability implications of using information and communication technologies can be difficult to deduce and measure.

On the other hand, the digital transformation is changing many sectors of activity and possibly making the world more sustainable, allowing to preserve the environment and achieving new opportunities. So, figure 5 analyzes teleworking in the five dimensions of sustainability.

These dimensions are interrelated and provide an instrument to disaggregate and analyze relevant issues, taking into account that sustainability is fundamental to our society.

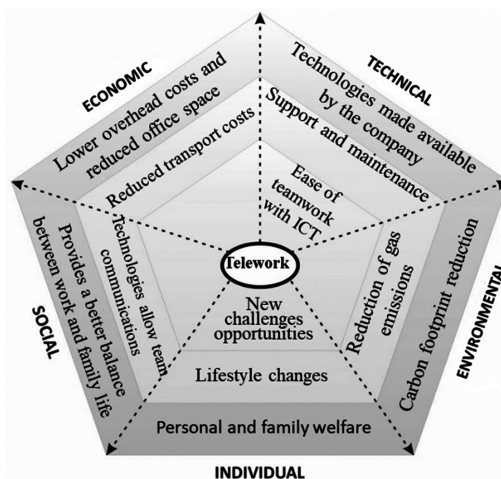


Figure 5. Analysis of sustainability dimensions - teleworking

The central factors of telework are represented in individual, social and environmental sustainability. The role of technologies is illustrated in the technical dimension. Analyzing Figure 5, the economic dimension shows an advantage that many organizations see with telecommuting that is lowered overhead costs and reduced office space. This can be a significant advantage to an organization looking to reduce expenses.

5. FUTURE RESEARCH DIRECTIONS

As perspectives of future work, it is considered in the view of the current state of the global pandemic; telework can be a differentiating factor in the context of project team management, especially in international teams. The results of (Martens & Carvalho, 2017) investigation highlighted that four factors are crucial, and those factors are the following: business model in sustainable innovation, stakeholder management, economic and competitive advantages, saving environmental policies and resources. Thus, it is intended to study references that optimize the current practices established considering the five dimensions of sustainability.

6. CONCLUSION

Concerns in the field of sustainability in the various aspects are the subject of study in the context of this paper. It was intended to reflect on the importance and added value of the inclusion of sustainability dimensions, in the scope of the study presented, as well as on the constraints of teleworking in relation to the current effects of the pandemic and underlying the performance

of professional functions. Success can only be assessed when the dimensions of the evaluation are adequately defined. In other words, a project is generally considered a success if its implementation complies with the usual constraints of time, cost, and customer terms of reference or „quality” (Diallo & Thuillier, 2003).

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