



Utilising multi-aspectual understanding as a framework for ERP success evaluation

ERP success
evaluation

A case study

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Abstract

Purpose – The purpose of this paper is to apply a philosophical framework in order to come to a life-world oriented understanding of an enterprise resource planning (ERP) system for evaluating system success. To do so, according to Dooyeweerd's theory of aspects, a multi-aspectual understanding is derived based on end-user's everyday experience of the system.

Design/methodology/approach – Through a qualitative case study, data are gathered based on 17 semi-structured interviews. The company within which this study was conducted is an Iranian manufacturer which fully implemented a SAP R/3 system about four years ago. In order to analyze text data, an interpretive text analysis is conducted.

Findings – According to the results, among all 15 aspects and from end users' point of view, the qualifying aspects are analytical, pistic, economic and formative, which means that the other aspects are ignored or repressed throughout the organization. All these qualifying aspects include both positive and negative norms but for three of them (analytical, economic and formative) the positive norms are dominant. Regarding the pistic aspect, even though it includes strong positive norms, they are not dominant compared to negative norms. Synthesizing results show that according to "Meeting objectives", "User satisfaction" and "Emancipation" as general norms, ERP success, in order to be completely realized, requires each general norm to be considered as a multi-aspectual criterion.

Practical implications – First, the management team has to concentrate not only on economic and formative objectives but also on the other aspectual objectives which are more qualitative and intangible. Each aspectual objective requires its own specific methods and data to be measured, therefore the management team must provide supportive conditions so that multiple measurement systems are allowed to be implemented. Second, through new long-term plans, budgets and training courses, already ignored aspects such as psychic, lingual, social, aesthetic, juridical and ethical must be more focused in order to bring to them more visibility and recognition throughout the organization. Third, In order to increase the positive norms for all aspects, holding periodical workshops and training courses is helpful. In addition, implementing reward systems can be a complementary action in order to improve positive norms.

Originality/value – The paper shows that evaluating ERP success according to end users' point of view brings more visibility to some issues which are usually ignored or missed by quantitative or uni-aspectual approaches. Furthermore, utilizing Dooyeweerd's framework as a life-oriented philosophy for evaluating ERP success is a novel work, which may lead to a kind of development and enrichment in the ERP success literature.

Keywords Iran, Manufacturing industries, Organizations, Resource management, User satisfaction, Enterprise resource planning, Life-world philosophy, Dooyeweerd, Multi-aspectual understanding, Qualifying aspects, General norms, Emancipation

Paper type Research paper

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Introduction

Enterprise resource planning (ERP) systems are one of the largest IT investments in today's organizations (Chung and Snyder, 2000). The smart organizations could manage customer expectations that are evaluated on the basis of availability and efficiency. To do so, the one tool that proactive organizations have come to increasingly depend on is ERP solution. According to Chung and Snyder (2000), these systems have traditionally been used by capital-intensive industries, such as manufacturing, construction, aerospace and defense. Additionally, they have recently been introduced to the finance, education, insurance, retail and telecommunications sectors. Hence, the number of organizations going in for ERP systems is growing rapidly (Momoh *et al.*, 2010).

ERP is such a huge information system (IS) solution through which a company manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total integrated solution for the organization's information-processing requests, through a process-oriented view consistent across the company (Dezdar and Suliman, 2009). In 2005, the total spending on IT was around \$1,000 billion (Network News, 2006). According to studies made over the past years the failure rate of IS systems using IT has consistently been over 50 percent (Basden, 2008) and approximately 90 percent of ERP implementation projects are late or over budget (Martin, 1998) and 70 percent of ERP implementations fail to deliver anticipated benefits (Al-Mashari, 2002). So, if ERP system is such a high risk project to be implemented and use, there is a necessity to evaluate the system success.

There has been extensive research focussing on the implementation process with the objective to identify the issues affecting ERP implementation in organizations (Al-Mashari, 2002; Al-Mashari *et al.*, 2003; Motwani *et al.*, 2002; Umble and Umble, 2002; Zhang *et al.*, 2005; Hong and Kim, 2002; Holland and Light, 1999; Somers and Nelson, 2001; Umble *et al.*, 2003; Davenport and Brooks, 2004; Marshall *et al.*, 2005; Soja, 2006; Laukkanen *et al.*, 2007; Raymond and Uwizeyemungu, 2007; Upadhyay *et al.*, 2011). But, the real benefits of ERP are derived not only from just improved operational efficiency but also internalization of behavioral aspects (Lee, 2001) during ERP post-implementation phase and understanding the system as a phenomenon during its use. With the progress of information technology and the internet, more enterprises are extensively utilizing ERP systems for efficiently performing business tasks, increasing business performance and strengthening the competitiveness of their enterprises. In this environment, it is not important how good the systems are, but rather how well they are used by end-users in the enterprises (Yoon, 2009).

ERP is a multi-faceted IS with which end-users have to deal during their working life in the organization. On the other hand, ERP is implemented and used in the organization as a human functioning context and its success depends on effective interaction with human actors (as end users) and their understanding of the system. So, capturing end-user's multi-aspectual understanding of ERP system can be a useful approach for evaluating the system success. In this study, we utilize multi-aspectual understanding in an Iranian manufacturing company in which a SAP R/3 solution has been implemented four years ago and now is used vastly throughout the organization.

This paper is divided into eight sections including the present. The next section is devoted to the theoretical background in which some elements of ERP system, its implementation, use and success are described. The third section presents a brief description of life-oriented philosophies especially Dooyeweerd's aspects theory.

In fourth section the research method and case material are presented. While in the fifth section, the results of data analysis are organized into general norms for evaluating ERP success according to end-user's understanding. Next, in order to ground the empirical work done back into the literature, a discussion is presented in sixth section. In seventh section some conclusions are presented and managerial implications are outlined in eighth section.

Theoretical background

ERP system

Having the ability to respond to the changing business environment of modern markets, compels enterprises to integrate business processes into a single system. Such solutions often referred to as ERP systems, efficiently utilize information technology, and enable the internal sharing of data and information (Vandaie, 2008). Many companies have implemented ERP solutions to integrate and control their processes such as order management, purchasing, supply and logistics functions (Parry and Graves, 2008). An ERP system is typically a packaged business software system that enables a company to use its resources efficiently and effectively by providing a total integrated solution for information processing (Dezdar and Suliman, 2009). Investment in ERP systems is an important strategy that enables businesses to achieve competitive advantages and provide good quality of product. An ERP system streamlines business processes by creating an enterprise-wide transaction structure that integrates the key functions of different departments within an integrated IS platform (Wu *et al.*, 2008). ERP systems have evolved into a platform to support almost all aspects of business and industrial operations. A typical ERP system includes modules such as procurement management; accounting and financial; human resources management; manufacturing; and distribution and supply chain (Chang *et al.*, 2008). However, ERP systems, similar to other organizational ISs, are often perceived as very complex and difficult to be implemented (Liang *et al.*, 2007; Xue *et al.*, 2005).

ERP implementation

ERP is the largest system with which many organizations have worked in terms of the financial resources invested, the number of people involved and the scale of implementation. Several recent cases of ERP system implementation have experienced considerable difficulties. The failure rate of ERP implementation is very high. Among other obstacles, technical problems and people obstacles have been cited as the major barriers (Chang *et al.*, 2008).

ERP implementation is a complex and continuous business re-engineering process, other than simply installing a software program once (Wu *et al.*, 2008). Implementation of an ERP system does not end with the system "going live" (Markus and Tanis, 2000). It is an ongoing process where new functionality, modules and updates need to be carried out along with changes in organizational processes (Kræmmegaard and Møller, 2000). These changes continue throughout the lifetime of an ERP system as it evolves in parallel with the organization (Parry and Graves, 2008). The start-up of an ERP system should not be considered as the final goal but a milestone, many ERP systems have been discontinued a couple of months after they were seemingly completed, which shows that a static view of ERP implementation is inaccurate, not strategic and potentially costly (McGinnis and Huang, 2007). ERP implementation is a knowledge intensive process and requires a great deal of experience from

many different stakeholders specially users, and requires these individuals to interact extensively during the implementation process (Wang *et al.*, 2007) and also post-implementation phase.

The rate at which ERP projects fail is surprisingly high, with serious consequences including failure to fulfill anticipated functions and cost/schedule overruns (Wu *et al.*, 2008). Approximately 90 percent of ERP implementations are late or over budget (Martin, 1998) and 70 percent of ERP implementations fail to deliver anticipated benefits (Al-Mashari, 2002). The gaps between the functionality offered by an ERP system and that required by the particular organization are common reasons for this weak performance (Wang *et al.*, 2007). Despite low cost and risk, and high system quality of ERP (Helo *et al.*, 2008), the failure rate of ERP implementation ranged from 40 to 60 percent (Chou and Chang, 2008). In an ERP implementation process, there are two main types of user: key-user and end-user. End users are the ultimate users of the ERP system. They have only very specific knowledge of the parts of the system they need for their work (Wu and Wang, 2007). Therefore, end-users knowledge and what they understand during working with the system is essential to the ultimate success of the system and its benefits. A vital task during ERP implementation is to understand the difference between functions and modules. Functions are defined as actual physical tasks that are performed within a company. While modules can be considered as pieces of software and different ERP vendors have different modules that perform the functions (Yusuf *et al.*, 2004). So, end-users must interact with these modules in order to carry out their everyday duties. An ERP life cycle can be synthesized in adoption decision phase, acquisition phase, implementation phase, use and maintenance phase, evolution phase and retirement phase (Capaldo and Rippa, 2009).

The fourth phase is the very phase in which end-users have to work with the ERP system effectively so that the promised benefits of the system become realized. In this phase the end-users have to deal with the system as a phenomenon (or thing) in their everyday working life and to do so, they must come to a deep understanding of ERP and its use in order to be able to change their working habits including current processes and procedures in compliance with new processes and procedures posed by the system.

ERP success

ERP success has been a focal point of academic research over the last decade (Al-Mashari, 2002; Al-Mashari *et al.*, 2003; Motwani *et al.*, 2002; Umble and Umble, 2002; Zhang *et al.*, 2005; Hong and Kim, 2002; Holland and Light, 1999; Somers and Nelson, 2001; Umble *et al.*, 2003; Upadhyay *et al.*, 2011). The most often identified critical success factors (CSFs) include top management support, vendor support, consultant competence, user support, IT capability and project manager leadership (Wang *et al.*, 2008) and also organizational climate (Upadhyay *et al.*, 2011). Also, measuring ISs (here ERP system) success has been an area of research for recent decades (Zviran and Erlich, 2003) and several studies have proposed metrics for evaluating success (or failure) of ERP system (Saarinen, 1996; Davenport, 1998; Markus and Tanis, 2000; Umble *et al.*, 2003; Sedera and Gable, 2004; Ifinedo, 2007; Zafar *et al.*, 2006; Kamhawi, 2008; Wang *et al.*, 2008; Esteves, 2009; Zhu *et al.*, 2010). These metrics are mostly quantitative and usually include managerial, operational and economic aspects. But as it is clear, ERP is a socio-technical system and must be implemented in a social context (the organization) within which people are working

and sooner or later they have to deal with the system as end-users. Several studies have applied theoretical frameworks or models for evaluating ERP success. For example Bueno and Salmeron (2008) has examined ERP success based on Technology Acceptance Model (TAM) and Wang *et al.* (2008) used contingency theory in order to assess ERP implementation success. Furthermore, Zhu and Kraemer (2002), argue that many studies used technology, organization and environment (TOE) theory to investigate the adoption of IS. Later on, researchers began to apply this theory to examine the post-adoption issue and Zhu *et al.* (2010) used this theory in order to examine ERP post-implementation success. However, Lee *et al.* (2007) focussed on social context of ERP use and also the end-user's point of view but the focal point of the study was on knowledge transfer through ERP system. Even though Wu and Wang (2007) conducted a study in order to measure ERP success based on key-user's point of view and Chang *et al.* (2008) concentrated on understanding ERP system adoption from the user's perspective but their research designs were quite quantitative. All these theoretical frameworks explain some of the issues and/or methodologies that guide them. But unlike life-world, "pre-theoretical," "naïve" or "everyday" experience (Basden, 2008), theoretical understanding focus on a narrow range of issues. The danger is that that very focus can lead researchers and practitioners to assume that nothing else is meaningful and so other issues become downplayed, suppressed and ignored (Basden, 2008, p. 8). ERP system like other instances of information technology cannot by itself influence the productivity (a quantitative metric) of a company. The main efficiency factor lies in the way people use this system (Genoulaz *et al.*, 2005). As Plotkin (1999) has emphasized, the ultimate measure of success for an ERP implementation is the value that the system adds to the organization. So, much of ERP value is expected to be received and understood by people who are working in the organization and dealing with the system. Therefore, extracting ERP success metrics from end-users perspective would be a critical issue for adopting organization. These metrics are not necessarily quantitative but are rooted in life-oriented understanding of the ERP system from the end-user's point of view. This understanding is expected to be realized through internalization of the embedded knowledge keeping inside the ERP system (in the form of processes and procedures) by end-users (Lee *et al.*, 2007).

A philosophical framework for understanding ERP system

ERP is a multi-faceted system which must be used in a human context. So, if we are to reach to a valuable meaning of such a system, we must adopt a framework through which multiple aspects of the system can be captured. Whereas science theoretically analyses a single aspect of our experience, philosophy reflects upon the coherence among, and diversity exhibited by, distinct aspects of our experience, such as information (system), communication, organizational relationships and culture (Basden and Burke, 2004). While much of our understanding is theoretical and involves explicit conceptual structures, some understanding is intuitive, cultural, embodied in aspiration that attitude, much of which cannot be made fully explicit. Philosophers have called this type of understanding the life-world, or "pre-theoretical" or "naïve" or "everyday" experience (Basden, 2008, p. 9).

Life-world-oriented frameworks for understanding

A framework for understanding an area is a way of seeing the area. But that involves the actual (social) activity of practice and research within the area, the implicit understanding that functions within this, making some understanding explicit,

interpreting it conceptually, discussing the appropriateness of conceptual frameworks and proposing better conceptual frameworks (Basden, 2008, p. 11). In the area of IS in general and ERP system specifically, having multi-dimensional knowledge is inevitable. If we are to understand ERP as an organizational system with the help of a framework, then it must have such a capability to cope with the diversity of the everyday life in the organization. According to Basden (2008), theories and theoretical frameworks can provide insight into specific issues, but they should never be allowed to divert attention away from other important issues. So, in this section we briefly present some points of life-world-oriented philosophy according to three thinkers whose thoughts are known as life-world-oriented philosophy. Husserl (1859-1938), was preparing a new science of perception and of essences, he had to begin with a new conception of "being." Central to his program is that the openness to discovery of the essence of a thing requires that one ignore one's pre-existing biases about the world (Budd, 2005). He says: "we must go from the scientific fundamental concepts back to the contents of 'pure experience', we must radically set aside all presumptions of exact science, all its peculiar conceptual superstructures – in other words, we must consider the world as if these sciences did not yet exist, the world precisely as life-world, just as it maintains its coherent existence in life throughout all its relativity, as it is constantly outlined in life in terms of validity" (quoted in Ferguson, 2001). Following Husserl's lead, thinkers such as Heidegger (1889-1976) and Dooyeweerd (1894-1977) have reflected upon the life-world and highlighted other characteristics (Basden, 2008). To Heidegger understanding (*Verstehen*) implies a "clear grasp" of a thing as a whole, but no necessary reference to any preceding process of thought. Understanding of being, however, tacit and deficient, is involved in all our everyday dealings with beings. According to Heidegger, we cannot escape from life and view it from outside, life speaks to itself in its own language, life is "self-sufficient." Life also "expresses" itself and possesses "significance," philosophy emerges from life. Every genuine philosophy is born from the distress of the fullness of life, not from an epistemological pseudo-problem or a basic question of ethics, I should let myself be carried along by the steam of life, joining in lived experience, we must "understand" life from within rather than focus on intentional experiences of "things," (Inwood, 1999). Dooyeweerd emphatically states the priority of everyday experience over against theoretical or scientific thought, he argues that theoretical analysis by its very nature is abstract and therefore limited in its scope, It can give insight and increase our understanding but it should never claim to reconstruct reality as it is given. Dooyeweerd distinguishes 15 mutually irreducible aspects of our temporal reality: numerical, spatial, movement, physical and chemical, organic life, psychical feeling, logical analysis or analytical, historical, linguistic, social, economic, aesthetic, juridical, moral and the aspect of faith. In spite of the way they are sometimes characterized they do not refer to the concrete "what" of phenomena but indicate "the different modes of the universal 'how' which determine the aspects of our theoretical view of reality." By this Dooyeweerd means that these 15 modes of being in principle can be found in all things or events we encounter in our world. (Geertsema, 2002). Dooyeweerd argued in depth that for 2,500 years theoretical thought has hidden the multi-faceted structure of reality and tended to reduce the diversity of spheres of meaning, a great diversity which can be seen in our everyday experience of things (and here of ERP system) (Basden, 2010). He believed that philosophy has fundamentally misunderstood the nature of everyday experience (Basden, 2008, p. 51). Since ERP system like another kinds of enterprise ISs is a socio-technical system that deals with diversity and

multiple disciplines, leveraging a multi aspectual framework enables us to assess ERP system as is understood by end-users in their everyday working life. Basden (2008) has enlisted 12 reasons why Dooyeweerd should be of interest when critiquing of formulating frameworks for understanding ISs. One reason based on which we select Dooyeweerd's framework is that Dooyeweerd emphasized meaning over being. Many of the issues faced in all areas of IS and also in management are issues of meaning (Basden, 2008, p. 59). The other reason is that Dooyeweerd's way of affirming the engagement and situatedness that Heidegger sought for, and yet allowing for critique of social structures helps us understand how IS may be situated in organizations and yet stimulate important changes (Basden, 2008, p. 59). So, Dooyeweerd's framework is a good choice through which we can evaluate ERP success according to the end-users understanding.

Dooyeweerd's framework for understanding ERP system

Dooyeweerd's framework is inherently inter-disciplinary and contains an intrinsic normativity (Basden and Burke, 2004). Also, Dooyeweerd's suite of aspects is attracting interest as an aid in analysis, discussion and research, partly because the aspects express the diversity and coherence of meaning and normativity that we experience in everyday reality.

Dooyeweerd's theory of aspects. Many thinkers have tried to produce sets of aspects as a natural response to the diversity experienced by human beings (Basden, 2010). A comparison between different sets of aspects has been made by Basden (2008). To Dooyeweerd, in our every day living we must function in all aspects in a balanced way because if we neglect an aspect then we take no account of its norms (or laws), and go against its norms. Usually aspects are not deliberately neglected; what happens is that one aspect is elevated in importance and this results in neglect of others. In the extreme, an aspect is absolutized (deified) and all others are reduced to it (Basden, 1999). According to Dooyeweerd who started, not from the "Being" of a thing, but from its "Meaning," we start from the meaning of ERP system as is revealed to the end-users who are working within the organization. Dooyeweerd proposed that there are distinct types of meaning, as expressed by aspects that he identified to be (Basden and Burke, 2004):

- quantitative meaning aspect, of amount;
- spatial meaning aspect, of continuous extension;
- kinematic meaning aspect, of flowing movement;
- physical meaning aspect, of energy and mass;
- biotic meaning aspect, of life functions;
- psychic meaning aspect, of sense, feeling and emotion;
- analytical meaning aspect, of distinction, clarity and logic;
- formative meaning aspect, of history, creativity, achievement and technology;
- lingual meaning aspect, of symbolic meaning and communication;
- social meaning aspect, of social interaction, relationships and institutions;
- economic meaning aspect, of frugality, skilled use of limited resources;
- aesthetic meaning aspect, of harmony, surprise and fun;
- juridical meaning aspect, of "what is due," rights, responsibilities;

- ethical meaning aspect, of self-giving love, generosity; and
- pistic meaning aspect, of faith (or belief), commitment and vision.

The apparent simplicity that the kernel meaning of each aspect in such a list implies is misleading. Within the sphere of meaning of each aspect is a whole constellation of meaningful concepts that are objects, relationships, properties, events, processes, goals, constraints, freedoms, norms and the like. The expression of the kernels above is not precise – it never can be because of the fundamental limitations of language – but rather indicates something near the center of the constellation (Basden and Wood-Harper, 2006). These aspects have some characteristics such as transcendence (according to which the aspects pertain, across all situations, all cultures, all times whether we acknowledge or understand them or not), irreducibility (according to which, aspects are irreducibly distinct in respect of their meaning), harmony, non-absoluteness, anticipation and retrocipation, inter-aspect dependency, inter-aspect analogy, inter-aspect “reaching out,” aspectual normativity and grasped by intuition (Basden, 2008; Basden and Wood-Harper, 2006; Basden and Burke, 2004).

Aspectual normativity. Each aspect has a set of laws or norms that meaningfully govern all activity and existence (Doing and Being) (Basden, 2010). To Dooyeweerd the aspects contain an intrinsic normativity that pertains whatever perspective the stakeholders take (Basden and Wood-Harper, 2006). The earlier aspects (especially quantitative to physical) are determinative while the later aspects (especially from the analytical aspects onwards) allow some freedom (Basden, 2008; Basden and Wood-Harper, 2006). Some hold that normativity begins with the analytical aspect, while others, who employ them in business analysis, suggest a general increase in normativity along the aspects (Basden, 2008, p. 73). Types of repercussion are different for each aspect, and since the aspects are irreducible to each other, the repercussions are to some extent independent of each other (Basden and Burke, 2004). In general, beneficial or positive repercussions come from functioning in line with the laws of aspects and negative repercussions come from going against the laws of aspects. Each aspect yields a distinct type of good and evil, such as (Basden, 2008, p. 78):

- biotic aspect: vitality, health vs disease, threat to life;
- psychic aspect: sensitivity vs sensory overload or deprivation;
- analytical aspects: clarity and awareness vs confusion, illogicality;
- formative aspect: forming, creating, achieving vs destroying;
- lingual aspect: conveying truth, understanding vs deceit and misunderstanding;
- social aspect: friendship, respect vs enmity, disrespect;
- economic aspect: care, frugality vs waste, squandering resources;
- aesthetic aspects: harmony, fun vs disharmony, boredom;
- juridical aspect: justice, giving due vs injustice, denial of what is due;
- ethical aspect: generosity, giving, sacrifice, hospitality vs selfishness, taking advantage of others, competition; and
- pistic aspect: loyalty, trust, orientation to true God vs disloyalty, cowardice, idolatry.

Dooyeweerd stressed that the aspects cannot be separated in temporal reality and all work together. Human activities exhibit all aspects (multi-aspectual human

functioning) and if we function in line with the laws of all aspects a rich multi-aspectual well-being arises, a kind of good known as shalom (*salaam*). According to shalom principle if we function well in every aspect then things will go well, but if we function poorly in any aspect, then our success will be jeopardized (Basden, 2008, p. 105).

Multi-aspectual human functioning. Human activity in everyday living is usually multi-aspectual, in that it embraces all aspects, each of which is important in principle (Basden and Burke, 2004). Multi-aspectual human functioning means that human behavior involves functioning in a variety of aspects (usually all of them). Aspectual functioning does not refer to different parts of such behavior, but to different ways in which it occurs meaningfully (Basden, 2008, p. 102). Multi aspectual functioning is not just a bundle of aspectual functionings; there is a coherence of meaning in it, made possible by the inter-aspect relationships and the inter aspect harmony. It is not only richer than a uni-aspectual viewed functioning such as those offered by psychology, linguistics or economics, but also more “true,” in that everything is interconnected, and the meaning of every aspect of our functioning, cannot be discerned properly without reference to all the other aspects. This multi-aspectual richness of meaning is important in understanding everyday life, and this includes especially human use of computers and IS development (Basden, 2008, p. 102) and here ERP systems. Basden (2008) believes that Dooyeweerd invites us to see use of computers and IS as multi aspectual human functioning. Basden argues that many existing frameworks for understanding computer and IS use elevate a single aspect thereof and largely ignore the others. But he believes that in a dooyeweerdian understanding of human use of computers and IS, all aspects are given due recognition and respect, yielding a framework that enables us to address the diversity that can be seen in human use of computers and IS when viewed from a life-world perspective (Basden, 2008, p. 127). There are at least three multi-aspectual human functionings may be distinguished that together constitute human use of computers and IS (Basden, 2008, p. 130):

- (1) *human-computer interaction (HCI)*: what the users experience of the interaction between the user and computer;
- (2) *engaging with represented content (ERC)*: what the users experience of the meaning that is represented in the IS: that is of the content of the model; and
- (3) *human living with computers (HLC)*: what the users experience when employing the computer in everyday living – aspects of living that might somehow be affected by, or affect , the use of the computer beneficially or determinantly.

Since, end users understanding of ERP system is influenced by what they experience during their every day dealing with the system, then, we choose to take HLC as our focal point in order to extract meaningful aspects from a life-world perspective.

Normativity in HLC. The shalom principle urges us to seek positive (good) function in every aspect, and promises that if we do then “good” repercussions or norm are likely to ensure. Here, according to Basden (2008), we can take these “good” norms as a base for judging the “success” of ERP system. Also, general norms of HLC have been suggested (Basden, 2008, p. 150):

- the objectivist norm of meeting objectives;
- the subjectivist norm of user satisfaction; and
- the criticalist norm of emancipation.

The objectives, satisfaction and emancipation may be understood by reference to the intrinsic normativity of aspects and the shalom principle. The aspects, because they are spheres of norms, can guide the setting of objectives that are appropriate, they can define "satisfaction" in terms of mixed aspectual diversity and then can define the "evils" (or negative norms) from which we seek to be emancipated (Basden, 2008, p. 151).

Important aspects. Dooyeweerd proposed that each type of entity (or activity) exhibits a different profile of aspects, in which each aspect has a different degree and type of importance; he called this a structure of individuality. But in such a profile, certain aspects are more important than others. He identified a number of ways in which aspects may be important, of which we mention the following (Basden and Wood-Harper, 2006):

- the qualifying aspect (or qualifying function) of an entity is the aspect in which this general type of entity is always meaningful – for example, the qualifying aspect of a poem is the aesthetic; and
- the subjective aspects are those that are particularly important for an individual – for example, a book might be used as a door-stop (physical aspect).

Dooyeweerd argued that when seeking to differentiate one type of thing from another on anything other than a subjective basis, it is often helpful to identify the important aspect, because this indicates the main meaning of the thing in the sense of its purpose or destination, to which all its other aspects contribute. Each of the three multi-aspectual functioning (HCI, ERC and HLC) is led by different important aspects (Basden, 2008, pp. 132-3). The assignment of a qualifying aspect to a thing is not given a priori, but must be chosen by a process of reflection on the thing as it presents itself to us in its everyday (pre-theoretical, naïve) life-world context (Basden, 2008, p. 135). In this paper, based on a deep case study, we try to identify important aspects related to ERP system. To do so, we first identify all meaningful aspects and their norms and then, according to the frequency of each aspect referred by participants, the important aspects are identified. Both phases including identification of meaningful aspects and determining important aspects are done through an interpretive text analysis.

Method and case description

Research method

In this paper, the authors are to come to an understanding of ERP system from the end-users point of view. To do so, a qualitative case study based on interpretive research seems to be appropriate. Interpretive research does not seek to pre-define dependent and independent variables, but concentrates on the complexity of human understanding (Kaplan and Maxwell, 1994); this research method seeks to understand ERP system as a phenomenon through the meanings that employees (or end-users) assign to it (Boland, 1991; Deetz, 1996). The main purpose of interpretive method of research in IS (and here, ERP system) is to produce an understanding of the context of the IS, and the process by which the IS influences and is influenced by the context (Klein and Myers, 1999). This study is based on in-depth interviews. All interviewees answered to questions through about 17 face-to-face interviews. The interview protocol including questions is adapted from Lee *et al.* (2007) (see Appendix for interview protocol). Each interview lasted 90-120 minutes. All interviews were

recorded with the permission of the interviewees and transcribed. The format of the interviews was semi-structured; prepared questions were asked and answered in an open-ended manner. In this research in order to analyze textual data, we do not focus on “words” or “phrases” separately but on each sentence or utterance as a whole. However, understanding the meaning of a whole sentence depends on the meaning of each word and the meaning of each word depends on the meaning of the whole. As Gadamer (1900-2002), a well-known thinker in interpretive philosophy, has said: “[...] the movement of understanding is constantly from the whole to the part and back to the whole. Our task is to extend in concentric circles the unity of the understood meaning. The harmony of all the details with the whole is the criterion of correct understanding. The failure to achieve this harmony means that understanding has failed” (Gadamer, 1976b, p. 117, quoted in Klein and Myers, 1999).

So, through an interpretive text analysis, the results are extracted. During data analysis, for each interviewee, we read each sentence he/she has said and try to assign one or more aspects to it according to its meaning. Also, for each assigned aspect, positive or negative norms are attributed. On the other hand, each sentence according to its aspectual meaning may include positive or negative norms. For example, when one participant (Participant #16) says: “I think that the ERP system has been implemented to engage all departments with each other in order to increase data integration throughout the organization,” we assign the analytical aspect to this sentence. Furthermore, this sentence includes a positive norm. So, as we mentioned earlier (p. 8, Aspectual normativity), the analytical aspect includes awareness and clarity as positive norms.

Case description

IRANCO (a pseudonym) is an Iranian leading company which was founded in 1999 and intends to produce required auxiliaries for simple and combined cycled power. Moreover, the company serves after sales services for its all products. IRANCO sells its products to governmental and private investors in the field power generation, oil and gas, and petrochemical industries. In 2006, the company decided to adopt and utilize the SAP R/3 4.7 solution offered for the engineering, construction and operations industry. SAP solution is the market leader in its industry and is highly configurable for flexible “vanilla” implementation. The project “kick-off” was at August 2006 and the system “go-live” was at September 2007 (so, the whole project duration was 16 months).

IRANCO has started to use SAP R/3 since almost four years ago and now, the system has almost 500 end-users and acts as an integral part of doing all business processes throughout the organization. In the words of one of the interviewees (Participant #6): “Sometimes, I think that without SAP, I am not able to do my job properly.”

Participants profile

The number of participants, SAP modules with which they are dealing and their working experience in IRANCO are shown in Table I. It is worth noting that the average working experience of participants is almost 6.2 years.

Results

Aspects ranking

Table II shows the frequency of each aspect to which participants have mentioned or referred (aspects indicated by the first letter of their name, from P = psychic to

Table I.
Participants profile

Number	Participant ID	SAP module(s)	Short name	Years of experience
1	PA	Finance, controlling	FI, CO	8
2	PB	Project system	PS	5
3	PC	Logistics execution	LE	6
4	PD	Warehouse management	WM	5
5	PE	Quality management, production planning	QM, PP	8
6	PF	Shop floor	SF	8
7	PG	Inventory management	IM	3
8	PH	Finance, controlling	FI, CO	10
9	PI	Material requirement planning	MRP	5
10	PJ	Finance, controlling	FI, CO	7
11	PK	Purchasing	PU	7
12	PL	Shop floor	SF	7
13	PM	Purchasing	PU	4
14	PN	Finance	FI	5
15	PO	Finance	FI	8
16	PP	Finance	FI	4
17	PQ	Purchasing	PU	4

Table II.
Aspect frequency

Number	Participants	Aspect frequency									
		P	A	F	L	S	E	A	J	E	P
1	PA	3	12	9	3	7	13	1	1	1	10
2	PB	2	5	5			3	2	2		9
3	PC	2	21	13	2	4	10	2	4	1	16
4	PD		8	7			12		1	1	9
5	PE	1	6	11		2	7		1		8
6	PF	1	8	10	1		8	1	1		5
7	PG		8	12	1	2	8		1		13
8	PH		6	18			8				3
9	PI		7	3		1	2				7
10	PJ		7	8			1	3			6
11	PK		4	4			2	2			5
12	PL		13	9	2	2	8				5
13	PM		6	2			6	2			4
14	PN		9	4			3	5		1	9
15	PO		6	5			2	3			9
16	PP		7	4	1	1	4				4
17	PQ		3	9			1	9			4
No. of participants (frequency)		5(9)	17(136)	17(133)	6(10)	12(28)	16(121)	5(8)	8(12)	3(3)	17(126)
Weighted score		45	2,312	2,261	60	336	1,936	40	96	9	2,142
Rank (importance)		8	1	2	7	5	4	9	6	10	3

P = pistic). By computing weighted score for each aspect, we can rank all aspects. So, this ranking is based on the degree of importance of each aspect from the participants point of view.

Additionally, using SPSS 19, Friedman test is executed in order to adjust the results of primal ranking. Table III shows all aspects and their ranks. As can be seen in

Aspect	Weighted score	Rank (importance)	Mean rank (Friedman test)	Adjusted rank
Analytic	2,312	1	9.50	1
Formative	2,261	2	7.50	4
Pistic	2,142	3	8.50	2
Economic	1,936	4	8.50	3
Social	336	5	3.75	6
Juridical	96	6	3.75	7
Lingual	60	7	5.75	5
Psychic	45	8	2.50	9
Aesthetic	40	9	3.75	8
Ethical	9	10	1.50	10

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Table III.
Aspects rank (importance)

Table III. analytical, formative, pistic and economic aspects are, respectively, of most importance and if we consider adjusted ranks, pistic and economic aspects become of more important than formative aspect.

Aspects normativity

Based on textual data, we can interpretively extract positive or negative norms for each aspect to which each participant has referred.

As examples for positive norms, one participant said (Participant #16): "I think that the ERP system has been implemented to engage all departments with each other in order to increase data integration throughout the organization" (analytical aspect/awareness(+)). And another participant pointed out that (Participant #7): "By using SAP, production planning is possible and we can efficiently schedule required materials and prevent production breaks" (formative aspect/achieving(+)). A participant also said that (Participant #1): "I think that domestic developers have no such an ability to develop a reliable and suitable ERP system, so we are happy with our German solution (SAP R/3)" (pistic aspect/belief(+)). Other participant indicated that (Participant #12): "Before SAP implementation, we had to calculate added values manually but now this is done automatically while production process is in progress" (economic aspect/frugality and care(+)).

Also, as examples for negative norms, one participant said that (Participant #11): "I think that my excel files were so powerful and could be exploited more efficiently but by using SAP, I had to truncate most of them" (pistic aspect/disbelief(-)). Additionally, another participant indicated that (Participant #5): "In the early stages of ERP system, I had no enough knowledge about ERP" (analytical aspect/confusion(-)). Also, another participant said (Participant #2): "I think that there is a kind of inflexibility imposed by using the system" (aesthetic aspect/boredom(-)). One participant pointed that (Participant #3): "In the early stages of ERP implementation, there was some conflicts between different individuals" (lingual aspect/misunderstanding(-)). And other participant said that (Participant #5): "In the early stages of ERP implementation, some individuals were worried about their jobs and positions" (psychic aspect/deprivation(-)).

In Table IV the frequencies of positive and negative norms for each aspect are presented.

Important aspects

In this section the important aspects (qualifying and subjective aspects) of HLC in ERP system are presented. Table V shows the qualifying aspects of HLC in ERP system.

Table IV.
Positive and negative norms for each aspect

Aspect	Positive norms	Frequency(+)	Negative norms	Frequency(-)
Psychic	Sensitivity	3	Deprivation	-6
Analytic	Clarity – awareness	141	Confusion	-9
Formative	Achieving – forming	148	Un-achieving	-4
Lingual	Understanding – expression	3	Misunderstanding	-7
Social	Friendship – respect	25	Enmity	-3
Economic	Frugality – care	102	Waste	-4
Aesthetic	Harmony	1	Disharmony – boredom	-8
Juridical	Due – justice	9	Injustice	-3
Ethical	Generosity	2	Selfishness	-1
Pistic	Belief – loyalty	79	Disbelief	-38

Table V.
Qualifying aspects of HLC in ERP system

Qualifying aspects	Weighted score	Mean rank (Friedman test)	Adjusted rank
Analytic	2,312	9.50	1
Pistic	2,142	8.50	2
Economic	1,936	8.50	3
Formative	2,261	7.50	4

Table VI shows the subjective aspects of HLC in ERP system according to the most important (most referred) aspects for each participant.

General norms

In this section, in order to evaluate ERP success, we examine the HLC normativity related to the system implemented in IRANCO. As previously has been mentioned, general norms of HLC are: the objectivist norm of meeting objectives, the subjectivist norm of user satisfaction and the criticalist norm of emancipation.

Table VI.
Subjective aspects of HLC in ERP system

Number	Participants	Subjective aspect(s)	Frequency (%)
1	PA	Economic, analytic and pistic	66
2	PB	Pistic	32
3	PC	Analytic and pistic	51
4	PD	Economic and pistic	55
5	PE	Formative and pistic	52
6	PF	Formative, economic and analytic	74
7	PG	Pistic and formative	55
8	PH	Formative	51
9	PI	Analytic and pistic	70
10	PJ	Formative, analytic and pistic	60
11	PK	Pistic, analytic and formative	76
12	PL	Analytic, formativeand economic	77
13	PM	Analytic and economic	60
14	PN	Analytic and pistic	58
15	PO	Pistic and analytic	60
16	PP	Analytic	33
17	PQ	Formative and economic	69

Meeting objectives. For each aspect we can set one or more objectives. These objectives come from the intrinsic normativity of aspects. For important aspects which include more positive norms than negative norms, we can say that pre-defined objectives are achieved and for other aspects, more plans and efforts are required. Table VII shows the aspects, their pre-defined objectives and the status of realization for each objective.

Since these objectives have intrinsic relationship with the positive norms of each aspect, then if the positive norms of each aspect are dominant then we can expect the objective of that aspect to be realized. So, as can be seen in Table VII, the objectives of four important aspects (analytic, pistic, economic and formative) which include significant positive norms (see Figure 1), are realized.

User satisfaction. As previously mentioned, we can define “satisfaction” in terms of mixed aspectual diversity. Figure 2 shows a radar diagram representing all aspects by their ranks. As can be seen in this diagram, four aspects (analytical, pistic, economic and formative) are of most important while the importance of the other aspects are almost negligible.

So, in order to increase mixed aspectual diversity, IRANCO has to concentrate on the other aspects which are not important from the end user’s point of view. Aspects such as social, juridical, lingual, psychic, aesthetic and ethical are profoundly normative and could have significant effects of user satisfaction.

Emancipation. Positive norms represent the “good” and negative norms represent the “evils.” We can define the “evils” from which we seek emancipation and the “good” we seek to be emancipated to. So, if we have the positive and negative norms for each aspect, then a roadmap can be drawn in order to reduce the negative norms and foster the positive norms throughout the organization. Figure 3, which is extracted from Table IV, shows all aspects with both positive and negative norms but in different levels.

As can be seen in Figure 3, formative, analytical, economic and pistic aspects include, respectively, greatest positive norms or repercussions. While, the pistic aspect has the greatest negative norms or repercussions and after that analytical, aesthetic, lingual and psychic aspects can be mentioned.

Aspect	Rank (importance)	Objective	Status of the objective
Psychic	9	Interactive engagement with the world (system and people)	Not realized
Analytic	1	Ability to think independently	Realized
Formative	4	Achievement and innovation	Realized
Lingual	5	Externalisation of one’s intended meaning.	Not realized
Social	6	Company, that is togetherness, respect and courtesy	Not realized
Economic	3	Sustainable viability/prosperity	Realized
Aesthetic	8	Generating something harmonious, interesting and enjoyable	Not realized
Juridical	7	Appropriateness, due and responsibility	Not realized
Ethical	10	Permeating the organization with extra goodness, beyond the imperative of due, and permeating social environment with a generous attitude	Not realized
Pistic	2	Courage, loyalty, hope, meaningfulness and openness to the divine at all levels	Realized

Table VII.
The status of the
objectives for each aspect

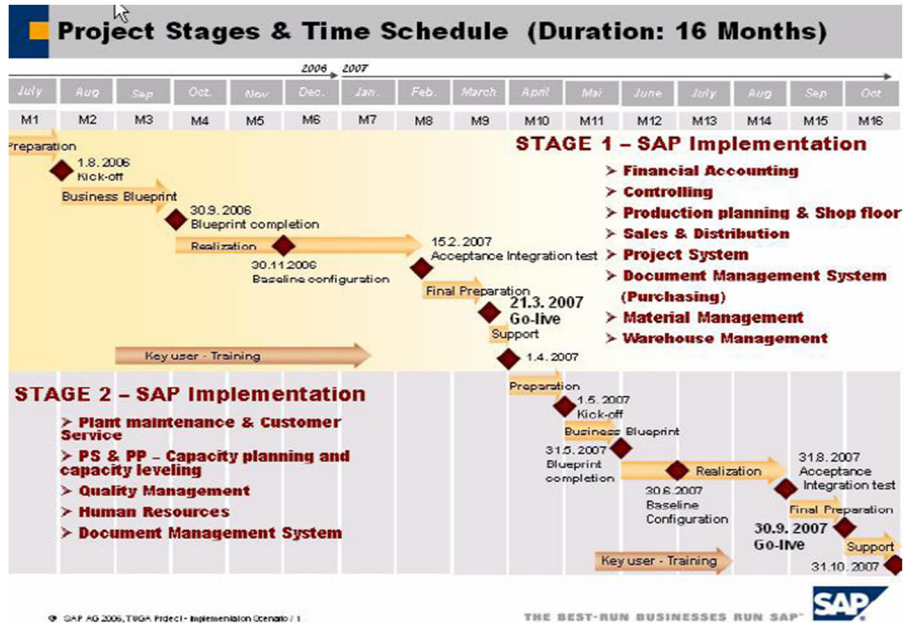


Figure 1. SAP implementation stages and time schedule in TUGA

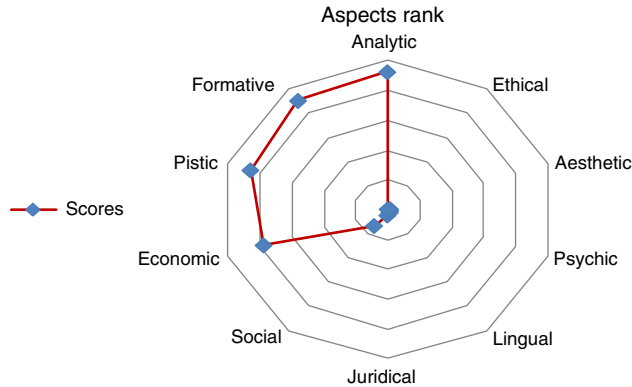


Figure 2. Radar diagram of aspects rank (importance)

Discussion

In this study, based on end users life-world understanding, a multi-aspectual framework is derived from philosophical work of Herman Dooyeweerd according to which ERP success is evaluated. This multi-aspectual framework includes three general norms which are meeting objectives, user satisfaction and emancipation. These norms are extracted based on shalom principle and in fact are success criteria through which end users understanding of ERP system is evaluated and criticized.

Meeting objectives. Previous studies focussed on quantitative and tangible objectives as metrics of ERP success. For example Davenport (1998) and Umble *et al.* (2003) considered potential benefits such as personnel reductions, a decrease in the cost of information technology, better inventory control, an identifiable level of ROI,

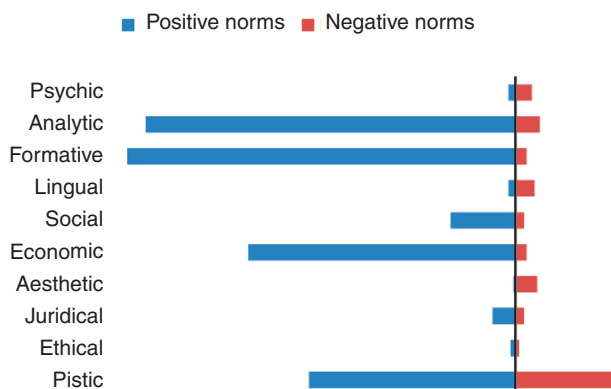


Figure 3.
Positive and negative
norms for each aspect

and/or an improvement in order and cash management. Another study centered on decision making and control, and efficiency and profitability (Saarinen, 1996). Also, in their studies, Esteves (2009) and Kamhawi (2008) emphasized on operational, managerial and IT-infrastructure benefits. Furthermore, some studies focussed on organizational performance and the financial return on investment in ERP (Ifinedo, 2007; Sedera and Gable, 2004). All these studies have concentrated on economic, formative and analytic aspects (in Dooyeweerd's language) and the other aspects are completely ignored. On the contrary, in this study, as can be seen in Table VII, specific objectives are set for each aspect separately and their realization status is examined according to the rank or importance gained by each aspect.

User satisfaction. Wu *et al.* (2002) argue that besides measuring ERP impact directly from cost and benefits, user satisfaction is a surrogate measure of ISs success. The others have noted that user satisfaction is one of the key factors affecting the management ISs' success (Powers and Dickson, 1973; Holsapple *et al.*, 2005). In addition, according to Nolan and Seward (1974), user satisfaction is feasible and practical to be used as a tool for evaluating ISs success. Zafar *et al.* (2006) argue that successful ERP implementation measurement should be evaluated based on user acceptance in terms of satisfaction. All these studies are conducted based on quantitative research designs in which standard instruments or models are used and as Holsapple *et al.* (2005) imply, user satisfaction is considered as a surrogate measure through which the economic aspect (productivity) can be assured. According to multi-aspectual understanding, user satisfaction is assured only when all aspects are of equal importance (not only the economic aspect) and there are a kind of harmony among them. In this research, user satisfaction acts as a self-sufficient norm (or measure) while for some researchers (Holsapple *et al.*, 2005), user satisfaction is an indirect measure and is used when direct measures are found to be impossible or difficult to recognize or convert to monetary equivalent (Galetta and Lederer, 1989; Ives *et al.*, 1983).

Emancipation. In looking for an alternative approach to ISs research a number of authors have been inspired by critical social theory (CST) and in particular to the work of Jurgen Habermas (Lyytinen and Klein, 1985; Hirschheim and Klein, 1989; Klein and Hirschheim, 1991; Lyytinen, 1992; Hirschheim and Klein, 1994; Hirschheim *et al.*, 1996; Cecez-Kecmanovic, 1994; Janson *et al.*, 1997; Ngwnyama and Lee, 1997; Myers and Young, 1997; Ngwnyama, 1998). Hirschheim and Klein (1989) believe that the

paradigm in which emancipation plays the most significant role and which has theoretically addressed the barriers to achieving emancipation is neohumanism (which includes emancipator ideals with reference to their philosophical foundation). They also argue that in recent times, the most prominent example of a theory that builds on the assumptions of neohumanism has been the CST of Jurgen Habermas (1984, 1987).

The theory of communication that Habermas develops draws on the idea of George Herbert Mead and others that personal identity – our experience of ourselves as a self – is inter-subjectively constructed through symbolic interaction, that is, communication (Harvey and Goodman, 2001). Habermas (1984) treats the whole of life as “text” (lingual aspect). He follows Husserl’s mistake of confusing signified intentional meaning (meaning – content of symbols in discourse involving speech, writing, graphics, gestures, etc.) with aspectual meaning (Basden, 2008, pp. 52-3). Habermas’s emphasizing on lingual aspect seems to have the tendency to reduce the other aspects to the lingual. But according to irreducibility as a main characteristic of aspects, aspects are irreducibly distinct in respect of their meaning, for example, the social aspect cannot be reduced to the lingual because the lingual does not care whether information flow brings togetherness or conflict. While the strength of the link between lingual and social seems to tempt theoreticians like Habermas to reduce one to the other.

In multi-aspectual framework the idea of emancipation or redemption is rooted in Dooyeweerd’s philosophical ground motive according to which the Divine is personal and good, and so all reality is intrinsically good, and may be enjoyed (Basden, 2008, pp. 39-40). So, since all aspects may include both positive norms (good) and negative ones (evil) then emancipation is realized when all negative norms for each aspect are reduced and positive norms are pursued and realized for all aspects simultaneously.

So, emancipation as a general norm for evaluating ERP success urges us to consider negative norms as evil and put effort to get rid of them. As can be seen in Figure 3, almost all aspect include some portion of negative norms but pistic aspect includes most negative norms and after that analytical, psychic, aesthetic and lingual aspects include more negative norms than the others. Table VIII shows a summarized comparison between current study and previous studies.

Conclusions

In this research, we applied a multi-aspectual framework based on end-user’s understanding in for evaluating ERP success. Such evaluation is conducted according to three general norms which are meeting objectives, user satisfaction and emancipation. Following results are derived from data analysis.

Meeting objectives: as can be seen in Table VII, for important (or qualifying) aspects including analytic, pistic, economic and formative, pre-defined objectives are realized. Actually when according to end-user’s understanding, an aspect becomes important and simultaneously includes strong positive norms, then its pre-defined objective(s) are expected to be realized. Here, in case of IRANCO, the objectives of non-important aspects including psychic, lingual, social, aesthetic, juridical and ethical, are not realized.

User satisfaction: users are satisfied when all aspects are equally important in a balanced manner and also all important aspects include strong positive norms. As can be seen in Figure 3, only four aspects including analytic, economic, formative and pistic are important and there is no a kind of balance between all aspects which indicate that user satisfaction is not completely realized in IRANCO.

Studies	Quantitative metrics	User's point of view	Meeting objectives	User satisfaction	Emancipation	Multi-aspectual view
Saarinen (1996), Davenport (1998), Markus and Tanis (2000), Umble <i>et al.</i> (2003), Sedera and Gable (2004), Ifmedo (2007), Zafar <i>et al.</i> (2006), Kamhawi (2008), Wang <i>et al.</i> (2008), Esteves (2009), Zhu <i>et al.</i> (2010)	✓ ✓	✓	✓			
Wu and Wang (2007), Chang <i>et al.</i> (2008)	✓					
Wu <i>et al.</i> (2002), Powers and Dickson (1973), Holsapple <i>et al.</i> (2005), Nolan and Seward (1974), Zafar <i>et al.</i> (2006), Holsapple <i>et al.</i> (2005)	✓			✓		
Lyytinen and Klein (1985), Hirschheim and Klein (1989), Klein and Hirschheim (1991), Lyytinen (1992), Hirschheim and Klein (1994), Hirschheim <i>et al.</i> (1996), Cecez-Kecmanovic (1994), Janson <i>et al.</i> (1997), Ngwinyama and Lee (1997), Myers and Young (1997), Myers and Young (1997), Ngwinyama (1998)		✓ ✓ ✓	✓		✓	
Lee <i>et al.</i> (2007)				✓		
Current study					✓	✓

Table VIII.
Comparison between current study and previous studies

Emancipation: according to the results (see Figure 3) all aspects include some degree of both positive (good) and negative norms (evil). According to the idea of emancipation, the negative norms must be reduced and also the positive norms must be increased. As can be seen in Figure 3, only the important aspects include strong positive norms while for the other aspects both negative and positive norms are almost equal. Pistic aspect as an important aspect also includes a considerable degree of negative norm. Social aspect which is not considered as an important aspect but includes strong positive norms. According to the results, all aspects include negative norms from which they have to be emancipated.

Managerial implications

According to multi-aspectual framework, ERP is considered as a successful system when pre-defined objectives for all aspects are realized simultaneously. So, management team has to concentrate not only on economic and formative objectives but also on the other aspectual objectives which are more qualitative and intangible. Each aspectual objective requires its own specific methods and data to be measured. So, management team must provide supportive conditions so that multiple measurement systems are allowed to be implemented.

According to multi-aspectual framework, ERP is considered as a successful system when end-users understand the system in a multi-aspectual manner in which positive norms are strong. If one or more aspects are ignored or some aspects include strong negative norms then user satisfaction is not expected to be realized. So, in case of IRANCO, through new long-term plans, budgets and training courses, the ignored (non-important) aspects including psychic, lingual, social, aesthetic, juridical and ethical have to be more focussed in order to make them more visible throughout the organization. This may lead to realize user satisfaction and finally ERP success.

According to multi-aspectual framework, ERP is considered as a successful system when multi-aspectual understanding of the system is emancipated from negative norms and tends to be enriched with positive norms as much as possible. In case of IRANCO, the pistic aspect, compared to other aspects, includes strongest negative norms. This fact urges management team to put some efforts in order to eliminate these negative norms as soon as possible because an important aspect like pistic which potentially have strong effects on the other aspects can be harmful for ERP success if its negative norms like disbelief and disloyalty remain strong. Also, the other important aspects (economic, formative and analytic aspects) include some degree of negative norms which can be harmful if become stronger. In order to increase the positive norms for all aspects some programs such as periodical workshops and training courses seems to be helpful. In addition, adopting reward and incentive mechanisms can be a complementary action for improving positive norms.

References

- Al-Mashari, M. (2002), "Enterprise resource planning (ERP) systems: a research agenda", *Industrial Management and Data Systems*, Vol. 103 No. 1, pp. 165-70.
- Al-Mashari, M., Al-Mudimigh, A. and Zairi, M. (2003), "Enterprise resource planning: a taxonomy of critical factors", *European Journal of Operational Research*, Vol. 146 No. 2, pp. 352-64.
- Basden, A. (1999), "Engines of dialectic", *Philosophia Reformata*, Vol. 64 No. 1, pp. 15-36.

- Basden, A. (2008), *Philosophical Frameworks for Understanding Information Systems*, IGI Global, Hershey, PA.
- Basden, A. (2010), "On using spheres of meaning to define and dignify the IS discipline", *International Journal of Information Management*, Vol. 30 No. 1, pp. 13-20.
- Basden, A. and Burke, M. (2004), "Towards a philosophical understanding of documentation: a Dooyeweerdian framework", *Journal of Documentation*, Vol. 60 No. 4, pp. 352-70.
- Basden, A. and Wood-Harper, V.T. (2006), "A philosophical discussion of the root definition in soft systems thinking: an enrichment of CATWOE", *Systems Research and Behavioral Science Syst. Res*, Vol. 23 No. 1, pp. 61-87.
- Boland, R.J. Jr (1991), "Information system use as a hermeneutic process", in Nissen, H.E., Klein, H.K. and Hirschheim, R.A. (Eds), *Information Systems Research: Contemporary Approaches and Emergent Traditions*, North-Holland, Amsterdam, pp. 439-64.
- Budd, J.M. (2005), "Phenomenology and information studies", *Journal of Documentation*, Vol. 61 No. 1, pp. 44-59.
- Capaldo, G. and Rippa, P. (2009), "A planned-oriented approach for EPR implementation strategy selection", *Journal of Enterprise Information Management*, Vol. 22 No. 6, pp. 642-59.
- Cecez-Kecmanovic, D. (1994), "Business process redesign as the reconstruction of a communicative space", in Glasson, B.C., Hawryszkiewicz, I., Underwood, B.A. and Weber, R.A. (Eds), *Business Process Re-Engineering: Information Systems Opportunities and Challenges*, IFIP, North-Holland, pp. 181-90.
- Chang, M.K., Cheung, W., Cheng, C.H. and Yeung, J. (2008), "Understanding ERP system adoption from the user's perspective", *International Journal Production Economics*, Vol. 113 No. 2, pp. 928-42.
- Chou, S.W. and Chang, Y.C. (2008), "The implementation factors that influence the ERP (enterprise resource planning) benefits", *Decision Support Systems*, Vol. 46 No. 1, pp. 149-57.
- Chung, S.H. and Snyder, C.A. (2000), "ERP adoption: a technological evolution approach", *International Journal of Agile Management Systems*, Vol. 2 No. 1, pp. 24-32.
- Davenport, T. and Brooks, J. (2004), "Enterprise systems and the supply chain", *Journal of Enterprise Information Management*, Vol. 17 No. 1, pp. 8-19.
- Davenport, T.H. (1998), "Putting the enterprise into the enterprise system", *Harvard Business Review*, Vol. 76 No. 4, pp. 121-31.
- Deetz, S. (1996), "Describing differences in approaches to organization science: rethinking Burrell and Morgan and their legacy", *Organization Science*, Vol. 7 No. 2, pp. 191-207.
- Dezdar, S. and Suliman, A. (2009), "Successful enterprise resource planning implementation: taxonomy of critical factors", *Industrial Management and Data Systems*, Vol. 109 No. 8, pp. 1037-52.
- Esteves, J. (2009), "A benefits realisation road-map framework for ERP usage in small and medium-sized enterprises", *Journal of Enterprise Information Management*, Vol. 22 Nos 1/2, 25-35.
- Ferguson, H. (2001), "Phenomenology and social theory", in Ritzer, G. and Smart, B. (Eds), *Handbook of Social Theory*, Sage publications Inc, Thousand Oaks, CA, pp. 232-48.
- Gadamer, H.G. (1976b), "The historicity of understanding", in Connerton, P. (Ed.), *Critical Sociology Selected Readings*, Penguin Books Ltd, Harmondsworth, pp. 117-33.
- Galetta, D. and Lederer, A. (1989), "Some cautions on the measurement of user information satisfaction", *Decision Sciences*, Vol. 20 No. 3, pp. 419-38.
- Geertsema, H.G. (2002), "Which causality? Whose explanation?", *Philosophia Reformata*, Vol. 67 No. 2, pp. 173-85.

- Genoulaz, B.G.V., Millet, A.P. and Grabot, B. (2005), "Survey on the recent research literature on ERP systems", *Computers in Industry*, Vol. 56 No. 6, pp. 510-22.
- Habermas, J. (1984), *The Theory of Communicative Action – Reason and the Rationalisation of Society*, Vol. I, Beacon Press, Boston, MA.
- Habermas, J. (1987), *The Theory of Communicative Action – the Critique of Functionalist Reason*, Vol. II, Beacon Press, Boston, MA.
- Harvey, R.B. and Goodman, D. (2001), "Jurgen habermas' theory of communicative action: an incomplete project", in Ritzer, G. and Smart, B. (Eds), *Handbook of Social Theory*, Sage publications Inc, Thousand Oaks, CA, pp. 201-16.
- Helo, P., Anussornnitisarn, P. and Phusavat, K. (2008), "Expectation and reality in ERP implementation: consultant and solution provider perspective", *Industrial Management and Data Systems*, Vol. 108 No. 8, pp. 1045-59.
- Hirschheim, R., Klein, H. and Lyytinen, L. (1996), "Exploring the intellectual structures of information systems development: a social action theoretic analysis", *Accounting, Management and Information Technology*, Vol. 6 Nos 1/2, pp. 1-64.
- Hirschheim, R.A. and Klein, H.K. (1989), "Four paradigms of information systems development", *Communications of the ACM*, Vol. 32 No. 10, pp. 1199-216.
- Hirschheim, R.A. and Klein, H.K. (1994), "Realising emancipatory principles in information systems development: the case for ethics", *MIS Quarterly*, March, pp. 83-109.
- Holland, C.P. and Light, B. (1999), "A critical success factors model for ERP implementation", *IEEE Software*, Vol. 16 No. 3, pp. 30-6.
- Holsapple, C.W., Wang, Y.M. and Wu, J.H. (2005), "Empirically testing user characteristics and fitness factors in enterprise resource planning success", *International Journal of Human-Computer Interaction*, Vol. 19 No. 3, pp. 323-42.
- Hong, K.K. and Kim, Y.G. (2002), "The critical success factors for ERP implementation: an organizational fit perspective", *Information and Management*, Vol. 40 No. 1, pp. 25-40.
- Ifinedo, P. (2007), "Investigating the relationships among ERP systems success dimensions: a structural equation model", *Issues in Information Systems*, Vol. 8 No. 2, pp. 399-405.
- Inwood, M. (1999), *A Heidegger Dictionary*, Blackwell Publishers Ltd, Oxford.
- Ives, B., Olson, M.H. and Baroudi, J.L. (1983), "The measurement of user information satisfaction", *Communications of the ACM*, Vol. 26 No. 10, pp. 785-93.
- Janson, M., Brown, A.P. and Traillieu, T. (1997), "Colruyt: an organization committed to communication", *Information Systems Journal*, Vol. 7 No. 3, pp. 175-99.
- Kamhawi, E.M. (2008), "Enterprise resource-planning systems adoption in Bahrain: motives benefits and barriers", *Journal of Enterprise Information Management*, Vol. 21 No. 3, pp. 310-34.
- Kaplan, B. and Maxwell, J.A. (1994), "Qualitative research methods for evaluating computer information systems", in Anderson, J.G., Aydin, C.E. and Jay, S.J. (Eds), *Evaluating HealthCare Information Systems: Methods and Applications*, Sage, Thousand Oaks, CA, pp. 45-68.
- Klein, H. and Hirschheim, R. (1991), "Rationality concepts in information system development", *Accounting, Management and Information Technology*, Vol. 1 No. 2, pp. 157-87.
- Klein, H.K. and Myers, M.D. (1999), "A set of principles for conducting and evaluating interpretive field studies in information systems", *MIS Quarterly, Special Issue on Intensive Research*, Vol. 23 No. 1, pp. 67-93.
- Kræmmergaard, P. and Møller, C. (2000), "A research framework for studying the implementation of enterprise resource planning systems", *Proceedings of the 23rd Information Systems Research Seminar in Scandinavia, Lngatan*, pp. 139-62.

- Laukkanen, S., Sarpola, S. and Hallikainen, P. (2007), "Enterprise size matters: objectives and constraints of ERP adoption", *Journal of Enterprise Information Management*, Vol. 20 No. 3, pp. 319-34.
- Lee, J. (2001), "A grounded theory: integration and internalization in ERP adoption and use", PhD thesis, University of Nebraska, Lincoln, NE.
- Lee, S.M., Lee, Z. and Lee, J. (2007), "Knowledge transfer in work practice: adoption and use of integrated information systems", *Industrial Management and Data Systems*, Vol. 107 No. 4, pp. 501-18.
- Liang, H., Saraf, N., Hu, Q. and Xue, Y. (2007), "Assimilation of enterprise systems: the effect of institutional pressures and the mediating role of top management", *MIS Quarterly*, Vol. 31 No. 1, pp. 59-87.
- Lyytinen, K. (1992), "Information systems and critical theory", in Alvesson, M. and Willmott, H. (Eds), *Critical Management Studies*, SAGE, London, pp. 59-180.
- Lyytinen, K. and Klein, H. (1985), "The critical social theory of Jurgan Habermas as a basis for a theory of information systems", in Mumford, E., Hirschheim, R., Fitzgerald, G and Wood-Harper, A.T. (Eds), *Research Methods in Information Systems*, North-Holland, Amsterdam, pp. 219-36.
- McGinnis, T.C. and Huang, Z. (2007), "Rethinking ERP success: a new perspective from knowledge management and continuous improvement", *Information and Management*, Vol. 44 No. 7, pp. 626-34.
- Markus, M.L. and Tanis, C. (2000), "The enterprise system experience: from adoption to success", in Zmud, R.W. (Ed.), *Framing the Domains of IT management: Projecting the Failure thorough the Past*, Pinnaflex Education Resources, Cincinnati, OH, pp. 173-207.
- Marshall, D., De Burca, S. and Fynes, B. (2005), "Strategic technology adoption: extending ERP across the supply chain", *Journal of Enterprise Information Management*, Vol. 18 No. 4, pp. 427-40.
- Martin, M.H. (1998), "An ERP strategy", *Fortune*, February, pp. 95-7.
- Momoh, A., Roy, R. and Shehab, E. (2010), "Challenges in enterprise resource planning implementation: state of the art", *Business Process Management Journal*, Vol. 16 No. 4, pp. 537-65.
- Motwani, J., Mirchandani, D., Madan, M. and Gunasekaran, A. (2002), "Successful implementation of ERP projects: evidence from two case studies", *International Journal of Production Economics*, Vol. 75 Nos 1-2, pp. 83-96.
- Myers, M.D. and Young, L.W. (1997), "Hidden agendas, power and managerial assumptions in information systems development-an ethnographic study", *Information Technology and People*, Vol. 10 No. 3, pp. 224-40.
- Network News (2006), "IT spending to increase 6.3% in 2006, IDS says", 27 March, Network World, Vol. 23 No. 12, p. 8.
- Ngwnyama, O.K. (1998), "Groupware, social action and organizational emergence: on the process dynamics of computer mediated distributed work", *Accounting, Management and Information Technologies*, Vol. 8 No. 2, pp. 127-46.
- Ngwnyama, O.K. and Lee, A.S. (1997), "Communication richness in electronic mail: critical social theory and the contextuality of meaning", *MIS Quarterly*, Vol. 21 No. 2, pp. 145-67.
- Nolan, R.L. and Seward, H. (1974), "Measuring user satisfaction to evaluate information systems", in Nolan, R.L. (Ed.), *Managing the Data Resource Function*, West Publishing Co, Los Angeles, CA, pp. 253-75.
- Parry, G. and Graves, A. (2008), "The importance of knowledge management for ERP systems", *International Journal of Logistic Research and Application*, Vol. 11 No. 6, pp. 427-41.

- Plotkin, H. (March, 1999), "ERPs: how to make them work", Harvard Management Update, Business Source Premier.
- Powers, R.F. and Dickson, G.W. (1973), "MIS project management: myths, opinions and reality", *California Management Review*, Vol. 15 No. 3, pp. 147-56.
- Raymond, L. and Uwizeyemungu, S. (2007), "A profile of ERP adoption in manufacturing SMEs", *Journal of Enterprise Information Management*, Vol. 20 No. 4, pp. 487-502.
- Saarinen, T. (1996), "An expanded instrument for evaluating information system success", *Information and Management*, Vol. 31 No. 1, pp. 103-18.
- Sedera, D. and Gable, G. (2004), "A factor and structural equation analysis of the enterprise systems success measurement model", paper presented at the 25th International Conference on Information Systems, Washington, DC, December 12-15.
- Soja, P. (2006), "Success factors in ERP implementation: lessons from practice", *Journal of Enterprise Information Management*, Vol. 19 No. 4, pp. 418-43.
- Somers, T.M. and Nelson, K. (2001), "The impact of critical success factors across the stages of enterprise resource planning implementations", *Proceedings of International Conference on System Sciences, Hawaii, 2007*, pp. 1-10.
- Umble, E.J. and Umble, M.M. (2002), "Avoiding ERP implementation failure", *Industrial Management*, Vol. 44 No. 1, pp. 24-33.
- Umble, E.J., Haft, R.R. and Umble, M.M. (2003), "Enterprise resource planning: implementation procedures and critical success factors", *European Journal of Operational Research*, Vol. 146 No. 2, pp. 241-57.
- Upadhyay, P., Jahanyan, S. and Pranab, K.D. (2011), "Factors influencing ERP implementation in Indian manufacturing organizations: a study of micro, small and medium-scale enterprises", *Journal of Enterprise Information Management*, Vol. 24 No. 2, pp. 130-45.
- Vandaie, R. (2008), "The role of organizational knowledge management in successful ERP implementation projects", *Knowledge-Based Systems*, Vol. 21 No. 8, pp. 920-6.
- Wang, E., Lin, C., Jiang, J. and Klein, G. (2007), "Improving enterprise resource planning (ERP) fit to organizational process through knowledge transfer", *International Journal of Information Management*, Vol. 27 No. 3, pp. 200-12.
- Wang, E., Shih, S., Jiang, J. and Klein, G. (2008), "The consistency among facilitating factors and ERP implementation success: a holistic view of fit", *Journal of Systems and Software*, Vol. 81 No. 9, pp. 1609-21.
- Wu, J. and Wang, Y. (2007), "Measuring ERP success: the key-users' viewpoint of the ERP to produce a viable IS in the organization", *Computers in Human Behavior*, Vol. 23 No. 3, pp. 1528-96.
- Wu, J.H., Wang, Y.M., Chien, M.C. and Tai, W.C. (2002), "An examination of ERP user satisfaction in Taiwan", Proceedings of the 35th Hawaii International Conference on System Sciences, University of Hawaii at Manoa, HI.
- Wu, L.C., Ong, C.S. and Hsu, Y.W. (2008), "Active ERP implementation management: a real options perspective", *Journal of System and Software*, Vol. 81 No. 6, pp. 1039-50.
- Xue, Y., Liang, H., Boulton, W.R. and Snyder, C.A. (2005), "ERP implementation failures in China: case studies with implications for ERP vendors", *International Journal of Production Economics*, Vol. 97 No. 3, pp. 279-95.
- Yoon, C.Y. (2009), "The effect factors of end – user task performance in a business environment: focusing on computing competency", *Computer in Human Behavior*, Vol. 25 No. 6, pp. 1207-12.
- Yusuf, Y., Gunasekaran, A. and Abthorpe, M. (2004), "Enterprise information systems project implementation: a case study of ERP in Rolls-Royce", *International Journal Production Economics*, Vol. 87 No. 3, pp. 251-66.

- Zafar, U.A., Zbib, I., Arokiasamy, S., Ramayah, T. and Chiun, L.M. (2006), "Resistance to change and ERP implementation success: the moderating role of change management initiatives", *Asian Academy of Management Journal*, Vol. 11 No. 2, pp. 1-17.
- Zhang, Z., Lee, M.K.O., Huang, P., Zhang, L. and Huang, X. (2005), "A framework of ERP systems implementation success in China: an empirical study", *International Journal of Production Economics*, Vol. 98 No. 1, pp. 56-80.
- Zhu, K. and Kraemer, K. (2002), "A cross-country study of electronic business adoption using the technology-organization-environment framework", *Proceedings of 32th International Conference on Information Systems*, pp. 337-48.
- Zhu, Y., Li, Y., Wang, W. and Chen, J. (2010), "What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry", *International Journal of Information Management*, Vol. 30 No. 5, pp. 265-76.
- Zviran, M. and Erlich, Z. (2003), "Measuring IS user satisfaction: review and implications", *Communications of the Association for Information Systems (CAIS)*, Vol. 12 No. 5, pp. 81-103.

Further reading

- Alvesson, M. and Wilmott, H. (1996), *Making Sense of Management: A Critical Introduction*, Sage publications, London.
- Alvesson, M. and Wilmott, H.C. (1992), "On the idea of emancipation in management and organisation studies", *Academy of Management Review*, Vol. 17 No. 3, pp. 432-64.
- Landauer, T.K. (1996), *The Trouble with Computers: Usefulness, Usability and Productivity*, MIT Press/Bradford Books, Cambridge, MA.
- Ngwenyama, O. (1991), "The critical social theory approach to information systems: problems and challenges", in Nissen, H.E., Klein, H. and Hirschheim, R. (Eds), *Information Systems Research: Contemporary Approaches and Emergent Traditions*, North-Holland, Amsterdam.
- Walsham, G. (1993), "Ethical issues in information systems development: the analyst as moral agent", in Avison, D., Kendall, J.E. and De Gross, J.I. (Eds), *Human, Organisational and Social Dimensions of Information Systems Development*, Elsevier Science Publishers B.V., North-Holland.

Appendix. Interview protocol

- (1) Personal background:
 - What is your current position and responsibilities?
 - How long you have been in IRANCO? What positions?
- (2) Work description:
 - Describe your work.
 - What are the changes in your work?
- (3) Procedures and responsibilities:
 - What are the new responsibilities in your work?
 - What are the new procedures in your job?
- (4) Causal conditions:
 - What causes do you think are behind the ERP implementation in IRANCO?

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- (5) Content of the system:
- What do you think about a system like ERP?
 - What is your idea about the core meaning of ERP system?
 - What are the main characteristics of ERP system?
- (6) Context:
- What do you think about the management team of IRANCO?
 - What do you think about informal groups and their impacts in IRANCO?
 - What are the collaboration and coordination mechanisms in doing your job?
 - What do you think about your colleagues?
 - What do you think about job carriers and promotions? Are they fair?
- (7) Training:
- What kind of ERP related training you have done so far?
 - How effective are trainings you have received?
- (8) Changes:
- What processes have been changed during ERP implementation?
 - Are there and changes after you started to use the ERP system?
 - Is there any process that will be changed?
- (9) Consequences:
- What are the effects of the ERP system on your job procedures?
 - What are the effects of the ERP system on organizational performance?
 - What are the effects of the ERP system on human relationships?
 - What are the effects of the ERP system on product quality?
 - What are the effects of the ERP system on job satisfaction?

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