

EXPLORING THE ADOPTION OF ENTERPRISE SYSTEMS IMPLEMENTATION METHODOLOGY: A MORPHOGENETIC APPROACH

Completed Research Paper

Daniela Mihailescu
School of Economics and
Management, Lund University
Lund, Sweden
mida@ihh.hj.se

Marius Mihailescu
School of Economics and
Management, Lund University
Lund, Sweden
mima@ihh.hj.se

Abstract

Enterprise Systems Implementation Methodology (ESIM) is considered to be a critical factor for successful Enterprise Systems (ES) implementations. In spite of ESIM's potential and significance for practice, little attention has been paid to this object of study in ES literature. Moreover, current studies reveal contradictory findings and provide a fragmented understanding. The purpose of this paper is to set before the reader an ESIM adaptation framework underpinned by a morphogenetic approach. Our qualitative study resulted in a richer description of ESIM and its adaptation. Four theoretically and empirically ESIM adaptation strategies, i.e. reorienting, cooperative, collaborative and coordinated, with related conditions and effects are suggested. Since ESIM might be regarded as one of the latest interventions undertaken in an attempt to improve the quality of an ES product and the productivity and quality of an implementation process, this study retains valuable insights of prior works in Information Systems Development (ISD) research.

Keywords: Enterprise Systems Implementation Methodology, IS development adaptation, Morphogenetic approach, Enterprise Systems

Introduction

By the late 1990s, Enterprise Systems (ES) solutions had come into widespread use and were suggested to represent a *de facto* standard to replace legacy systems in large and multinational companies as well as small and medium-sized enterprises (Davenport 1998; Parr and Shanks 2000). The trend contributed to the formation of a significant market for ES solutions and a triadic group consisting of ES vendors and ES implementer organizations on the supply side and customers or implementing organizations on the demand side (Sammon and Adam 2004). Focusing on the knowledge and the interrelationship between the supply side and the demand side, the three parties have the particular knowledge and skills necessary for implementing ES solutions (Haines and Goodhue 2003). ES implementers need to grasp and contribute implementation methodology, which is intended to support not a software development process but rather an implementation process (Caldas and Wood 1998; Haines and Goodhue 2003). The clear distinction between the development and the implementation of ES seems to alter the work practice significantly in terms of roles and responsibilities, activities and competences (Davenport 1998). Although most ES solutions provide similar functionality, each ES vendor has developed its own instance of Enterprise Systems Implementation Methodology (ESIM). For instance, the “Sure Step” methodology is recommended by Microsoft for implementing Microsoft Dynamics solutions and the “AcceleratedSAP”, or ASAP methodology, is developed and recommended by SAP as a *de facto* standard for implementing SAP solutions. While the potential value of ASAP in particular (Bhattacharjee 2000) and ESIM in general is disputed (Truex and Avison 2003), it is still an intriguing case and deserves further examination for three reasons.

Firstly, unlike Information Systems Development Methodology (ISDM), which focuses on technical aspects entailing the development of isolated and function-based software, ESIM emphasizes organizational aspects entailing: a) a mix of business process design and change (Davenport 2000), b) configuration and/or customization of software in order to align the business processes with the application software (Holland and Light 2003; Seddon, Shanks and Willcocks 2003) and c) project management and evaluation (Motiwalla and Thompson 2009). This represents a significant distinction between ISDM and ESIM. The latter is a new approach for providing integrated and process-based ES solutions built on generic software applications, which can be either rented or purchased and can have the potential to change or maintain the operations of an organization.

Secondly, ES implementation practice represents a steadily growing market (Jacobson, Shepherd, D’Aquila and Carter 2007; CBR 2011) with significant budget allocations (Panorama Consulting Group 2010). Yet, time and budget overruns have been more a rule than an exception, and the value of ES solutions has been questioned (Grabski, Leech and Lu 2003; Panorama Consulting Group 2010) in ES implementation practice, making the need to study this practice even more relevant. One of the critical success factors for minimizing these issues is represented by ESIM (Esteves and Pastor 2001; Sumner 2005). Although ESIM is recommended for the implementation of ES solutions (Truex and Avison 2003), there is a scarcity of research (Adam and Sammon 2004) and contradictory findings about the potentialities of ESIM (van Slooten and Yap 1999; Hedman 2004) and of its use in ES implementation practice (Bhattacharjee 2000; Fleisch, Öesterle and Powell 2004).

Thirdly, regarding ESIM as a type of complex innovation technology, it imposes a substantial knowledge burden on adopters that might reduce their performance or impede its use (Fichman and Kemerer 1997). Yet, the use of ESIM occurs in practice but it varies, since, as indicated by a knowledge transfer perspective, the type of knowledge incorporated into ESIM, i.e. how-to knowledge, requires adaptation (Backlund, Hallenborg and Hallgrímsson 2003). This proposition is seconded by an action perspective, which suggests that implementers reflect on formal activities or activities that occur spontaneously in their work and adapt the content of ESIM with regard to their agenda and competences (Mihailescu, Mihailescu and Carlsson 2006). Since the adaptation of ESIM undertaken by implementers who exhibit reflexivity in ES implementation practice is unexplored, the research remains silent regarding potential reflexive adaptation strategies and their conditions and effects. A reflexive adaptation strategy represents a potential mechanism that generates variations in the content of ESIM and its use in ES implementation practice. The examination of the reflexive adaptation strategy in the context of ES implementation practice may provide a better understanding and potential explanation for variations in the content of ESIM and its use and the contradictory findings with regard to its potential from the research.

In spite of significant investments in ES implementation practice, the productivity and quality of ES implementations continue to be problematic, and the potential value of using ESIM in ES implementation practice is questioned. Assuming that the empirical manifestation of the use of ESIM and its content in different conditions in ES implementation practice varies due to different reflexive adaptation strategies, there is a need to explore the ES implementation practice in which they occur. This paper represents such an attempt. In particular, the objective of this paper is to describe and provide a potential explanation for the reflexive adaptation strategies that might occur in ES implementation practice and answer the following research questions:

RQ 1 – Which reflexive adaptation strategies are undertaken by which ES implementers in ES implementation practice?

RQ 2 – What are the conditions and the effects of ESIM reflexive adaptation strategies in ES implementation practice?

The paper continues with a presentation of the prior research on ESIM and related IS adaptation literature. Then, a brief description of Archer's Morphogenetic approach is introduced and used to underpin a conceptual ESIM reflexive adaptation framework. The framework is used to describe the adaptation of one ESIM, i.e. AcceleratedSAP (ASAP), and to expose potential ESIM adaptation strategies as a result of the interplay between implementers' stance and particular situational logics in ES implementation practice. The article proceeds with a discussion of the implications of the findings and concludes with some promising avenues for future research.

Literature Review

Although the potential value of ESIM is questioned, its adaptation represents a topical subject both for practitioners and for research. Since implementers need to grasp and contribute implementation methodology to the implementation of ES (Haines and Goodhue 2003), the examination of ESIM adaptation might provide valuable knowledge about, at least, three perpetual and essential aspects of ES implementation: firstly, a shorter and more effective implementation process (Esteves, Chan, Pastor and Rosemann 2003; Fisher and Ostwald 2003); secondly, faster diffusion of "best practice"; and thirdly, variations in the content of ESIM and its use. Moreover, adequate ES implementation methodologies represent a critical success factor in ES implementations (Esteves and Pastor 2001; Sumner 2005) but there is a lack of studies about the features and adaptation of such methodologies in ES implementation practice

Enterprise Systems Implementation Practice

During the 1970s, "off-the-shelf" or generic software application suites, which could be customized to the needs of a customer, were introduced to the market. The term Enterprise Systems suggested by Davenport (1998), refers to organizational systems that include people, processes and information technology and are built around packaged Enterprise Systems Software, like Enterprise Resource Planning, Customer Relationship Management, and Supply Chain Management (Seddon et al. 2003). ES refers to solutions that are implemented and operated in organizations in order to integrate data, processes and information technology across internal and external value chains in real time (Seddon et al. 2003). By the early 1990s, the seductive idea of reducing time and costs, and improving effectiveness and efficiency by implementing generic software applications provided by ES vendors, captured the attention not only of user organizations but of an increasing number of professional service organizations as well. While the number of ES vendors specializing in developing generic software applications continued to increase, professional service organizations perceived significant business potential and the possibility to enter the market by joining alliances and partnerships with vendors. By the late 1990s, the ES solutions market represented one of the fastest-growing markets in terms of license sales and implementations (Caldas and Wood 1998). The ES solutions market continued to grow in the software industry in the early 2000s, with penetration at 67% and the largest segment of a company's applications budget at 34% (Scott and Shepherd 2002), reaching \$28B in 2006 (Jacobson et al. 2007) and \$43B in 2010 (CBR 2011). Yet, lack of knowledge and skills, particularly in ES implementing organizations and in unprepared customers, contributed to difficulties in the implementation of ES solutions (Caldas and Wood 1998; Haines and Goodhue 2003).

It has been estimated that the implementation costs were often four to eight (Zeitzi 1996) or five to ten (Davenport 2000) times the costs of the software. Moreover, a large number of ES implementations ended up late or over budget or under-delivered business value (Grabski et al. 2003; Panorama Consulting Group 2010). Most alarming were the examples of ES implementations being abandoned or even leading to bankruptcy (Adam and Sammon 2004). Consequently, the suitability of the knowledge base incorporated into the ISDM, the term used in this study for approaches previous to ESIM, considered to display best practices and to incorporate valuable knowledge about information systems development (Iivari, Hirschheim and Klein 2000), is implicitly questioned. An empirical study conducted in 1998 consisting of two empirical investigations in the UK of multinational companies that implemented SAP R/3, indicates that structured methods appear to be expendable in ES projects and are valued mostly for political reasons (Smethurst and Kawalek 1999).

Enterprise Systems Implementation Methodology and Adaptation

Most ES solutions provide similar functionality, yet each ES vendor has developed its own instance of ESIM, which represents “both a type of method engineering approach and a platform with design and configuration tools supporting that approach” (Truex and Avison 2003 p. 509). With a clear focus on the implementation of ES solutions and being intended to reengineer the whole organization through Business Process Reengineering (BPR) and workflow, ESIM is regarded as one of the latest method engineering approaches (Truex and Avison 2003). The use of ESIM represents a critical success factor in ES implementations (Esteves and Pastor 2001; Sumner 2005). Yet, there is a lack of studies about the properties and use of such methodologies (Esteves and Pastor 2001; Rosemann 2003). Similar observations are made by Adam and Sammon (2004), who suggest that more studies are needed to improve our understanding of the adequacy of methodologies in order to avoid future problems in ES implementations. Annotated bibliographies of ES publications in the main IS journals and conferences for 1997–2000 and 2001–2005, respectively, show that studies regarding ESIM are scarce (Esteves and Pastor 2001; Estevez and Bohorquez 2007).

Besides a limited amount of research that mainly focuses on describing the potential content of ESIM, like modelling tools and implementation approaches, some studies arrive at contradictory results regarding the potential value of ESIM in practice. For instance, in the SAP community, by 1999, only 2 years after introducing ASAP in the US, customers or implementing organizations from the US preferred SAP’s methodology to the methodologies offered by their implementation partners (Input company 1999, in Esteves et al. 2003). Moreover, using ASAP or adapted versions, so-called Powered by SAP methodologies, seemed to impact on the productivity in ES implementations in terms of reduced implementation time, averaging only 8 months compared with 15 months for standard implementations (Esteves et al. 2003). The evaluation of the use of ASAP in 4 ES implementation projects in small and medium-sized companies indicates that all 4 companies completed the implementation quickly and effectively (Fleisch et al. 2004). Yet, analysing the underlying characteristics of ASAP, scholars reach contradictory conclusions (cf. van Slooten and Yap 1999; Hedman 2004). As a result of applying Wijers, Seligman and Sol’s (1992) framework to discuss the IS engineering process, ASAP is considered “a very sound method in terms of Wijers’s Framework for Understanding” (van Slooten and Yap 1999 p. 227).

Contrary to this, the use of Iivari et al.’s (2000) framework to analyse the underlying assumptions of ASAP indicates the instrumental view of humans and organizations as well as the bureaucratic character of the ASAP methodology as a drawback, which may explain users’ aversion to the system or its use (Hedman 2004). In spite of the potential advantages, in its shape, i.e. with a focus on the rapid implementation of ES software, ESIM is a source of dissatisfaction for adopting organizations (Truex and Avison 2003). Similarly, observations indicate that although selected for the potential to support rapid implementation, ASAP lacked the flexibility necessary for extensive customization needs and for the support of process improvements. It also alienated functional user groups from system implementation (Bhattacharjee 2000).

While research on the use of ESIM is scarce, and its adaptation is unexplored, these topics have attracted attention in Information Systems Development (ISD) research. Insights from ISD research indicate that in practice methodologies are not usually used as prescribed but involve adaptation (Baskerville and Stage 2001) or tailoring (Fitzgerald, Russo and O’Kane 2003). Two perspectives dominate the research on methodology adaptation:

1. a method engineering perspective based on a positivist view of natural science that focuses on the adaptation of the formal aspect of methodologies represented by their content, e.g. approach, methods, tools and services;
2. a socio-organizational perspective based on an interpretative view of social science that focuses on the adaptation of the situational aspect represented, e.g. stakeholders and their use of methodologies in different contexts (Baskerville and Stage 2001).

In an attempt to bridge the gap between these two perspectives, a third perspective with a focus on the process of adaptation is advancing in the literature (Baskerville and Stage 2001; Backlund et al. 2003; Aydin, van Slooten and Stegwee 2005; Fitzgerald, Hartnett and Conboy 2006). Despite research efforts to explain methodology adaptation, the research remains silent about potential adaptation strategies and their potential causes and effects.

Conceptual Framework

Instead of research underpinned by positivist or interpretative views, like the studies undertaken previously on methodology adaptation, this study adopts a critical realism perspective, which is suggested to transcend the positivism vs. interpretivism dualism and is regarded as a promising view in IS (Carlsson 2009; Mutch 2010). Situated within the broader critical realism perspective, Archer's (1995; 1996; 2000; 2003; 2007) *morphogenetic approach* maintains that *structure*, *culture* and *agency* are analytically distinct, each having relative autonomy but interacting with each other. While structure refers to resource distribution and the organizational and institutional positions that agents occupy as they pursue their interests, culture represents theories, beliefs and "... the ideas which at any given time have holders" (Archer 1996 p. xxi). The parts, i.e. structure and culture, shape the situations in which agents find themselves involuntarily by providing reasons or directional guidance. However, agents enjoy interpretative freedom and evaluate their situations in the light of their concerns and their projects in the light of their situations. In other words, the situations in which agents find themselves do not have a direct impact upon agents, but are reflexively mediated via agents' own concerns through their stances (Archer 2003). The dialectical interplay between structure and culture, on one side, and agency, on the other, over time is represented by morphogenetic cycles that consist of three phases:

1. *Structural conditioning* at T1;
2. *Social interaction* between T2 and T3; and
3. *Structural elaboration* at T4 (Archer 1995).

Structural conditioning is the result of previous cycles and represents the socio-cultural conditions in which agents find themselves in terms of differential life chances and the distribution of both material resources, like sanctions, assets and expertise, and cultural sources, like theories, beliefs and ideas. The occurrence of relationships of necessary or contingent complementarities and necessary or contingent incompatibilities within structure and culture produces different situational logics that motivate agents to advance or defend their life chances and to pursue different modes of interaction (Archer 1995). The four situational logics that motivate agents to maintain or alter the status quo, due to different systemic relationships, are: correction, protection, elimination and opportunism. The situational logics and related relationships are illustrated in Table 1.

Table 1. Situational logics and related relationships	
Situational logic	Systemic relationship
Protection	Necessary complementarities
Correction	Necessary incompatibilities
Elimination	Contingent incompatibilities
Opportunism	Contingent compatibilities

Social interaction, as the second phase of a morphogenetic cycle, commences when one or several organized agencies with publicly articulated objectives, also named corporate agents, decide to take action. They take a stance towards their situations and promote their interests, i.e. to change or maintain their situations, in order to resolve their concerns. Representing what they care about most, the concerns are organically or ultimately prioritized and vary with different modes of reflexivity and different stances, which inform agents' course of action (Archer 2003). Agents' stances and related modes of reflexivity and concerns are illustrated in Table 2.)

Table 2. Agents' stances, modes of reflexivity and concerns		
Stances	Modes of reflexivity	Concerns
Evasive	Communicative	Inter-personal relationships
Strategic	Autonomous	Performative achievements
Subversive	Meta-reflexive	Value rationality
-	Fractured	Disconcerted

When dominant, a *fractured reflexivity* produces a passive agent who lacks a stance towards his or her context, i.e. to whom things happen, while the dominance of *the first three modes of reflexivity* indicate an active agent with a distinctive stance towards his or her situation.

Structural elaboration, the final phase, is represented by reproduction, i.e. morphostasis, or transformation, i.e. morphogenesis, and entails the effects of exchange and power transactions of material resources, e.g. sanctions, assets and expertise, and ideational sources, e.g. theories, beliefs and ideas. Due to differentiated resources, the transaction between agents is realized in terms of power, while evenly distributed resources involve exchange transactions. The results of this phase represent the start and the structural conditioning of the next morphogenetic cycle (Archer 1995).

In this study the *morphogenetic approach* helps in focusing on the research efforts at the outset of the study and provides a theoretical lens for exploring a reflexive adaptation of ESIM. Underpinned by a morphogenetic approach, a reflexive adaptation of ESIM is conceptualized as an emergent process generated over time by the interplay between:

- (i) *situational logics*, which are generated by systemic relationships delineated by involuntary positions and structural and cultural configurations of resource distributions and provide directional guidance by enabling or constraining different courses of action in ES implementation practice;
- (ii) *implementers' stances*, which represent orientations towards particular situations and are affected by their modes of reflexivity, which are delineated by self-determined configurations of concerns that motivate agents to pursue different *reflexive adaptation strategies*.

The interplay between (i) and (ii), which generates a reflexive adaptation strategy of choice that implementers pursue in a situation (micro level) in the context of ES implementation practice (macro level) over time, is illustrated in Figure 1 as morphogenetic cycles.

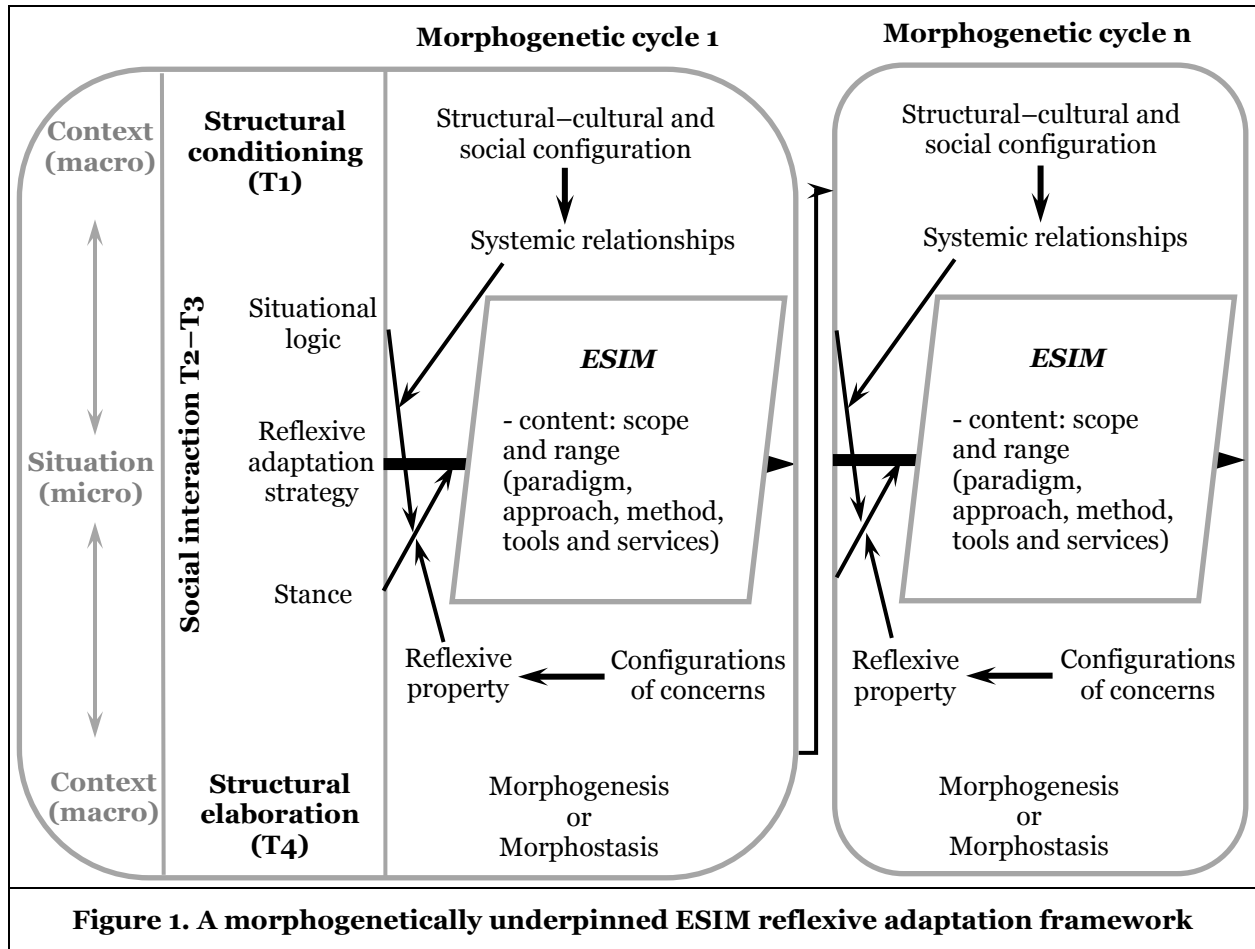


Figure 1. A morphogenetically underpinned ESIM reflexive adaptation framework

Each morphogenetic cycle starts with structural conditioning (T1) and illustrates the structural, cultural and social configurations in ES implementation practice. These configurations enable or constrain social interaction in which a reflexive adaptation strategy, which contributes to variations in the content and the use of ESIM, takes place between T2 and T3. The cycle ends with structural elaboration at (T4), which indicates potential morphogenesis, i.e. changes, or morphostasis, i.e. reproduction, in ES implementation practice and the beginning of the next cycle.

Research Design

The research design involves an iterative research process and is based on a longitudinal case study strategy and a qualitative approach to data collection and analysis. The research design provides the opportunity to understand the reflexive adaptation of ESIM by considering an extreme case that illustrates the phenomenon of interest as it comes into view in a real case. The particular case selected for examination is represented by the AcceleratedSAP (ASAP) methodology as one ESIM instance that is well documented in research publications (e.g. Ghosh 1999; van Slooten and Yap 1999; Esteves et al. 2003) and has been presented by the SAP provider at practitioners' conferences. The case also facilitates familiarization with ES implementation practice (Danermark, Ekström, Jakobsen and Karlsson 2002). Additionally, since ASAP is developed and recommended by one of the largest ES suppliers and used by consultants in implementations all over the world, it facilitates the finding of interviewees.

The study adopts a qualitative approach, which subsumes a combination of qualitative data collection techniques and analysis procedures. Two qualitative data collection techniques, documents and semi-structured interviews, are employed. In line with Webster and Watson's (2002) recommendation, a concept-centric literature review for the collection of documents was used. Google Scholar beta was used

to search through web databases in order to identify studies about adaptation, ESIM and ES implementation in general and about SAP implementation and ASAP. A snowball sampling technique was used in order to identify additional studies by consulting the references listed by the studies collected. The sizable and heterogeneous body of literature formed the basis for qualitative content analysis, as suggested by Bryman (2004). The studies were categorized based on theoretical perspectives and used to identify the potential characteristics of ESIM and select a theoretical lens for the examination of the ASAP case. In addition to published articles and books with a focus on SAP implementation and ASAP, the secondary data also include documents provided by the interviewees.

Primary data are gathered through semi-structured interviews, consisting of 13 interviews with implementers with experience of working on ES implementation projects with ASAP or Powered by SAP methodologies. The interviews are referred to by the numbers 1–13 in the next section. The interviewees had the possibility to develop and motivate their answers to questions related to identified aspects and related components. A retrospective analysis is conducted in order to describe the emergence of an ESIM from the early 1980s until 2004.

ESIM Adaptation – The Case of AcceleratedSAP

The case reported in this study begins in a context in which the idea behind ES as an alternative to in-house IS development was achieving increased salience on the market. We apply the framework developed in section 2 and describe four morphogenetic cycles that explain a reflexive adaptation of ASAP implementation methodology over time.

Time for Reorientation – Early 1980s–1987

Particularly from the early 1980s until the beginning of the 1990s, the search for one all-encompassing and universally applicable ISDM began to fade away (Malouin and Landry 1983; Brooks Jr. 1995) and a large number of ISDM contents emerged from practice, based on experiences from specific ISD projects and from research by employing theoretical and deductive arguments (Fitzgerald, Russo and Stolterman 2002; Avison and Fitzgerald 2006). Driven by user relationship constraints, like the system quality problems arising from inadequate perceptions of user demand and resulting in inadequate services, lack of management, and description and tool innovations (Mustonen-Ollila and Lyytinen 2003), a proliferation of new approaches, methods, techniques and supporting tools was registered on the market during this time, which is described by Avison and Fitzgerald (2006 p. 578) as “the methodology era”.

Available on the market from the 1970s, “off-the-shelf” or generic software application suites that could be customized to the needs of the buyer attracted increasing interest among customers. One of the few suppliers of generic software applications and contributors to the growth of the software industry was SAP AG, where SAP stands for Systems, Applications and Products in data processing. The company was founded by five former IBM employees in 1972 and from the early 1980s SAP worked on the development of a novel system applications architecture intended to replace its mainframe-based product R/2. With this product, a standard business software suite with integrated modules, SAP not only attracted the majority of the largest companies in Germany but also began its international expansion (Neumann and Srinivasan 2009). By the late 1980s, these ideas were rather different from the prevailing view on information systems development and the use of technology to support and automate an organization’s existing processes (interview 13).

Time for Cooperation – 1988–1992

By the late 1980s, with its head office and product development unit in Waldorf, Germany, SAP registered strong growth in the number of employees and expansion of its operations and customer base internationally. As a global company SAP was organized with centralized management and decentralized operations through its subsidiaries around the globe (interviews 1; 6; 13). Established in 1988, SAP America became SAP’s most important subsidiary by the early 1990s. Unlike other subsidiaries, SAP America focused on providing complementary services exclusively to its service partners. SAP America was managed centrally and consisted of operationally decentralized sales and support offices located across the United States, all meant to support and nurture consultants and partners (Workgroup Strategic Services Inc. 1995).

On one hand, the management team concentrated its efforts on marketing and selling SAP's products, and on the other hand, the focus was on developing strategic partnering relationships and providing support services, i.e. consulting, training and support, exclusively to its partners (interviews 1; 6). By the early 1990s, SAP America continued to increase its cooperation with local and global consulting partners. In 1991 Deloitte (interview 10) and in 1993 Capgemini (interview 7) were added to SAP America's existing partners, like IBM, whose partnership with SAP started in the late 1970s as a technology and consulting partner (interview 12). According to Workgroup Strategies Services Inc. (1995), by the early 1990s, SAP America had partnering relationships with hardware, database and consulting/integrator partners to support its direct sales effort. In their turn, the service partners provided consulting, implementation and support services for SAP implementation to customers (Workgroup Strategies Services Inc. 1995; interview 6).

The relationship between vendor and service partners was beneficial to both. SAP focused more on product development and installation or customization and less on implementation services, which in SAP America's case were exclusively managed by its independent service partners (interview 12). Besides knowledge of SAP products, the service partners contributed to implementation projects with skills accumulated from previous projects and know-how through their own methodologies. However, these methodologies were specialized in particular parts of ES implementation and differed with regard to integration, scope, contents and efficiency in SAP implementation projects (interviews 1; 6; 13). In spite of this variety of complementary services and expertise, and although SAP's products continued to increase in popularity, their implementation was far from being without challenges. Both partners and customers encountered operational obstructions and practical problems.

Time for Collaboration – 1993–1995

SAP grew rapidly and by the early 1990s "... employs over 3,600 employees and has 24 regional offices and 28 subsidiaries worldwide, including SAP America of Philadelphia" (Software Industry Report 1994) and introduced a new generic, integrated and modular application suite, called R/3, underpinned by a novel system applications architecture. Although the application was to some degree adaptable/customizable, the underlying ideas were to reduce the potential problems related to the development cycle and/or enable BPR. Yet, according to Reed and Doane (2004 p. 212), between 1993 and 1995 "North America had only a shallow base of experienced SAP consultants".

In addition, service partners used their own implementation methodologies, which were better suited to system development than R/3 implementation. Consequently, as indicated by Reed and Doane (2004 p. 52), "... consultants were wasting time on tasks that were not required. The resulting implementation mess (high costs, long project duration) gave SAP itself a very black eye." A report presented by Workgroup Strategic Services Inc. in 1995 states that the costs of external consultants for reengineering "can range from 2 to 15 times the cost of the R/3 software. According to Digital Equipment Corp. hardware costs equal the R/3 software, while consulting activities will run about three times the cost of the R/3 modules. Annual SAP support is 15% of the software price, with the first six months of support free." These challenges were not unfamiliar to SAP or its subsidiary SAP America, which annually evaluated its service partners (Workgroup Strategic Services Inc. 1995). Being aware of the challenges with the R/3 product and its implementation, SAP America worked with its consulting and supporting services and took the initiative to improve the professional service offered not only to its partners but also to SAP customers (interview 6).

After the release of the R/3 application by mid-1992, SAP America's product selling registered an impressive increase but the implementation of its product was challenging. In order to tackle this challenge, SAP America extended its cooperation with its partners (Sippy 1996). Consultants from SAP America and from its service partners began to work jointly on SAP implementations. Supported by SAP America's service division, a team of consultants who had participated in joint SAP implementations since 1993 (Keller and Teufel 1998; interview 6) were assigned to develop "a single implementation methodology for mid-tier companies" (March and Garvin 1996 p. 13). The implementation methodology emerged progressively from customers' feedback and experiences accumulated during collaborative pilot implementations by assembling ideas and theories from software engineering, project management and organization development (Keller and Teufel 1998).

Time for Coordination – 1996–2004

By 1996, the outcome of the initiative taken by SAP America and the work of the team of consultants was represented by an implementation methodology, which was described by SAP as “a best-practices implementation toolkit, which incorporates the capabilities already embedded in SAP’s R/3 product. The toolkit provides a step-by-step roadmap comprising tools, templates, how-to’s and questionnaires for the six phases of an implementation, optimizing the process-oriented approach of R/3: project preparation, business blueprint, simulation, validation, final preparation, and go live and support ... for easier, faster implementation and continuous business engineering” (Sippy 1996). The implementation methodology was added to SAP’s product development portfolio and extended SAP’s complementary services. The new implementation methodology was introduced to SAP’s partners and customers as AcceleratedSAP (ASAP), and recommended as a *de facto* standard for all SAP implementations, managed not only by SAP’s consultants but also by its partners (interviews 1; 4). In addition, the methodology was included in SAP’s professional services, i.e. training and certifications, and actively promoted through TeamSAP, which was an initiative that entailed a combination of the vendor’s resources, including personnel and technology, and its service partners in all SAP implementations (Keller and Teufel 1998; SAP 1998; Khan 2002; interviews 1; 6). TeamSAP represented the SAP’s answer to customers’ expectations of responsibility, vision, partnership, efficiency and support. Moreover, a new role was added to all SAP implementation projects, namely an SAP coach whose involvement in the implementation project could vary from “the lead role in complete management of the project to simply playing the role of quality assurance advisor” (SAP 1998 p. 7). The SAP Solution Manager offers project managers, project teams, system administrators and consultants “the tools necessary to design, configure, test, operate, monitor and support SAP solutions” (interview 6).

Later on, in 1999, ASAP was integrated into SAP’s implementation life-cycle concept, with related support tools, and was introduced to the market as ValueSAP. Since the possibility to visualize, automate and handle a large amount of documentation related to large projects was limited at its introduction, ASAP was integrated into an SAP Solution Manager platform in 2003 and integrated into all SAP installations free of charge (SAP 2008; interview 1). SAP Solution Manager is an information and tool integration platform offering process-oriented and integrated support with a focus on the implementation project life cycle of a complete business solution, i.e. both project and program implementation, and offers central access to methods, tools, preconfigured content and services. The tool can be used during evaluation and implementation as well as in the operation of an SAP solution and represents part of SAP NetWeaver.

SAP Solution Manager is an add-on for Web Application Server 6.20, is highly integrated with the SAP system landscape and is owned by the customer. During these years the methodology was continuously improved and updated by an international consulting team that collected feedback from SAP customers using it (interview 1; 4). Although the development of ASAP and its integration into the TeamSAP concept were time and resource consuming for SAP, it seemed that the efforts were paying off. Besides a steep rise in consulting sales revenues, growth of 75% and training revenues of 54% (SAP 1998), only two years after the introduction of ASAP, customers from the US preferred SAP’s implementation methodology or Powered by SAP methodologies (Input 1999 in Esteves et al. 2003). One such example is *Ascendant SAP*, which is based on ASAP and promoted by IBM. Hence, some of SAP’s implementation partners continued to cooperate with SAP in order to implement R/3 solutions, but initiated the development and deployment of their own methodology (interviews 3; 4). Particularly, large service partners engaged in extending and/or integrating parts of ASAP with their own implementation methodology (interview 9).

Yet others deployed ASAP and collaborated with the vendor (interview 8) in enhancing ASAP. After the introduction of ASAP in 1996, the implementation process accelerated. Positive results in terms of efficiency and effectiveness were indicated by SAP and its service partners (SAP 2000; Esteves et al. 2003; Fleisch et al. 2004; Reed and Doane 2004; interviews 1; 6; 11). Moreover, SAP took a more active role in supporting customers’ implementation projects and required the involvement of an SAP representative, at least as a quality assurance advisor or SAP reviewer, in all projects. The initiative was met with mixed feelings within SAP and its partners, in some cases being well received (SAP 1997; interviews 6; 8) and in other cases being regarded as an additional burden to the already hectic schedule of consultants who needed to become acquainted with ASAP. Additionally, it was perceived as another training or resource hiring cost, or as a way to increase partners’ dependence on SAP’s products (interviews 3; 13).

Although ASAP in many cases was requested by customers, the opposite case exists as well, for instance when the organization in which the application software was implemented used its own or other methodologies rather than ASAP (Bhattacharjee 2000; interviews 1; 2; 5; 13). After the introduction of ASAP in 1996 the implementation process was accelerated (Reed and Doane 2002). A study of ASAP customers conducted by Aberdeen Group in 1998 (SAP 2000) expressively states “No pain ... no gain – but AcceleratedSAP works!” Positive results were indicated by SAP and its service partners (SAP 2000; Esteves et al. 2003). The latter mentioned that the implementation time may be reduced for implementations to an average of eight months by using ASAP or Powered by SAP methodologies compared with fifteen months if the methodology is not used. A similar point of view was put forward by Fleisch et al. (2004) on the deployment of ASAP in four ES implementation projects in small to medium-sized companies. The authors found that all four companies completed the implementation quickly and effectively. According to all the interviewees, the different implementation methodologies on the market seem to be similar to ASAP. The main differences between them are considered to be:

1. *The number of accelerators*, which is significant in order to identify when and what to do;
2. *The integrated tools and prototyping*, which support and have significant importance during the ES implementation process; and
3. *Some fixed principles specific to R/3*, which need to be taken into consideration in R/3's implementation.

Findings

In this study four different ESIM reflexive adaptation strategies have been identified: reorienting, cooperative, collaborative and coordinative. Each strategy is generated by a dialectical interplay between a *situational logic (i)* and *implementers' stances (ii)* and contributes to variations in the content and the use of ESIM and potential changes or reproduction in ES implementation practice. The four ESIM reflexive adaptation strategies are described below:

1. **Reorienting adaptation strategy**

- (i) *Situational logic* – By the early 1980s there was an explosion of corrective repairs through the reinterpretation of ISDM and/or IS and its development process in an attempt to resolve the inconsistencies between them. The majority of the developer population was engaged in corrective efforts directed towards ISDM contents and the IS development process. The few organizations that followed the path of ES, as modular software providers, integrated general guidelines and provided training, congruent with the principles and assumptions that underpinned their ES solutions. Hence, imbued by the principle of technology-enabled BPR and the configuration of ES software based on a vanilla implementation strategy, ESIM began to take shape as a complementary part of the ES implementation process and ES solution. The corrective ideational repairs fostered by ES providers challenged the dominant IS doctrine on the IS market and education, and coincided with a protective integration of ES operations and roles
- (ii) *Implementers' stance* – Although continuously increasing, the number of ES vendors who are both developers and implementers of ES solutions is still limited compared with the number of IS providers that dominated by the early 1980s. Due to fractured reflexivity, delineated by undetermined concerns and disconcerted experiences, ES vendors are *passive* in their orientation towards ES implementation practice and are reorienting their concerns. Yet, they attract the interest of an increasing number of customers, who increase the legitimacy of their syncretic endeavour and improve their position on the market. They attempt to advance new ideas, but also to reuse their expertise in IS development, augmenting in this way their distress and precluding the formation and pursuit of purposive ES implementation activities. The difficulties in articulating and prioritizing their ultimate concerns in relation to ES implementation confine ES providers to passivity.

The effects of a reorienting adaptation are represented by a limited ESIM content and fragmented ESIM features with cognitive and technical transformation support. Due to limited contributions from a passive ES provider in a corrective ES implementation practice, the establishment of ESIM was slow, but complementary to the ES assumptions and a technical implementation process. The ES implementation practice was morphostatic, with passive ES providers whose interests were served by subordinated collectivities and an increasing number of customers. The reproduction of a centralized organization of integrated roles and differentiated distribution of resources was reinforced by ES implementation ideas legitimized by an increasing number of customers consolidating the position of an ES provider with reproductive interests. As the exploration and integration of operations intensified, differentiated access to material resources and the undermined ability to make resilient differences, due to a pronounced dependence on subordinated collectivities and customers' interests, emerged as unintended effects.

2. Cooperative ESIM Adaptation Strategy

- (i) *Situational logic* – An explosive demand for ES solutions and limited ES implementation resources, in terms of the available expertise on the part of ES vendors, encouraged an increasing number of consulting companies and ES vendors to join together. Due to their differentiated distribution of resources but complementary expertise, defensive alliances were initiated between the two parts, which shared a common interest in legitimizing ES ideas through defensive protection. There is mutual recognition of benefits between the ES vendor and its implementation partners, but both parts also have a sectional interest in their own operations. Due to their differentiated material resources and operational autonomy, they joined together on their own terms, i.e. guided by their own sectional interests and diversified services. Part of their protective efforts entailed reusing the available but limited ESIM contents, and adding their own contents, e.g. project management and BPR, and reproducing their specialized expertise.
- (ii) *Implementers' stance* – Differentiated partners mobilize and exchange material resources, particularly human assets and expertise. They complement their operations but on their own terms. Due to communicative reflexivity, delineated by an ultimate concern for maintaining concordant inter-relationships, ES partners are *evasive* in their orientation towards ES implementation practice. They conceive their operations within available but differentiated resources. Their cooperation is based on shared interests and an active, but circumventing response intended to avoid potential constraints due to a lack of, or incongruent, ES expertise in different implementation areas. However, at the same time, they also renounce potential opportunities, such as augmenting their positions and resources and taking a proactive role in differentiating themselves and their results in ES implementation. Contentment with their position insulates against external stimuli and sustains the reproduction and efficiency of their own operations and expertise.

The effects of a cooperative adaptation of ESIM are represented by an extended ESIM content with aggregated and complementary ESIM features with added control and analysis support, but potential risks of inconsistencies. As the content relies on fast aggregation of complementary, but limited, ES parts enhanced by service partners' own parts, which have IS development provenance, the content of ESIM presents risks of inconsistencies. The ES implementation practice is morphostatic with intensified interaction protected by cooperative ES partners with shared interests in interrelationships. They take an evasive stance towards material and cultural differences, as well as rewards, and are actively involved in reproducing a defensive ES implementation practice. The reproduction of a distributed organization of differentiated roles and the differentiated distribution of resources is reinforced by systematized ES implementation ideas, legitimized by an increasing number of customers who consolidate the position of ES partners with sectional interests in ES implementation. Selective assimilation of novelty and reduced variety among implementation partners emerge as unintended effects.

3. Collaborative Adaptation Strategy

- (i) *Situation logic* – ES implementation partners join together on their own terms and are operationally autonomous. Guided by their own sectional interests, they pursue the opportunity to differentiate their operations and services. Hence, alternative ES implementation strategies and specialized ideas about the role of ES in organization and ES implementation processes gain support from differentiated groups of ES implementers and customers. For instance, whilst an ES

implementation based on vanilla strategy entails the configuration of ES software, the alternative chocolate strategy involves considerable customization of ES software. Mobilized by the ES vendor, a team of implementation partners extends the underlying ES ideas and implementation process and exposes complementary and congruent ESIM contents. Specialized but complementary operations and services retain salience in practice.

- (ii) *Implementers' stance* – Committed to accumulating and integrating differentiated resources systematically, ES partners join their efforts. Due to meta-reflexivity, delineated by organic concerns in exposing best practice, ES partners are *subversive* in their orientation towards the state of ES implementation practice and concentrate on providing a specialized set of ideas and resources compatible with an ES implementation role. They collaborate and integrate diversified resources in an attempt to improve quality and raise value rationality in ES implementation practice. Their commitment to the integration and protection of quality in ES implementation practice comes at a price, but long-term achievements are valued more.

The effects of collaborative adaptation of ESIM are represented by extended ESIM content and integrated ESIM features with added cooperation and representation support. The ES implementation practice is morphogenetic with vocational ideals sustained by collaborative partners with shared interests in value rationality. They organize and take a subversive stance towards material differences as well as rewards and are actively involved in a continuous search for value and quality in ES implementation practice. Transformation into a centralized organization of differentiated roles and differentiated distribution of diversified resources is reinforced by specialized ES implementation ideas promoted by a new and well-positioned ES implementation partner and legitimized by an increasing number of customers and ES implementation partners. A display of alternative values that animate the interests of passive and diversified partners emerges as an unintended effect.

4. *Coordinated ESIM Adaptation Strategy*

- (i) *Situation logic* – Passive acceptance and support of opportunistic efforts introduced by ES partners with sectional and diversified interests and differentiated resources in ES implementation practice are disadvantageous and affect customer satisfaction, the performance in the implementation process and the quality of the ES solution. In order to show commitment to its services and customers, the ES provider takes an active position in promoting complementary resources. A platform of diversified and sectional resources is introduced in ES implementation practice.
- (ii) *Implementers' stance* – Concentrating on sustaining satisfactory implementation performance, ES partners are active in capitalizing on availabilities and circumventing constraints. Due to autonomous reflexivity, delineated by an ultimate concern for proficiency and feasible performative achievements, an ES implementation group takes a *strategic* stance towards ES implementation practice and accommodates specialized and differentiated resources in a comprehensive platform of services and resources. Aware of the limitations and benefits of the ES implementation, the group harnesses the compliance of various resources and circumvents constraints by coordinating sectional and diversified efforts of ES partners.

Discussion

Enhanced by insights gained from the ESIM literature and ASAP case, a potential explanation for reflexive adaptation of ESIM in ES implementation practice over time is advanced. The framework applied in this paper exemplifies how a morphogenetic approach might be used to provide a coherent and emergent view on variations in ESIM's content and use over time, and to add more precision in describing and explaining the reflexive adaptation strategies that contribute to the variations. In spite of its usefulness, the morphogenetic approach is comprehensive, tending to enlarge the focus of an enquiry and making it difficult to incorporate and consider all the aspects within a limited study, like this one. Hence, the approach has been applied with regard to the research objectives of the study to describe and explain ESIM and its reflexive adaptation.

Due to a focus on ES implementation practice, the potential explanation captures only components appropriate for the objective of the study. Therefore, it is partial but has been developed by corroborating theoretical and empirical evidence through retroduction, which is a mode of inference in critical realism. Moreover, it fulfills the transfactual generalization criteria by explaining the phenomenon of study by providing an account of two different, but interacting, mechanisms, i.e. adaptation and reflexivity, which generate potential changes in ESIM. In addition, acknowledging the existence of a stratified reality that exists independently of our knowledge, the awareness of a multitude of perceptions of reality has been enhanced through triangulation from multiple data sources. From a critical realist perspective, reality exists independently of our knowledge, which is fallible and open to correction, but the corroboration of theoretical and empirical evidence indicates the significance of an alternative interpretation and the usefulness in explaining changes in ESIM.

The framework of ESIM reflexive adaptation provided in this paper retains valuable insights from the previous works that informed the study, but also complements the wider adaptation research, providing an alternative to two frequent perspectives, positivist and interpretative, on the relatively limited research on ESIM. The critical realism perspective, suggested in this paper, moves the understanding of ESIM adaptation beyond the current descriptive views and provides a fruitful way to understand and explain the changes in ESIM's content and use from an emergence view.

In addition to the theoretical contributions, the results from this research help ES professionals to become aware of the characteristics of ESIM and potential ESIM reflexive adaptation strategies undertaken in ES implementation practice, as well as the potential causes and effects. The results are of interest particularly to practitioners in similar implementer positions who engage in ESIM reflexive adaptation, or are affected by such interventions, and strive to position themselves in relation to their partners and customers. Through the research, knowledge and insights that may prove useful for implementers who are interested in taking a proactive stance towards this type of intervention are provided.

Conclusion

The research undertaken in this study describes and provides a potential explanation for a reflexive adaptation strategy of Enterprise Systems Implementation Methodology (ESIM) in Enterprise Systems (ES) implementation practice. A morphogenetic approach, which is framed by a critical realism perspective, is applied in order to answer the following research questions:

RQ 1 – Which reflexive adaptation strategies are undertaken by which ES implementers in ES implementation practice?

Four theoretically and empirically grounded ESIM reflexive adaptation strategies undertaken by ES implementers with different concerns are advanced:

1. *A reorienting ESIM reflexive adaptation strategy, which entails a passive ES implementer with disconcerted concerns and corrective interests.*
2. *A cooperative ESIM reflexive adaptation strategy, which is undertaken by an evasive ES implementer with ultimate concern for maintaining concordant inter-relationships and defensive interests.*
3. *A collaborative ESIM reflexive adaptation strategy, which is undertaken by a subversive ES implementer with organic concerns in exposing best practice and advancing vocational ideals and protective interests.*
4. *A coordinative ESIM reflexive adaptation strategy, which is undertaken by a strategic ES implementer with ultimate concern for proficiency through task and productivity achievements and opportunistic interests.*

RQ 2 – What are the conditions and the effects of ESIM reflexive adaptation strategies in ES implementation practice?

The following conditions and effects of attempts to adapt ESIM reflexively in ES implementation practice are suggested:

1. A reorienting ESIM reflexive adaptation strategy
 - a. Conditions – a *corrective situation* delineated by an ES implementation practice, with centralized organization of interlocking roles, interchangeable personnel, concentrated distribution of resources and *syncretic ideas* that gain sponsorship from customers.
 - b. Effect – *limited ESIM content*, with cognitive and technical transformation support and *fragmented* use, and a *reproduction of ES implementation practice* in which undermined ability to make a resilient difference and pronounced dependence on the interests of subordinated collectivities and customers emerge as unintended effects.
2. A cooperative ESIM reflexive adaptation strategy
 - a. Conditions – a *defensive situation* delineated by an ES implementation practice, with centralized organization of integrated roles and differentiated distribution of resources and *systematized ideas* that gain sponsorship from customers.
 - b. Effects – *extended ESIM content* with added control and analysis support and *aggregated* use with risk of inconsistencies, and a *reproduction of ES implementation practice* in which selective assimilation of novelty and reduced variety among partners emerge as unintended effects.
3. A collaborative ESIM reflexive adaptation strategy
 - a. Conditions – a *protective situation* delineated by an ES implementation practice with distributed organization of differentiated roles and differentiated distribution of resources, and *systematized ideas* that gain sponsorship from customers and are legitimized by allied partners.
 - b. Effects – *extended ESIM content* with added cooperation and representation support and *integrated* use, and a *transformation of ES implementation practice* in which the display of alternative values and animated interests from passive and diversified partners emerge as unintended effects.
4. A coordinative ESIM reflexive adaptation strategy
 - a. Conditions – an *opportunistic situation* delineated by an ES implementation practice, with centralized organization of differentiated roles and differentiated distribution of diversified resources, and *specialized ideas* that gain sponsorship from customers and are legitimized by partners.
 - b. Effects – *comprehensive ESIM content* with organizational, coordination and production support and an *infrastructural* use, and a *transformation of ES implementation practice* in which the intensification of divergent interests and reduced interaction among partners emerge as unintended effects.

The results of the research provide explanatory insights into a reflexive adaptation of ESIM over time, and are of particular interest to ES research and practice and more generally to IS. The study contributes to ES research and particularly to the relatively limited research on ESIM adaptation in ES implementation practice. While there is much research to be carried out on this subject, this study offers a foundation for future work that may contribute to a more coherent view of ESIM and reflexive adaptation strategies. More specifically, the next step on the agenda is to enhance the explanatory potential of the ESIM reflexive adaptation framework by formulating coherent design propositions that may provide high-level guidance for ES practitioners involved in reflexive adaptation of ESIM in ES implementation practice.

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