# The Conditions of Complex Innovation Adoption Occurrence — A Critical Realist Perspective

**Marius Mihailescu[1], Daniela Mihailescu[2] and Sven Carlsson[1]**
**[1]Informatics, School of Economics and Management, Lund University, Sweden**
**[2]Informatics, Jönköping International Business School, Jönköping University, Sweden**
marius.mihailescu@jibs.hj.se
daniela.mihailescu@jibs.hj.se
sven.carlsson@ics.lu.se

**Abstract:** The adoption of innovation is a multifaceted and dynamic phenomenon. It occurs as a result of the interplay between structural influences and agents' activities. Although existing studies on innovation have recognised the importance of theories that link the structure, the macro level, and agency, the micro level, in explaining changes over time, few theoretical accounts support the integrations of multiple levels of analysis. The purpose of this paper is to develop an explanatory framework based on a realist social theory and underpinned by a critical realist perspective, with the intention of describing and explaining IS/IT adoption occurrences. The potential of the framework is empirically illustrated with a case study that examines the adoption of one Enterprise Systems Implementation Methodology by implementers in an implementation context. Our qualitative study provides explanatory insights and a rich description of a particular type of complex innovation. Four theoretically and empirically grounded modes of adopting an implementation methodology are identified: fragmented, aggregated, integrated and infrastructural. Using the framework allow us to achieve four things. First, the framework will support the researchers in identifying particular configurations and the pattern of events caused by them. Second, it will take into account the embeddedness of innovations that have occurred within broader structural configurations. Third, it will allow the researchers to distinguish the different stances agents might adopt toward particular innovations and structural configurations. Fourth, the researchers will be able to identify variations that have occurred in the adoption of innovations. This study offers a foundation for future work that may contribute to a more coherent view on complex innovations and insights into their potential adoption; as such, the findings presented here can provide guidance for practitioners who seek to adopt complex IS/IT innovations.

**Keywords:** IS/IT adoption occurrence, enterprise systems implementation methodology, realist social theory, critical realism, morphogenetic approach, modes of reflexivity

## 1. Introduction

IS/IT adoption represents a mature research stream within the IS field. Despite an extensive body of research, progress has occurred mainly at either an individual- or an organizational level, with less work devoted to linking the two levels (Sarker and Valacich 2010). Moreover, there has been gradual movement toward homogeneity of a type that might weaken innovation adoption research, a field that is dominated by the positivist paradigm (Fichman 2004), and to a lesser extent of the interpretive paradigm (Williams, Dwivedi, Lal and Schwarz 2009). Several authors have suggested a need for alternative paradigms and theories that might lead to a deeper understanding and alternative explanation of the IS/IT adoption (Williams et al. 2009). In line with these recommendations, we suggest an alternative approach that will provide valuable insights and explanatory purchase in the face of IS/IT adoption phenomena. The objective of this paper is to describe and explain potential IS/IT adoption occurrences of an Enterprise Systems Implementation Methodology (ESIM), which we regard as a type of complex innovation technology, by applying a Realist Social Theory (RST) that is underpinned by a Critical Realist (CR) perspective. The paper continues with a presentation of current trends in IS/IT adoption research, followed by a brief description of the CR perspective and RST, which is applied as a way to conceptualize IS/IT adoption. A framework is then developed and applied in order to explain the adoption of AcceleratedSAP, an example of an ESIM, in an ES-implementation context. The paper concludes with a discussion of the implications of the findings and some promising avenues for future research.

## 2. IS/IT innovation adoption

There is a rich diversity in the research streams and theories available within the body of IS/IT adoption literature. Several studies point to the Technology Acceptance Model (TAM) as having a dominant position in IS/IT adoption research. For instance, based on a review of 211 IS/IT adoption studies published in IS journals and conferences between 2000 and 2006, Liu, Min and Ji (2008) found TAM to be the most influential among the theories employed, having been applied in 40% of the aforesaid studies. TAM is followed by the Diffusion


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of Innovation Theory (DoI) and Theory of Planned Behaviour (TPB). DoI was applied in 12% of the studies reviewed and TPB in 10%. Williams et al. (2009) also found TAM to have a dominant position (29%), followed by DoI (16.3%) and TPB (5.6%) in their review of 345 studies on innovation adoption, acceptance and diffusion research, published in IS journals between 1985 and 2007. Williams et al. (2009) observe a gradual moving towards homogeneity that might weaken innovation adoption, acceptance and diffusion research, dominated by a positivist perspective, empirical and quantitative research, and survey method. Besides different underlying perspectives, i.e. positivist and interpretivist, the dominant theories focus on determinants or behaviours at the individual or organizational level of IS/IT adoption (Basole, Seuss, and Rouse 2013). While DoI focuses on the organizational adoption of IS/IT, TAM, TPB and Unified Theory of Acceptance and Use of Technology (UTAUT) address the individual adoption of IS/IT (Oliveira and Martins 2011). Moreover, focusing on the impact of technical and contextual variables on technology adoption, positivism takes a deterministic view that IS/IT adoption and its outcomes can be objectively described and predicted. Empirical findings show unpredictable effects, however, which often cannot be explained from a deterministic viewpoint (Venkatesh, Thong and XU 2012). Unlike those scholars, interpretivists attempted to understand IS/IT adoption as it is experienced by actors through their meanings and frames of reference. Due to their reliance on empirical epistemology, the resultant descriptions and explanations of IS/IT adoption have been confined to observable regularities that provide a one-dimensional view of the IS/IT adoption phenomenon at organizational- or individual level. Within the positivist perspective, the variance models have accorded contextual factors a deterministic influence on the regular occurrence of IS/IT adoption; within the interpretivist perspective, the process models have accorded importance to social actors, who differ from one another by virtue of their knowledge and skills.

Notwithstanding the extensive research to date, the progress of technology adoption research has mainly been at either the individual or organizational level, with little focus on how to link the two levels (Venkatesh, Davis and Morris 2007; Sykes, Venkatesh and Gosain 2009; Sarker and Valacich 2010). In addition to such one-dimensional views, these models fall short in explaining changes in the occurrence of IS/IT adoption. Moreover, the positivist and interpretivist perspective lead to theory-practice inconsistencies (Smith 2006), and introduce a problematic notion of causality, as they are based on Humean assumptions of regular cause-effect relationships within positivism, and interpretations of meanings and idiographic phenomena within interpretivism (Sayer 2000). Critical realism (CR) therefore has been suggested as a potential means of overcoming these inconsistencies (Smith 2006), guiding analysis of factors involved in technology adoption and use (Dobson, Jackson, Gengatharen 2011) and enriching IS research (Carlsson 2012). Underpinned by a CR perspective, Archer's Realist Social Theory (RST) (1995; 2007) seems to be a promising alternative for providing causal explanations of complex, dynamic and multilevel phenomena (Wong 2005) and a CR-based development of IS theories (Carlsson 2012).

## 3. Theoretical framework

The insights garnered from a review of the extant literature have yielded a preliminary understanding of the potential issues that might be overcome by adopting a CR perspective. This section provides a brief introduction to CR and to RST.

### 3.1 Critical realism perspective

The central tenets of CR, as developed by Bhaskar (1989) and expanded upon by several authors (Archer, Bhaskar, Collier, Lawson and Norrie 1998; Sayer 1992), are: *stratification*, *causal explanation*, *differentiation* and *emergence*. The notion of *stratification* draws attention to the ontology of CR, which regards reality as being stratified into three separable but interrelated domains: the real, the actual and the empirical (Figure 1).

The stratified ontology directs the critical realist toward an explanatory focus on the domain of the real, where unobservable mechanisms generate observable phenomena in the actual and empirical domains.

*Causal explanation* concerns the identification of causal mechanisms that reside in the domain of the real and generate events in the domain of the actual. Although events in the domain of the actual might be unobservable, they are nevertheless experienced. Experiences of the events that populate the domain of the empirical are observable but represent only the starting point of inquiries intended to result in causal explanations. The form of causal explanation advanced by CR is different, on one hand, from the Humean notion of causality based on law-seeking cause-and-effect relationships expressed by observable and regular

 

conjunctions of events (Smith 2006). This form of causality does not consider humans with their reasons, choices and activities, which are significant ingredients for social phenomena. On the other hand, it is also different from the notion of causality based only on interpretation of meanings and idiographic phenomena (Sayer 2000). Hence, rather than focusing on observable regularities or interpretation of meanings, CR directs attention towards identification of structural and causal mechanisms residing in the real domain of reality. In the context of this study, causal explanation involves the identification of causal mechanisms, which contribute to the occurrence of ESIMs adoption and under what conditions they are adopted in an ES implementation context.

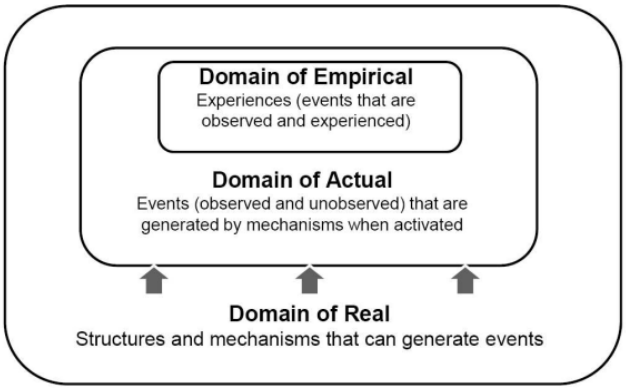


**Figure 1:** The three overlapping domains of reality in CR ontology (Mingers 2004)

The notion of *differentiation* emphasises an analytical and temporal distinction between structure and agency since the former is dependent on the activity of the latter - i.e., structure pre-dates agency. Owing to their distinctive properties, structure and agency are considered capable of independent variation and temporally distinguishable as being out of phase, because the two operate over different tracts of time (Archer 1995). Stratification and differentiation are related to *emergence*, which *"derives from interaction and its consequences which occur in time"* (Archer 1995:14). Operative in open systems, emergence is embedded in interaction when structure and agency shape and re-shape one another over time (Archer 2010).

### 3.2 Realist social theory

The tenets of CR underpin RST, which is based on the notions of *analytical dualism*, as a theorizing tool and a foundation for social analysis and explanation of social change (Archer 2010); *morphogenesis*, as an explanatory framework for social change; and, *reflexivity*, which provides explanatory purchase for agents' distinctive stances toward their social circumstances. In order to theorize the interplay between structure and agency, Archer (1995) has suggested the notion of analytical dualism, that emphasise the fact that structure and agency are interdependent but analytically separable and temporally sequenced. In addition to an analytical separation, Archer (1995) also has suggested a separation between structure and culture. Both provide insights into the social context that depends on, but cannot be reduced to, agency - i.e., to individuals and their activity. Structure and culture on the one hand, and agency on the other, therefore are not only two separate strata but are also understood to be temporally differentiated. Furthermore, structure and culture are held to have existed prior and to have exerted a causal influence upon agency - i.e., to have enabled or constrained human activity. Agency, which mediates the influence of structure and culture on individuals, has the power to reproduce or transform structure and culture, but it is the individual who possesses the relevant powers that enable agency - e.g., reflexivity, self-consciousness and intentionality (Archer 1995).

In this study, analytical dualism informs the interpretation of IS/IT adoption as a concrete phenomenon regarded as a manifestation of the interplay between a social context (structure, culture and groups of agents) and human activity (agents' stances and interactions). The means by which Archer (1995) suggests the operationalization of analytical dualism are represented by a morphogenetic cycle that consists of the structural/cultural conditioning of groups; interaction; and, a structural/cultural and group elaboration phase (Figure 2).

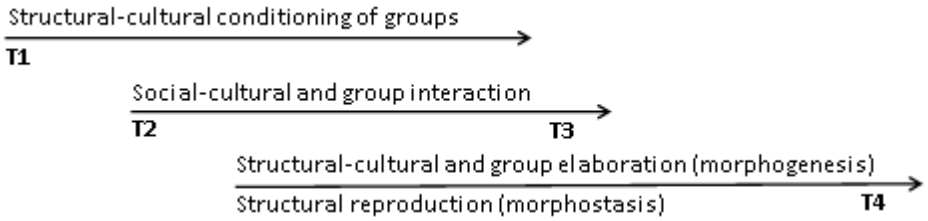


**Figure 2:** The basic morphogenetic cycle (Archer 1995)

*In the first phase*, at Time 1 (T1), the cycle begins with and is informed by the structural-cultural properties available from previous interactions to have occurred in the social context. According to Archer (1995), these are emergent properties and represent relationships which entail: a) material resources such as wealth, power or expertise with regard to structure; and, b) ideational sources such as doctrines, theories or beliefs, with reference to culture. The distribution of material resources and the composition of ideational sources pre-groups agents into collectives with under-privileged positions as primary agents and organised groups with privileged positions as corporate agents. Primary agents are mobilised to advance the interests of corporate agents, who have emergent powers that they exercise in promoting and articulating their vested interests in maintaining or improving their positions. Relationships of compatibility or incompatibility, and necessary or contingent create different situational logics. The four situational logics that provide directional guidance and motivate agents to maintain or alter the status quo are:

1) correction generated by relationships of necessary incompatibilities,

2) protection generated by relationships of necessary complementarities,

3) elimination generated by relationship of contingent incompatibilities, and

4) opportunism generated by relationships of contingent compatibilities (Archer 1995).

Each situational logic provides directional guidance for different forms of strategic action and shapes the situations that differently positioned ES implementers confront when they interact at the second phase of the morphogenetic cycle. While the first phase directs the attention towards structural and cultural properties delineated by distributions of material and ideational resources and situational logics encountered by agents with different vested interests, the second phase focuses on interaction.

*In the second phase,* T2-T3, the focus is on *agency* and concerns the interaction and emergent properties of peoples possessing reflexive power. They act by virtue of their subjectively defined concerns with regard to three orders of reality: a) well-being concerns with regard to natural order; b) performative achievements with regard to practical order; and c) self-worth with regard to social order. Representing what they most care about, the concerns are organically prioritized and are realized through projects that are adjusted to reflect the objective circumstances created by previous cycles. The interplay between people's configurations of concerns i.e., what they most care about and their context generates four distinctive modes of reflexivity and related stances:

1) an evasive stance in the case of communicative reflexivity due to ultimate concerns in inter-personal relationships,

2) a strategic stance in the case of autonomous reflexivity due to ultimate concerns in performative achievements,

3) a subversive stance in the case of meta-reflexivity due to ultimate concerns in value rationality, and

4) a passive stance in the case of fractured reflexivity due to a lack of ultimate concerns and hence disconcerted (Archer 2007).

When dominant, fractured reflexivity produces a passive agent, i.e. one to whom things happen, whereas the dominance of the first three modes of reflexivity indicates an active agent with a distinctive stance towards structural and cultural constraints and enablements. Owing to their bargaining power and negotiating

 

strength, which are delineated by material and ideational distributions of resources and their relations with other agents, their interaction, which takes place between T2 and T3, ensues in structural elaboration/reproduction at T4.

*In the third phase,* T4, interaction ensues in the form of structural-cultural and group elaboration i.e., reproduction (morphostatis) or transformation (morphogenesis). As a result of exchange and power transactions, agents undergo: a) re-grouping, as of initial ideational sources - i.e., propositions, theories, doctrines; and b) re-constitution of material resources - i.e., wealth, power and expertise are re-distributed during morphogenesis. Due to differentiated resources, the transactions between agents are realized in terms of power, while evenly distributed resources involve exchange transactions. The results represent the start and structural conditioning of the next morphogenetic cycle, at T1.

### 3.3 A realist conceptualization of IS/IT adoption

Informed by RST, IS/IT adoption occurrence is regarded as a manifestation of the interplay between *situational logics* and *stances of interacting agents* over time. Figure 3 illustrates a realist conceptualization of it.

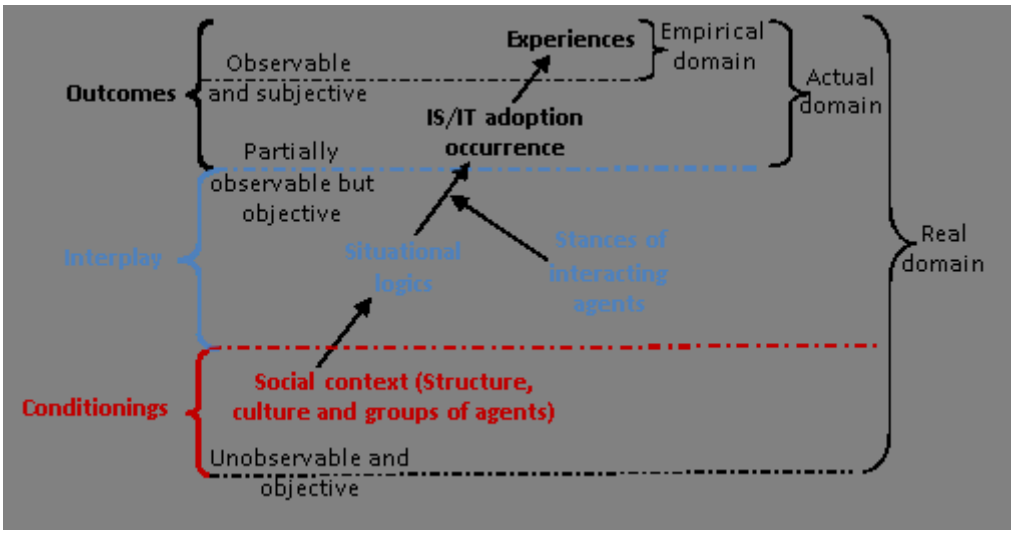


**Figure 3:** A realist conceptualization of IS/IT adoption occurrence

Working within this framework adaptation in structure, which is a precursor of technology adoption (Khanagha, Volberda, Sidhu and Oshri 2013), is enabled by particular situational logics, and interaction through power or exchange transactions is undertaken by agents who take particular stances towards their context in order to achieve their concerns. Adaptation and interaction, which are internally related to each other, together generates particular IS/IT adoption occurrences. The morphogenetic cycle provides us the means to examine and provide potential explanations of IS/IT adoption occurrences and their variations over time.

## 4. ESIM adoption – the case of ASAP

The retrospective case reported in this study concerns ASAP, an ESIM adopted by the SAP vendor. The study adopts a qualitative approach, which subsumes a combination of qualitative data collection techniques, documents and semi-structured interviews. A retrospective analysis is conducted in order to explain the adoption of an ESIM from early 1980s until 2004 through four morphogenetic cycles. Each cycle depicts a particular adoption occurrence as the interplay between the situational logic and the implementer's stance. The shape of the distribution of material resources, such as wealth, power or expertise and ideational resources, such as doctrines, theories or beliefs, which are related necessarily or contingently in compatible or incompatible relationships serve as indicators for particular situational logics. The configuration of material and ideational resources express structural relationships between the roles and activities on the institution of the SAP implementation context and ideational relationships between ASAP, the implementation process and the SAP product. The lack of or predominance of concerns for productivity, quality of products or relationships characterising different modes of reflexivity, serve as indicators for particular stances. The adaptation enabled by different situational logics is examined with regard to content and purpose of ASAP and the interaction

facilitated by different stances undertaken by implementers is assessed based on the relationships of power or exchange between implementers and other agents.

The examination of ESIM adoption occurrences follows the *conditionings*, *interplay* and *outcomes* phases of the morphogenetic cycle. Four different adoption occurrences: fragmented, aggregated, integrated and infrastructural, have been identified and are described bellow.

### 4.1 Fragmented adoption — early 1980s–1988

The first morphogenetic cycle delineates the occurrence of a fragmented adoption taking place between early 1980s and 1988.

**Conditionings**: Available on the market as early as the 1970s, "off-the-shelf" or generic application packages, which could be customised to better meet the buyer's needs began to attract increased interest among customers in the period beginning in the early 1980s. One of the few suppliers of generic software applications and contributors to the growth of the software industry was SAP AG. By the early 1980s the company develops and provides a configurable and mainframe-based business application with integrated modules, known as R/2. The underling ideas of providing a configurable product are to reduce potential problems related to the development cycle of the application package and to facilitate a rapid implementation. These ideas was rather different from the prevailing view on IS development and the use of technology to support and automate an organization's existing processes. As a global company, SAP is organised with centralised management and decentralised operations through its subsidiaries around the globe. As one of SAP's subsidiaries, SAP America benefits from operational autonomy and focuses on providing complementary services exclusively to their service partners.

**Interplay:**

*Situational logic*: By the early 1980s, there had been an explosion of corrective repairs initiated via the reinterpretation of IS development methodologies and system development processes in an attempt to resolve the inconsistencies between them. The majority of developers were engaged in corrective efforts directed toward system development content and system development processes. The few organizations that followed the path of Enterprise Systems (ES), such as modular software providers, integrated general guidelines and provided training congruent with the principles and assumptions that underpinned their ES solutions. Shaped by the principle of rapid implementation of and configurable application packages, SAP's implementation methodology takes shape as a complementary part to the implementation process of the R/2 product. The corrective ideational repairs fostered by SAP challenged the dominant IS doctrine on the IS market and in IS education, and coincided with a protective effort to preserve their integrated operations and role as both developer and implementer of the R/2 product. The *selective adaptation* occurring in the SAP implementation context is achieved through a limited extension of the content of implementation methodology by adding cognitive support the technical transformation support. Hence, the content consists of principles of a buy-in approach and configuration of R/2 provided by SAP.

*Implementers' stance*: Although continuously increasing, the number of ES vendors, who like SAP, were both developers and implementers of ES solutions remained limited compared with the number of IS developers, which dominated by the early 1980s. Due to fractured reflexivity, delineated by undetermined concerns and disconcerted experiences, SAP implementers, as both developers and implementers were passive in their orientation towards SAP implementation context. However, they did attract the interest of an increasing number of customers, who increase the legitimacy of SAP syncretic endeavours and improve its market position. They attempted to advance the alternative principles of a buy-in approach, but also sought to reuse their expertise in IS development, augmenting their distress in implementation and precluding the formation and pursuit of purposive ES implementation activities. The difficulties encountered in articulating and prioritising their ultimate concerns in relation to R/2 implementation confined implementers as a dependent and subordinated collectivity in reactive and *power-induced interaction* controlled by the R/2 developers.

**Outcomes:** The effects of selective adaptation realised through a limited extension of the content of the implementation methodology and a reactive power-induced interaction controlled by R/2 developers, contributes to a *fragmented adoption* of implementation methodology by passive implementers in a situation

 

of corrective protection. Passive implementers serve the interests of the R/2 developers who promote a buy-in package approach, as an alternative to in-house development in a centralised organisation of interlocking roles and interchangeable personnel with concentrated distribution of resources, most of them oriented towards the development of the R/2 product. This structure of necessary and complementary roles is accompanied by a culture with necessary but contradictory ideas advanced by the syncretic ideas of a buy-in package approach, which gain legitimacy from customers. The position of SAP, as a generic application package provider, is consolidated in the market. However, as differentiated access to material and ideational resources intensifies between developers and implementers due to exploration and integration of operations, an undermined ability to make resilient differences in implementation and a pronounced dependence of developers on subordinated implementers and the need to satisfy customers' interests, emerged as an unintended side-effect in the SAP implementation context.

### 4.2 Aggregated adoption — 1989–1992

The second morphogenetic cycle delineates the occurrence of an aggregated adoption of implementation methodology taking place in the SAP implementation context between 1989 and 1993.

**Conditionings:** SAP grows rapidly and by early 1990s the company introduces a new generic application package called R/3, which is based on a novel system applications architecture. The generic application package incorporates functionalities of its predecessor R/2 but it is based on a client-server architecture, which provides the benefits of portability, inter-operability and scalability. In order to benefit from the business processes embedded in the application package, the customer is required to re-engineer its business processes in accordance with R/3 product. SAP America concentrates its efforts on the one hand, in marketing and selling SAP application packages and the other hand, developing strategic partnering relationships and providing support services exclusively to their partners. In their turn, the partners provide consulting, implementation support and support services for SAP implementation to customers. The relationship between SAP and its partners is beneficial for both. SAP focuses more on generic application package development and installation and less on implementation services, which in the case of SAP America are exclusively managed by its independent partners on integration, project management and customer services. Both SAP and its partners retain their operational autonomy and differentiate themselves by specialising in complementary areas of expertise. In addition to knowledge of SAP products, the partners contribute to implementation projects with skills accumulated from previous projects and expertise through their own methodologies. However, these methodologies are specialised in particular part of implementation and differ with regard to content, congruence and efficiency in SAP implementation projects. Despite this variety of complementary but contingently related operations and expertise, and although SAP's generic application package continues to increase in popularity, its implementation is far from being without challenges. Both vendor and its partners encounter operational obstructions and practical problems in implementation projects.

**Interplay:***Situational logic*: Exploding demand for SAP solutions and for implementation resources, which were limited in terms of the available expertise available, encouraged an increasing number of consulting companies and SAP vendor to join together. Due to their differentiated distribution of resources but complementary areas of expertise, defensive alliances were initiated that shared a common interest in legitimizing SAP ideas for a buy-in package approach through defensive protection. There was mutual recognition of benefits between the ES vendor and its implementation partners, but both actors also retained sectional interests in their own operations and in being able to offer diversified services. Part of their protective efforts entailed the reuse of the available but limited SAP implementation methodology content and the reproduction of their own expertise by adding project management and BPR services. The *selective adaptation* occurring in the SAP implementation context is realised through a horizontal expansion of the implementation methodology content with added control and analysis support provided by independent partners.

*Implementers' stance*: Differentiated partners were able to mobilise and exchange material resources, particularly human assets and expertise. Due to communicative reflexivity, delineated by an ultimate concern for the maintaining of concordant inter-relationships, SAP ant its partners were evasive in their orientation toward the SAP implementation context. They conceived their operations within available but differentiated resources. Their *exchange induced interaction*, realised through cooperation was based on shared interests and an active but circumventing response intended to avoid potential constraints due to a lack of, or incongruent expertise in different SAP implementation areas. They also simultaneously renounced potential

opportunities such as those that would have allowed them to augment their positions and resources and taking a proactive role in differentiating their implementation expertise. Contentment with their position insulated against external stimuli and sustained the reproduction and efficiency of their own operations and expertise.

**Outcomes:** The effects of a selective adaptation realised through a horizontal extension of the content of the implementation methodology with potential risks for inconsistencies and an exchange-induced interaction of cooperative partners contributed to an *aggregated adoption* of implementation methodology by evasive partners in a situation of defensive protection. As the content relied on the rapid aggregation of complementary but limited parts provided by independent partners, the content of implementation methodology presented an increased risk of inconsistencies. Evasive partners with shared interests in their interrelationship are promoting a systematisation of a buy-in package approach, in a sectional organisation of independent roles and differentiated distribution or resources, most of them oriented towards project management and configuration of SAP's product. This structure of necessary and complementary roles and relations is accompanied by a culture with necessary and complementary ideas, legitimised by an increasing number of partners and customers. The position of SAP as provider and its partners with sectional interests in implementation is consolidated in the market. However, a selective assimilation of novelty and a reduced variety among implementation partners emerged as unintended side-effects in SAP implementation context.

### 4.3 Integrated adoption — 1993–1995

The third morphogenetic cycle delineates the occurrence of an integrated adoption of implementation methodology taking place in an SAP context between 1993 and 1995.

**Conditionings:** After the release of the R/3 product in 1992, SAP America's product registered an impressive increase in sale, even though the actual implementation of the product remained a challenge. The expertise necessary to implement the R/3 application was shallow. In addition, partners used their own implementation methodologies, which often were better suited to system development than to the task of implementing R/3. SAP America's lack of commitment in the implementation process and the complexity of the R/3 are issues of discontentment and concern for customers who are not only unprepared for the idea of business process reengineering but also increasingly dissatisfied with the partners' performance, support and knowledge about R/3. Hence, SAP America is induced in a frustrating situation. Ignoring its customers' concerns could be costly and risky in the long run, not least in view of the increasing competition from other ES vendors such as Oracle. Although both SAP America and its partners are wealthy, they are dependent on each other and their expertise is complementary but incongruent with their interests. In order to tackle this challenge, supported by SAP America's service division, a team of consultants with past experience having participated in joint SAP implementations were assigned to develop an implementation methodology.

**Interplay:** *Situation logic*: ES implementation partners joined together on their own terms and were operationally autonomous. Guided by their own sectional interests, they pursued the opportunity to differentiate their operations and services. Alternative ES implementation strategies, as well as specialized ideas about the role of SAP application packages in organizations and SAP implementation processes began to gain support from different groups of implementers and customers. While an ES implementation based on a vanilla strategy entailed the configuration of R/3 product, the alternative, "chocolate" strategy involved considerable customisation of the R/3 product. Mobilised by SAP America, a team of implementation partners extended the underlying ideas of a buy-in package approach and the implementation process, and exposed a complementary implementation methodology with congruent content. Alternative but complementary operations and services remained salient in practice and were exposed through conferences. The *comprehensive adaptation* taking place in the SAP implementation context was achieved through a vertical extension of the implementation methodology content with added cooperation and representation support provided by an implementation team.

*Implementers' stance*: Committed to accumulating and integrating differentiated resources in a systematic fashion, implementation partners joined together and organised their efforts. Due to meta-reflexivity delineated by organic concerns in exposing best practices, implementation partners were subversive in their orientation toward the state of SAP implementation context and concentrated on providing a specialised set of

 

ideas and resources that were compatible with an SAP implementation role. Their *exchange-induced interaction*, achieved through collaboration, was based on a commitment to integrate resources in an attempt to improve quality and raise value rationality in the SAP implementation. Their commitment to the integration and protection of quality in an SAP implementation context came at a price but long-term achievements were valued more.

**Outcomes:** The effects of a comprehensive adaptation achieved through the vertical extension of the content of the implementation methodology and an exchange-induced interaction of collaborative partners, contributed to an *integrated adoption* of implementation methodology by subversive implementers in a situation of protective opportunism. A subversive team of collaborative partners with shared interests in value rationality and quality was stimulating a systematization of an implementation methodology in a cohesive organisation or interrelated roles and similar distribution of resources. This structure of contingent but complementary roles and resources was accompanied by a culture with necessary and complementary ideas sponsored by SAP and legitimised by an increasing number of customers. A display of the alternative values that might animate the interests of passive and diversified partners has emerged as an unintended side-effect.

### 4.4 Infrastructural adoption — 1996–2004

The fourth morphogenetic cycle delineates the occurrence of an infrastructural adoption of the implementation methodology occurring in an SAP implementation context between 1996 and the early 2000s.
**Conditionings:** By 1996, the outcome of the initiative taken by SAP America and the work of the implementation team was represented by an implementation methodology that had been added to SAP's product development portfolio and extended their complementary services. The implementation methodology was introduced to SAP's partners and customers as AcceleratedSAP (ASAP), and was recommended as a de facto standard for all SAP implementations, managed not only by SAP's consultants but also its partners. The implementation methodology was included in SAP's professional services - i.e., training and certifications, and demonstrated at conferences arranged by the SAP vendor. In addition, it was 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 implementation. Moreover, a new role was added to all SAP implementation projects, namely, a SAP coach, whose level of involvement in the implementation project could range from that of project manager to quality assurance advisor. In 1999, ASAP was enhanced via the implementation of related support tools such as the SAP Solution Manager platform, which was integrated into all SAP installations free of charge and was thereafter owned by the customer. Moreover, the Solution Manager platform could be used during evaluation and implementation as well as in the normal operation of a SAP solution; the platform came to comprise part of SAP's NetWeaver platform. Some of SAP's implementation partners continued to cooperate with SAP in implementing R/3 solutions, but initiated the development and deployment of their own methodologies by extending and/or integrating elements of ASAP. Others deployed ASAP and collaborated with the vendor to enhance it. Positive results in terms of efficiency and effectiveness were indicated by SAP and its service partners after the introduction of ASAP. Moreover, SAP took a more active role in supporting customers' implementation projects and required the involvement of an SAP representative in all projects. The initiative was met with mixed feelings, in some cases being well received and in others being regarded as an added burden imposed on the already hectic schedules of consultants who first needed to acquaint themselves with ASAP. It was also perceived as another training or resource hiring cost, or as a way to increase partners' dependence on SAP's products.

**Interplay:***Situation logic*: Implementation partners with their own interests and differentiated resources in an SAP implementation context were disadvantageous and affected customer satisfaction, the performance in the implementation process and the quality of the implemented SAP product. In order to show commitment to its service partners and customers, SAP takes an active position in promoting complementary resources. A *comprehensive adaptation* occurred in the SAP implementation context through a connective extension of the implementation methodology content with organisational, coordination and production support provided by a dedicated team. A platform of diversified and specialised but complementary resources were recommended and endorsed through certification programs in the implementation context.

*Implementers' stance*: In concentrating on sustaining satisfactory implementation performance, implementation partners were active in capitalising on availabilities and circumventing constraints. Due to autonomous reflexivity, delineated by an ultimate concern on proficiency and feasible performance

achievements, SAP took a strategic stance towards its implementation context and connected specialised and diversified resources in a comprehensive platform of services and resources. Aware of the limitations and benefits of an SAP implementation, a dedicated team harnessed the compliance of various resources and circumvented certain constraints through an active and coordinated involvement in a *power-induced interaction*.

**Outcomes:** The effect of a comprehensive adaptation, entailing the connective extension of implementation methodology content and a power-induced interaction coordinated by SAP, contributed to an *infrastructural adoption* of implementation methodology by a strategic implementation team in a situation of offensive opportunism. A strategic implementation team with particular interests in task and productivity achievements was promoting a specialisation of distinctive roles and diversified distribution of resources. This structure of contingent and complementary roles and resources was accompanied by a culture with contingent and complementary ideas legitimised by implementation partners and an increasing number of customers. Intensification of sectional and divergent interests and reduction of interaction among implementation partners emerged as unintended side-effects.

## 5. Conclusion

This study has provided an alternative conceptualisation of the IS/IT adoption phenomenon, one informed by a RST underpinned by a CR perspective. Despite its complexity, RST facilitates an emergent and stratified account of a complex innovation, thereby providing a potential explanation for the occurrence of IS/IT adoption and its variations over time. Four things have been achieved in applying the suggested framework: First, it has supported the researchers in identifying particular innovation configurations. Second, it has taken into account the embeddedness of innovations within broader structural configurations. Third, it has allowed the researchers to distinguish the different stances of agents toward particular innovations and structural configurations. Fourth, we have been able to identify variations in how certain innovations have been adopted; such variations have been seen to have often occurred as a result of the interplay between structure and agency over time. Our qualitative study has provided explanatory insights and a rich description of a particular type of complex innovation and its adoption over time.
Four theoretically- and empirically-grounded implementation methodology adoption, with related conditions, have been identified:

- A *fragmented adoption,* where a *selective adaptation* achieved through limited extension to ESIM's content and a *power-induced interaction* achieved through a control of passive implementers, takes place in a situation of *corrective protection*;
- An *aggregated adoption*, where a *selective adaptation* realised through horizontal extension to ESIM's content and an *exchange-induced interaction* realised through cooperation of evasive partners, takes place in a situation of *defensive protection*;
- An *integrated adoption*, where a *comprehensive adaptation* involving a vertical extension to ESIM's content and an *exchange-induced interaction* realised through collaboration of a subversive team, occurs in a situation of *protective opportunism*; and
- An *infrastructural adoption*, where a *comprehensive adaptation* consisting of a connective extension of ESIM's content into a platform and a *power-induced interaction* attained by a strategic team through coordination, occurs in a situation of *offensive opportunism*.

The labelling and classification of implementation methodology adoption occurrences suggested in this study are corroborated by empirical evidence from literature and the study's case. In spite of its usefulness, a morphogenetic approach is comprehensive, tending to enlarge the focus of an inquiry, making it difficult to incorporate and consider all aspects within a limited study, such as this one. Hence, the potential explanation provided in this study captures only components appropriated to describe and explain the adoption of ESIMs and its variations over time in an ES implementation context. However, the occurrence of ESIM adoption might be supported or counteracted by other mechanisms, which are originating and might be identified in other contexts, such as ES operation context, generic application package development context, or an ES educational context.

While there is much research still to be carried out on this subject, this study offers a foundation for future work that may contribute to a more coherent view of IS/IT adoption phenomena. One potential avenue is to

 

examine the adoption of implementation methodology introduced in the study after early 2000s. By this time, the use of ASAP seems to oscillate between an infrastructural and integrated adoption through incorporation of advancements, such as Application Lifecycle Management (ALM), IT Infrastructure Library (ITIL), agile and lean development, production and management. Moreover, the use of ASAP is extended to an ES operation context and seems to take the form of a fragmented adoption in this context. Another potential avenue is to apply the realist IS/IT adoption framework developed in the study in other settings in order to refine it and to provide better conceptualisations and explanations of complex phenomena. Moreover, another possibility could be to enhance the explanatory potential of the realist IS/IT adoption framework by formulating coherent design propositions that provide high-level guidance for practitioners who find themselves in similar situations.

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