Association for Information Systems
AIS Electronic Library (AISeL)

ECIS 2015 Completed Research Papers

ECIS 2015 Proceedings

Spring 5-29-2015

Linking Report Individualization and Report Standardization: A Configurational Perspective

Martin Kretzer

University of Mannheim, kretzer@es.uni-mannheim.de

Follow this and additional works at: http://aisel.aisnet.org/ecis2015_cr

LINKING REPORT INDIVIDUALIZATION AND REPORT STANDARDIZATION: A CONFIGURATIONAL PERSPECTIVE

Complete Research

Kretzer, Martin, Business School, University of Mannheim, Mannheim, Germany, kretzer@es.uni-mannheim.de

Abstract

Many organizations are facing the challenge that employees supplement their standardized Accounting Information Systems (AIS) with individually tinkered spreadsheets or other types of workaround systems. While such supplements provide employees with the flexibility to adjust the AIS to their individual preferences and to respond quickly to new opportunities, these supplements also cause adverse effects such as data redundancy, limited report reuse, loss of economic scale effects, and loss of compliance with regulatory and supervisory reporting requirements.

To provide organizations with a model for balancing report standardization and report individualization, I explore and analyse the AIS of four organizations. Specifically, I adopt a configurational perspective to examine two AIS use processes simultaneously: report standardization and report individualization. The resulting model indicates the need for an iterative approach which supports discussion and feedback on individualized reports and views individualized reports as prototypes for standardized reports. I conclude may work by discussing the value and limitations of the model and research design.

Keywords: configuration theory, report reuse, multiple case study, multilevel research, affordances.

1 Introduction

Until a decade ago, there has only been little standardization of regulatory reporting across the European Union. Standardized electronic formats and data models such as XBRL and DPM were only introduced by the Committee of European Banking Supervision in 2004 and the European Banking Authority shortly after. These standards, however, remained non-binding until the introduction of the Single Supervisory Mechanism at the European Central Bank in 2014 (ECB, 2014). It is crucial to note, that this is not just "the next step" in reporting anymore, but rather represents a radical change in regulation and supervision. This is because prior initiatives for standardization of regulatory reporting focused on how organizations exchange data (and thus mainly resulted in requirements for IT departments). The enforcement of standards such as XBRL and DPM, however, affects organizations' entire data collection and data compilation chains (and thus mainly results in requirements for business departments).

Although this represents an example for the continuously growing regulatory reporting demand within the financial industry, similar trends can also be observed within further industries (e.g., pharma, ICT, energy) and across industries (e.g., mandatory IAS/IFRS adoption; Byard et al., 2011; IFRS, 2013). In addition, many organizations drive standardization projects internally with the expectations that the resulting standardized Accounting Information Systems (AIS) will be reused across teams and departments (Behrens, 2009; Durcikova et al., 2011; Morisio et al., 2002), integrate data and functionality (Fichman and Kemerer, 1997), improve data quality (Frakes and Succe, 2001), enable economic scale effects (Ceran et al., 2014), and improve compliance with internal and external policies (Alter, 2014).

However, vast research indicates that employees tend to supplement their AIS due to missing flexibility and long implementation times necessary to change them (Györy et al., 2012). These supplements may range from single, individually tinkered reports (Allen and Parsons, 2010; Davenport, 2014; Paulsson and Johansson, 2013) to developing large workaround systems that are used across multiple departments and substitute a significant portion of the organization's AIS (Alter, 2014). I refer to this phenomenon as individualization of the AIS as opposed to standardization of the AIS (Baskerville, 2011; Beck, 2007). Although the perks gained from individualization (such as high fit between the system and individual users' tasks) sound tempting, workaround systems are well-known for challenging the expected benefits for which AIS were implemented in the first place.

As a consequence, exploring how employees may enhance their AIS without creating workaround systems is highly interesting to industry and academia (Tilson et al., 2010; Yoo et al., 2012). Although the importance of managing tensions between standardization and individualization is not unique to the AIS domain, in practice AIS are among the systems that are most frequently challenged by these tensions because (1) governmental bodies continuously demand new reports at increasingly detailed levels, (2) employees particularly often supplement their systems with individually tinkered reports and (3) reuse of these reports is usually very limited across multiple employees and departments and, thus, prevents the goals of standardization such as achieving economic scale effects (Davenport, 2014).

Therefore, this paper first investigates the affordances which constitute AIS standardization and AIS individualization. Affordances are action capabilities provided to an individual, a group or an organization with a particular purpose (Majchrzak and Markus, 2012; Yoo et al., 2012). Furthermore, I suggest a way for linking AIS standardization and AIS individualization in order to achieve their goals simultaneously. Although other articles have already examined factors that enable their goals such as organizational agility (Chakraverty et al., 2013) or economic scale effects, only few, if any, articles have investigated the goals of individualization and standardization simultaneously. This paper addresses this gap. In particular, I focus on the reporting capability of an AIS because reporting is a capability provided by practically every AIS (Hall, 2013). Hence, my work addresses the research question *"Which affordances link report standardization and report individualization to each other and allow organizations to benefit from both simultaneously?"*

I first conduct four case studies to reveal a set of potential affordances that may cause agility and scale effects (Carlsson, 2004; Wynn and Williams, 2012). Upon identification of this set, I synthesize my

findings and propose a process model (Langley et al., 2013) that draws researchers' attentions to the links between standardization and individualization and guides practitioners in managing their AIS. Throughout my study, I adopt a configurational perspective because it supports examination of interconnected structures and processes that need to be understood simultaneously (El Sawy et al., 2013).

The remainder of this article is organized as follows. Section 2 builds my theoretical foundation. Section 3 presents the elements of the configurational perspective and section 4 introduces my research method. Section 5 analyses the four cases separately, develops a set of candidate affordances, and proposes a model for linking standardization and individualization. Finally, section 6 discusses the value of the model and section 7 concludes my work.

2   Theoretical Foundations

Our work explores the affordances that constitute and link the two AIS use processes (Nan, 2011) standardization and individualization. Use processes have been recognized as an important key to harvesting returned value from IT investments (Jasperson et al., 2005). My work particularly focuses on reporting as a major capability provided by an AIS. I define *report standardization* as the convergent process of unifying multiple reports (Guilford, 1967) and *report individualization* as the divergent process of adjusting reports to individual preferences (Baskerville, 2011; Beck, 2007; Avital and Te'eni, 2008).

Information System (IS) standardization and IS individualization may be distinguished along several dimensions that are commonly associated with them. First, standardization and individualization may be differentiated based on the direction of the use process. While standardization is typically associated with static, centrally enforced IS use (i.e., top-down), individualization is typically associated with dynamic IS use where individual-level use behaviours and interactions collaboratively create collective-level use patterns and outcomes (i.e., bottom-up use processes) (e.g., Nan, 2011; DeSanctis and Poole, 1994; Markus and Robey, 1988; Orlikowski, 1992). This differentiation of directions usually comes with a differentiation of control. While standardization is frequently associated with control of end user, individualization devolves control to end users and empowers them (Boudreau, 2010, 2012; Burnett and Scaffidi, 2013). I further distinguish standardization and individualization based on the organizational goals they aim to support. While standardization targets operational efficiency by realizing economic scale effects (Avital and Te'eni, 2008; Codd, 1970; Guilford, 1967; Someh and Shanks, 2013), individualization targets agility, i.e., flexible and fast system changes (Chakravarty et al., 2013; Kumar and Stylianou, 2014; Leonardi, 2011; Baskerville, 2011) as well as high alignment between a user's preferences and the technology (Goodhue, 1995; Strong and Volkoff ,2010; Xu et al., 2014). Finally, standardization and individualization differ in their learning orientation and the post-acceptance IS use concepts associated with them (Li et al., 2013). While standardization refers to exploitation, and routine, habit use of IS (Jasperson et al., 2005), individualization describes exploration and deep, innovative use of IS (Saga and Zmud 1994; Li et al., 2013; Wang et al., 2014). Table 1 compares the two IS use processes: IS standardization and IS individualization.

Distinguishing dimension	IS standardization	IS individualization
Direction	Top-down	Bottom-up
Control versus empowerment	End user control	End user empowerment
Exemplary associated goals	Scale effects, operational efficiency	Fit, agility, generative capacity
Learning orientation	Exploitation	Exploration
Exemplary associated post-acceptance use concepts	Routine use, habit use	Innovative use, deep use

Table 1.   Comparison of IS use processes: standardization versus individualization.

Extant literature (e.g., Tilson et al., 2010; Yoo, 2013) indicates that organizations may be able to balance IS standardization and IS individualization and, thus, achieve both goals simultaneously (Im and Rai, 2014; Smith, 2014; Wijen, 2014). My work builds on these foundations and first explores affordances

that constitute standardization and individualization within the domain of AIS and then links the two processes to each other. The domain of AIS is particularly suited for such an inquiry because users frequently supplement their AIS with individually tailored reports and workaround systems although their organizations as well as governmental regulatory and supervisory bodies require them to follow standardized reporting procedures that are implemented within and enforced by their AIS.

3 The Elements of the Configurational Perspective

Ie adopt a configurational perspective because it provides a view of a phenomena as clusters of inter-connected structures and processes that need to be understood simultaneously. It suits very well to situations in which a system can reach the same outcome (e.g., economic scale effects) from different initial conditions and through different paths (i.e., equifinality; El Sawy et al., 2013). In my work, each configuration is determined by (1) the set of affordances that constitute report standardization or report individualization and may enable economic scale effects or organizational agility and (2) the set of contextual conditions that may interact with these affordances (Henfridsson and Bygstad, 2013). In this section I introduce the concept of affordances as well as the contextual conditions I controlled for.

3.1 The Concept of Affordances

Extant literature uses the notion of *generative mechanisms* to refer to *potential* capacities a certain entity provides to produce certain causal effects (Bygstad, 2010; Hedstrom and Ylikoski, 2010; McGrath, 2013). Such capacities are inherent to physical and social structures (Morton, 2006; Wynn and Williams, 2012). They enable or limit what can happen in a given context (Sayer, 2010; Smith, 2006).

A "special case of generative mechanisms" (Volkoff and Strong, 2013, p. 832) are affordances (Gibson, 1986). An *affordance* is a generative mechanism which immediately leads to a "concrete outcome that arises from the relation between an artefact and a goal-oriented actor" (p. 823). For instance, a fallen log affords a person with the opportunity of sitting (Volkoff and Strong, 2013). If a person would actually sit down on the fallen log, the affordance would be referred to as being *actualized* or *enacted* because the potential capacity the log provided, that is sitting, would have been realized (Bhaskar, 1998a).

Our work first identifies a set of contingent, plausible candidate affordances whose actualization (or unactualization) may allow organizations to (1) realize scale effects with regards to report development and/or (2) respond quick and flexible, i.e. agile (Bernardes and Hanna, 2009), to new reporting requirements. Based on this set of affordances, different configurations of affordances are compared in order to determine the best set of affordances (Wynn and Williams, 2012). Thereby, I differentiate affordances based on the level at which they emerge. While individual level affordances refer to affordances primarily associated with outcomes on the individual level, group level affordances refer to affordances primarily associated with collective outcomes on the group level (Strong et al., 2014).

3.2 Contextual Condition I: User Control versus User Empowerment

While affordances are capacities provided directly by an AIS, contextual conditions are further, potentially influencing variables that may bias examined outcomes (Rihoux and Ragin, 2009). My research design, which will be introduced in detail in the next chapter, allows us to control for two contextual conditions. I selected *end user control versus end user empowerment* (e.g., Boudreau, 2010, 2012) and *specialized organizational units* (e.g., Unger et al., 2008; Zeid, 2006) as contextual conditions because extant literature indicates their relevance for standardization and individualization. Regarding *end user control versus end user empowerment* (CC1), I divide organizations based on whether they (1) support and empower end users to develop new individual reports or (2) implement and enforce controlled report development processes which need to be followed (Maas et al., 2012).

The trade-off between the two sides, that is, the trade-off between leaving freedom to employees and controlling them, has been investigated extensively in literature yet. Since the 1980s, management liter-

ature has been examining the challenge of achieving balance between empowering and controlling individuals. Even the first definitions of empowerment were already closely linked to controlling employees (Duane and Finnegan, 2000). For instance, Rappaport (1987) explained that "empowerment refers to a process of becoming able or allowed to do some unspecified thing because there is a condition of dominion or authority with regard to that specific thing as opposed to all things". In other words, empowerment places boundaries around an area in which the individual may test and experiment (Fatout, 1995). The adherence to these boundaries needs to be controlled in a way that balances the tension between control and empowerment (Ghazwaneh and Henfridsson, 2013; Simons, 1995). With regards to IS, user empowerment refers to users who are becoming allowed to modify a system within their use context (Won et al., 2006). User empowerment is typically viewed as the opposite of user control (e.g., Duane and Finnegan, 2000; Boudreau, 2010; Elmes et al., 2005; Maas et al., 2012).

3.3 Contextual Condition II: Specialized Organizational Reporting Unit

As my second contextual condition (CC2) I acknowledge the existence of dedicated organizational units. Extant literature frequently recommends establishing additional organizational units for balancing stability and agility of IS that focus reporting capabilities. These cross-functional units are oftentimes referred to as Business Intelligence Competency Centre (BICC; O'Neill, 2011). They are specialized organizational units with a formal and permanent structure (Unger et al., 2008; Zeid, 2006). They focus on aligning business functions with IT departments (Forrester Research, 2013a) and perform cross-functional tasks regarding development, operation and support of reports across their company. Although vast literature promotes their benefits, establishing a BICC represent a high investment and therefore is oftentimes only a reasonable choice for large organizations.

4 Research Method

Building on the aforementioned theoretical foundations and configurational perspective, my endeavour aims at identifying and linking affordances that may cause agility and economic scale effects. As such an inquiry requires flexibility for examining aspects that may not be completely identifiable at the outset of the study, I adopt a qualitative research approach (Eisenhardt, 1989; Myers, 2008; Sarker et al., 2013). Specifically, I select a multiple case study design to answer my research question because this facilitates recognition of contingency patterns (Eisenhardt, 1991; Zachariadis et al., 2013) which are relevant for the configurational perspective (Henfridsson and Bygstad, 2013).

At the outset of my study, four sites were theoretically sampled in order to ensure an adequate foundation for comparison and to maximize variation of the identified contextual conditions (Guba and Lincoln, 1989; Lapointe and Rivard, 2007). In other words, based on my personal experiences from working and collaborating with potential organizations, I selected two sites that purport and control report development processes and two sites that empower and support employees to develop new individual reports (CC1). Furthermore, I assured that two organizations had established a specialized organizational reporting unit and two organizations had not (CC2).

I focused on vehicle manufacturing companies, because otherwise different regulatory requirements could have highly biased organizations' reporting requirements and, thus, impeded comparability of cases. Besides, vehicle manufacturing companies are suited for my inquiry because they typically use reporting capabilities in manifold usage scenarios that may be compared across organizations (e.g., financial accounting, process analyses, material analyses, logistics monitoring). Regarding software supplier, the two companies with BICCs are using the same software product provided by the same global vendor (Forrester Research, 2013b; Gartner, 2014). Conversely, the two companies without such a unit are using software products provided by different, rather small and specialized vendors.

Furthermore, empirical corroboration was sought in several ways. Besides examining multiple cases, I interviewed employees from different departments, explored potential contingent explanations, and an-

alysed documents (e-mails, webpages) (Myers and Klein, 2011; Williams and Karahanna, 2013). I conducted semi-structured in-depth interviews to gain detailed real-life data. I first interviewed managers from the IT department or members of the BICC because these people were most-likely able to provide us with rich information about their AIS. Additional respondents were recruited using snowball sampling and their suitability to provide additional insights (Patton, 2002). Table 1 shows detailed descriptive information about all interviewees grouped by organization. The interviews lasted 30-50 minutes and were transcribed and translated into English. Transcripts were analysed according to the Strauss and Corbin (1990) step-wise coding paradigm, consisting of open, axial, and selective coding. Resulting codes were primarily used to identify affordances and their actualizations. Table 2 provides descriptive details about the theoretical sample.

Firm	End user empower-ment	Special. org unit	Em-ployees	Respondents (total: 20)
Alpha (USA)	Yes	No	300-500	• IT professionals: 1 IT director, 2 BI experts • Power users: 1 financial analyst, 1 lean manager • User: 1 program manager
Beta (UK)	No	No	300-500	• IT professionals: 1 IT director, 1 BI expert
Gamma (Germany)	Yes	Yes	20'000	• IT professional: 1 BI administrator • BICC member: 2 (in-house) BI consultants • Power users: 1 process owner marketing &sales, 1 process owner cost accounting, 1 process owner logistics
Delta (Germany)	No	Yes	10'000	• IT professional: 1 system administrator • BICC member: 1 director, 2 (in-house) BI consultants • Power user: 1 process owner logistics • User: 1 supply chain management director

Table 2.   Descriptive case information.

5   Findings

5.1   Within Case Analyses

5.1.1   Alpha

Reports at Alpha are developed according to two different routines. As a first option, reports may be developed by users themselves by extracting data into spreadsheets and building individual reports there. As a second option, reports may be implemented by the central IT department and then verified by the users. Whether the central IT department or a user develops a new report is not clearly defined. Instead, it depends on the current workload of IT professionals as explained by the IT director: *"Users are able to develop their own reports. They do not need us, which of course is better for me and my limited resources. That is a good thing. It gives them more control over the results. (IT professional 3)"*

Furthermore, users at Alpha do not only develop individual reports based on data from their internal systems but also enrich it with data from external sources: *"We also have […] a database [which] takes data from a company in the UK. […] It includes information related to our product. And we use it to […] derive our market share. […] The database is extracted, and combined with the data that we have and that is used by our sales people and our executives to figure out where the market's going and how much market share we have. (IT professional 2)"*

Alpha uses its individual reports as prototypes for new standardized analyses. In particular, the IT department creates new standard reports based on existing individual reports. Importantly, individual reports that extract and transform data and contain additional fields, are loaded back into the stable AIS. Thus, the data flow between the AIS and individual supplements is bi-directional: *"We take some*

spreadsheets that the users are maintaining and they save them to a folder which is mounted in way that the UNIX machine can read the same folder. […] Then I can use it in my system. It is kind of more flexible this way. (IT professional 3)"

However, although Alpha established a bi-directional data flow between spreadsheets and the main database of its AIS, data that is loaded from spreadsheets into the main database is not reused across different departments because these departments do not know about the data. As a consequence, Alpha cannot benefit from synergies that might occur if multiple employees used the same report: *"There are small reports that only certain departments know about. […] If one could create transparency there, many others would benefit from it or say: 'We are doing it differently and it is much easier!' Then one could use synergies. (User 2)"*

5.1.2 Beta

In contrast to Alpha, Beta has a clearly defined process for developing reports. Users may not develop own reports or extract any data. Instead, if a user needs an individual report, IT professionals first look for potential further users and discuss the requested report with them: *"If you got a job doing a report in finance and you know engineering will also need it, you then bring the two together. […] You could build it to tailor both. (IT professional 1)"* This assures that IT professionals stay informed about new requirements and existing reports. It also allows them to adjust new reports to the needs of multiple potential users so that reports will actually be reused. Besides, Beta attempts to generate scale effects through continuously monitoring usage of reports and removing existing reports as indicated by the following excerpt: *"You have your catalogue of all the different types of reports and then you need to go through them on a regular basis to make sure 'Are we still using this information?' (IT professional 2)"*

Beta's report development process provides IT with knowledge about all existing reports and allows IT professionals to derive new reports from existing ones. For instance, even if at the time of development no further departments are interested in a particular report, IT would know about its existence and thus be able to create further reports based on it.

However, since discussions between IT and business departments take time and IT resources for developing new reports are limited, Beta currently cannot respond quickly to newly arising requirements: *"We got a lot of problems now which we wouldn't be experiencing if we just used something else from where users could extract data. Then they would be able to get all the reports from there. (IT prof. 1)"*

5.1.3 Gamma

Similar to Alpha, employees at Gamma are empowered to extract data and develop their own reports when they realize shortcomings of their AIS. However, in contrast to Alpha, Gamma established a BICC between the business function and the operational IT function. BICC experts foster report reuse across business divisions and develop report templates that serve as foundations for standard and individual reports. In addition, Gamma introduced so-called *process owners* (POs) within each department. POs are power users who receive special training in developing reports and evaluating whether a report may be of interest to further users in their department as well. Compared to BICC experts, POs are able to develop standard reports which may be reused within their departments. However, they do not develop standard reports which may be reused across business divisions. A BICC expert explains the PO role as follows: *"You should distinguish when talking about users. There definitely should be a user within each business department who takes the lead. We call them process owner. They know a lot about their department and the system but they don't need programming experience. (BICC expert 1)"*

The established report development process provides agility to users by empowering them to rapidly respond to new reporting requirements. Specifically, different users and process owners are equipped with specialized reporting tools (SAP, 2013) for accessing and modifying the data stored within their AIS: *"Process owner get 'Design Studio' authorizations. […] We have several reports that may be changed individually. However, this may only be done by advanced users. (PO 3)"*

Furthermore, my findings at Gamma revealed that communication across single users, teams and departments causes standardization because users discuss individual reports and, thus, provide information on how individual reports would need to be changed to support a larger number of users. This allows POs to collect requirements for standardizing reports as indicated by the following excerpt: *"Over the course of time you have to keep up with the users and frequently collect feedback. [Otherwise] they run away from the standard although, maybe, they would not have to. (PO 2, Gamma)"* Similarly, discussing reports and collecting feedback allows BICC experts to iteratively develop report templates: *"That is a typical life cycle. In my experience, it's best if I don't try to define a standard in the beginning that suits all users, but rather try to build something open which suits, for instance, two areas. Then I see whether I can include areas 3, 4, and 5. This should be seen as a development process. (BICC expert 2)"*

The development of standard reports and templates supports reuse of reports across teams, departments and entire business divisions. Eventually, it affords realization of economic scale effects: *"Due to the standardization, we can provide multiple business divisions with the same solutions for similar applications, similar processes, and comparable tasks. […] Of course that is a scale effect. (BICC expert 2)"*

5.1.4 Delta

Development of individual reports is discouraged at Delta. Technical measures are implemented to mitigate data extraction and enforce Delta's clear report development process. If a user needs a new report, the user has to contact the process owner who is assigned to the user's department. The PO then forwards the request for a new (or modified) report to Delta's BICC. BICC experts evaluate importance and reuse of the requested report across departments and locations and implement the report. If deep technical knowledge is required (e.g., extensive SQL programming skills), the request is forwarded to Delta's IT department for implementation. Importantly, BICC experts evaluate whether a new report needs to be developed at all or whether a similar report already exists which could be modified and reused instead. While this approach supports report reuse, it also impedes quick adjustments and may become bothersome as indicated by the following excerpt: *"We can always think of additional information that would allow us to get better and thus we have many requirements. This may be annoying (User 1)"*

Similarly to the other companies, individual reports at Delta are viewed as prototypes and can be refined and used as input for standardized report templates as explained by a BICC expert: *"You build prototypes and then the entire maturity emerges until you say 'OK, this is it.' This is then integrated into the template. (BICC expert 3)"* However, at Delta there appears to be a lack of communication about existing reports. Employees only provide limited feedback on their colleagues' reports; thus making it difficult for their colleagues (as well as POs and BICC experts) to find out how individual reports would need to be changed in order to support a larger number of users. For instance, an IT professional explains the need for a more communication encouraging system: *"You do not have to deliver the overarching standard right away; but you have to provide a system where people can discuss that. […] With another system I was able to create a wiki page which exactly describes how it works, how one may use it, and what the preconditions are. Thus, I managed to enable one person from each team to becoming a 'disseminator' [who] may then spread knowledge about the system within his team. (IT professional 1)"*

5.2 Cross-Case Analysis

This section identifies and analyses affordances that *contingently* cause individualization or standardization of an organization's AIS. I assume that it is the actualization (or lack of actualization) of affordances that may lead to one outcome in a specific context and another outcome in a different context (Bhaskar, 1998a; Henfridsson and Bygstad, 2013). This means that the actual effect a specific affordance causes depends on whether further affordances (and contextual conditions) are actualized or not because affordances (as well as contextual conditions) may interact with each other (Henfridsson and Bygstad, 2013). Therefore, the first subsection reveals a set of candidate affordances and explains how these may be actualized. After that, the second subsection recalls which affordances were actualized within each

of the four cases, draws inferences and abstracts a process model for linking report individualization and report standardization.

5.2.1 Retroduction: Identification of a Set of Plausible Candidate Affordances

One characteristic of configurational perspectives is that the same affordances may cause different outcomes in different configurations. Since the outcome depends on configurations (i.e., sets of affordances and contextual conditions), it depends on the direct effects of actualizations as well as interaction effects. Such configurations are usually studied by mentally abstracting actual events from empirical experiences and linking these events to the set of affordances that *may* have caused them (Bhaskar, 1998b; Henfridsson and Bygstad, 2013). This describes a process of mentally reducing events to a set of plausible candidate affordances and is referred to in literature as retroduction (Peirce, 1898; Wynn and Williams, 2012)[1] Retroduction generates a set of provisionally adopted hypotheses (Peirce, 1896) which then need to be further corroborated (Wynn and Williams, 2012).

Actualizations of affordances depend on actors or, more specifically, the actors' beliefs which motivate their behavioural intentions to act in certain ways (Bhaskar, 1998b). While the actualization of an individual level affordance (IA) refers to the actions taken by a single employee to achieve a specific outcome, the actualization of a group level affordance (GA) refers to the actions taken by multiple employees to achieve a specific outcome (Strong et al., 2014). Following the recommendations of Strong et al. (2014), I name each affordance as a gerund associated with the action that would need to be taken to actualize it. Table 3 lists all identified CCs, IAs, GAs as well as organizational goals (OGs).

ID	Description	Actualization
CC1	End user empowerment to extract data and/or modify the data model	End users are empowered to extract data and/or change the data model by themselves
CC2	Existence of a specialized organizational reporting unit	The organization has a dedicated cross-functional unit "between" the IT department and business departments focusing on reporting
IA1	Realizing shortcomings of existing reports	Individuals regularly recognize new requirements
IA2	Responding swiftly to new reporting requirements/ opportunities	Individuals resolve shortcomings in a short amount of time
IA3	Incorporating organization-external data	Individuals enrich organization-internal data with external data
GA1	Discussing individual reports	Individuals discuss and provide feedback on reports that were originally individualized to other users or user groups
GA2	Reusing reports	Individuals reuse reports that were originally individualized to other users or groups
GA3	Using individual reports as prototypes for standard reports	IT professionals and or business users derive standard reports from individual reports
OG1	Enabling organizational agility	The AIS improves organizational agility
OG2	Generating organizational scale effects	The AIS allows the organization to produce economic scale effects

Table 3.   Contextual conditions, individual and group affordances, and organizational goals.

---

[1]Aristotle distinguished three types of reasoning: (1) "synagögé" or "anagögé" ("something actually is", *deduction*), (2) "epagögé" ("something must be", *induction*), and (3) "apagögé" ("something may be"). Peirce (1896, 1898) translated "apagögé" with *retroduction* although previous scientists used the term *abduction*. According to Pierce, *abduction* would be misleading and "break the continuity of the train of Aristotle's thought". Today, *abduction* and *retroduction* are used interchangeably.

5.2.2 Empirical Corroboration: Linking Report Standardization and Report Individualization

Although the previous subsection identified multiple affordances that may cause OG1 and OG2, I acknowledge an independent reality in which some affordances have greater explanatory power than alternatives (Wynn and Williams, 2012). As a consequence, following the identification of alternative theoretical explanations in the form of causal affordances, this subsection corroborates affordances using empirical evidence found within and across cases. The goal of empirical corroboration is to select the affordances that provide the best explanation (Wynn and Williams, 2012) for how an AIS may support organizational agility (OG1) and generate economic scale effects (OG2) simultaneously.

Prior studies have adopted various techniques in order to determine the best affordances from a set of candidate affordances. These include, for instance, comparison of affordances (Danermark et al., 2002), elimination of affordances (Bhaskar, 1979), elaboration of affordances (Bhaskar, 1979), assessment of affordances (Mingers, 2006), summative validity (i.e., seeking empirical evidence against an affordance; Lee and Hubona, 2009; Volkoff et al., 2007), pattern matching (Yin, 2003) or combinations thereof (Bygstad, 2010). For my research inquiry, I decided to compare affordance actualizations because this eases examination of multiple configurations (Henfridsson and Bygstad, 2013). Subsequently, I determine the "best explanation" (Wynn and Williams 2012, p. 796) using logical reasoning and elimination (Bhaskar, 1979) as well as further empirical evidence found within the studied cases. Figure 1 starts my empirical corroboration by comparing actualizations of CCs, IAs, GAs, and OGs in a format typical for configurational analysis (e.g., El Sawy et al., 2014; Fiss, 2011; Henfridsson and Bygstad, 2013).
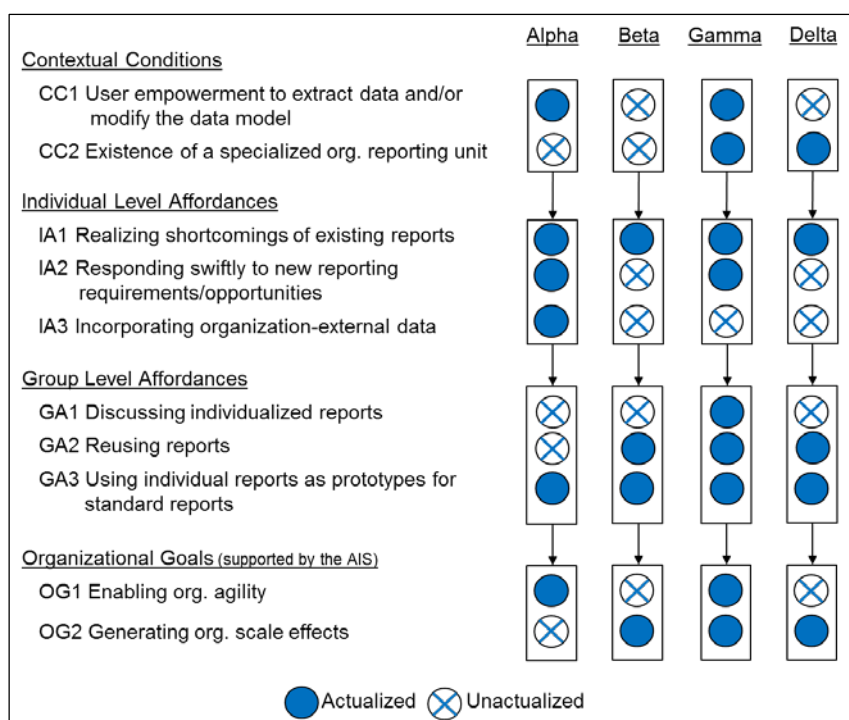

Figure 1.   Comparison of actualizations across single cases.

Based on my comparison of actualizations I assess explanatory power of each affordance and contextual condition relative to alternative explanations (Wynn and Williams, 2012) and propose a concrete process model (Langley et al., 2013) that may help practitioners to focus on the relevant affordances. My comparison indicates that empowering users to extract data and/or modify the data model (CC1) allows users to swiftly respond to new reporting requirements and opportunities (IA2) and eventually leads to AIS that support organizational agility (OG1). However, only one of the two companies that empowered users has also been able to reuse reports (OA2) and generate organizational scale effects (OG2). In particular, I noticed that Alpha and Gamma (i.e., the two firms in which users are allowed to extract data

for individual reports and/or change the data model) differ in four points: (1) Gamma has established a specific organizational reporting unit while Alpha has not (CC2), (2) Alpha allows users to load external data into its AIS while Gamma does not (IA3), (3) employees at Gamma provide feedback on reports that are tailored to the needs of their colleagues (GA1), and (4) employees at Gamma are reusing reports that were initially tailored to the needs of their colleagues (GA2).

Based on this identification of differences between Alpha and Gamma, the cases Beta and Delta allow us to identify which differences are most likely enabling Gamma to generate organizational scale effects and impeding Alpha from doing so. Specifically, I notice that, of the four identified differences between Alpha and Gamma, Beta and Delta only differ from Alpha in difference 2 (incorporation of external data, IA3) and difference 4 (report reuse, GA2). This indicates that Gamma's (un)actualization of the affordances IA3 and GA2 allowed Gamma to achieve organizational scale effects.

Thus, I can draw several conclusions. First, incorporating external data into AIS may make it hard for organizations to realize reuse of reports. Second, if an organization empowers its users to extract data and/or modify the data model, the organization should also encourage discussions about individual reports. Such discussions provide feedback on individual reports, initiate adaptation to further users' needs and, eventually, increase report reuse. Third, organizations should not aim to develop reports that fit many different purposes. Rather, they should first develop reports that fit only few users' requirements. Only after that, they should extend these reports to meet the demands of further users (GA3). Fourth, I found that not only do individual reports serve as prototypes for standard reports, but also may standardization lead to individual reports that would otherwise not be developed (or even be required). For instance, if a report is standardized in order to address the needs of departments A and B, further departments C and D may start to individualize it to their needs although they were not initially targeted users. This circular effect of individualization leading to standardization and vice versa was also indicated by the interviewees. For instance, the BICC director at Delta explained: *"A living AIS is always changing. The analysis that it allows will again provide the chance to identify new issues and to develop new solutions and new tools."* (BICC expert 3, Delta)

Fifth, I noted that reports vary regarding the time horizon for which they provide benefits to the organization. While individual reports may be developed and implemented swiftly and improve employees' peak performance in the short run, standard reports are more likely to be reused and generate organizational scale effects such as less maintenance costs per user in the long run (Smith and Lewis, 2011). For instance, an IT professional at Alpha explains: *"The long-term supportability is a downside of the users having their way with spreadsheets. But somewhere there is a balance point that kind of makes everyone happy. (IT professional 3, Alpha)"*

The long-term benefit of standardized reports is also supported by reports' costs. While in the short run individual reports appear to be less costly, they are likely becoming more expensive in the long run because they limit scale effect opportunities. In addition, individual reports typically have shorter lifecycles which results in higher maintenance costs as indicated by the following excerpt: *"At first sight, a report development within the AIS is more expensive than a spreadsheet solution. But maybe not if the developed solution will be used longer."* (BICC expert 1, Gamma)

Finally, I propose a model that may guide practitioners who strive for agility and scale effects simultaneously. The model suggests a process linking affordances to organizational goals. It views individualization as the process that enables employees to rapidly respond to new requirements and standardization as the process that causes reuse of reports and generates economic scale effects. To accomplish both goals, these two processes need to take turns. Therefore, the affordances of realizing new requirements (IA1) and discussing reports (GA1) are particularly important because they link individualization and standardization and vice versa. Figure 2 visualizes the proposed dynamic equilibrium model.
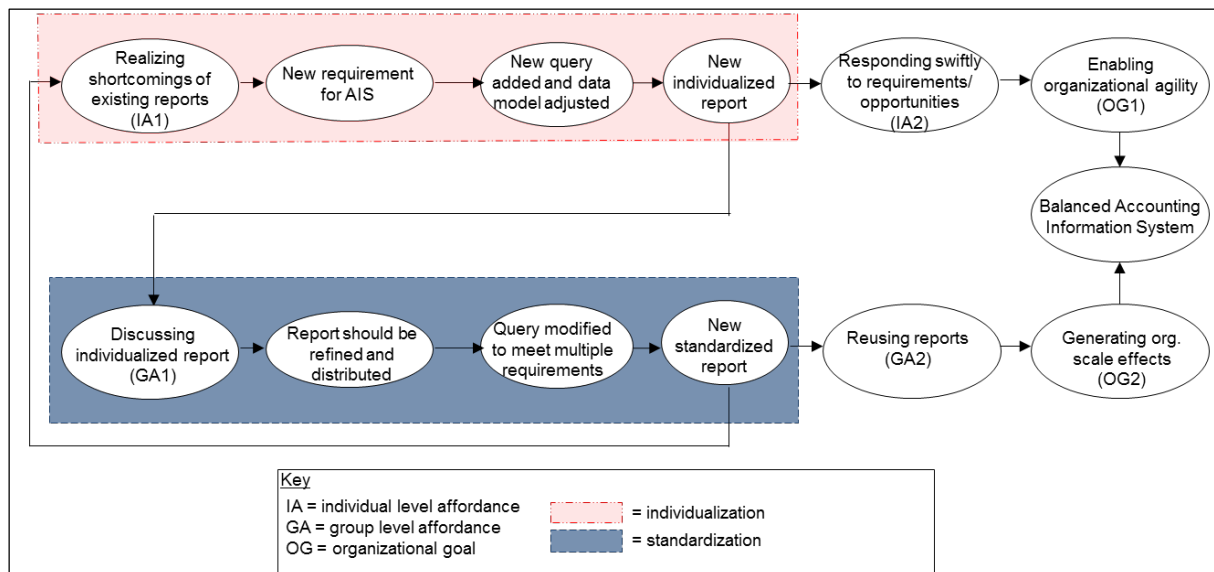
Figure 2.   Dynamic Equilibrium Model for Accounting Information Systems.

6   Discussion

Our dynamic equilibrium model is built based on retroduction of actualizations across four organizations and subsequent corroboration. It reflects a mid-range theory because its theoretical concepts are specific to AIS. Besides, it also reflects a process theory because it illuminates the tensions between stability and agility (Kumar and Stylianou, 2014; Smith 2014) and reveals the dynamic activity underlying the maintenance and reproduction of stability over time (Langley et al., 2013). While extant literature mainly focused on identification of antecedents causing agility and/or scale effects, my work focuses on affordances that constitute and link these two IS use processes in order to accomplish their goals simultaneously. By identifying and linking affordances of opposing IS use processes, my work explains, at a sufficiently detailed level, how and why outcomes occur, rather than focusing solely on what outcomes occur and what the impediments to those could be.

Achieving significant performance outcomes often depends on an organization's ability to manage both standardization and individualization (e.g., Benner and Tushman, 2003; Li et al., 2013; Teece et al., 1997). However, many of these studies have not regarded how the two processes may work in a synergistic manner (Maas et al., 2012; Tilson et al., 2010). First, individualization (Baskerville, 2011) and similar approaches such as *end-user development* (Burnett and Scaffidi, 2013), *Shadow IT* (Behrens, 2009) and *tailorable design* (Germonprez et al., 2007, 2011) have been promoted recently to provide benefits such as timely development and greater alignment between system requirements and users' needs. These approaches focus on which benefits may be achieved and how but do not provide guidance on how to overcome their downsides. Second, literature on standardization has been promoted to provide benefits such as data integration and management control (e.g., Bunker et al., 2008; Mehta and Hirschheim, 2004). However, these streams do not link their benefits to benefits typically associated with individualization. Finally, third, some scholars examined balances between goals such as agility and scale effects. However, these studies oftentimes focus on logistics and supply chain management cases (e.g., Im and Rai, 2014) or investigate the two sides separately without considering linkages and interaction effects that may occur in different configurations (e.g., Maas et al., 2012; Swafford et al, 2008).

Overall, extant approaches differ from the model in six ways. First, my model illustrates a process for linking standardization and individualization, rather than examining them as two isolated drivers that both offer advantages. Second, my model features immediate concrete outcomes of affordance actualization and how affordances contribute to organizational goals, rather than solely investigating whether organizational goals are accomplished (Strong et al., 2014). Third, my model reflects the impacts of

actualization on the individual and the organizational level, rather than examining outcomes at a single level (Burton-Jones and Gallivan, 2007). Fourth, my model applies an abstract perspective on reporting capabilities of AIS and illustrates a way for achieving benefits of individualization and standardization simultaneously, rather than focusing on benefits of either one without considering potential interaction effects between them. Fifth, by focusing on report reuse and report development, my model examines a common practical AIS problem, rather than examining abstract technological changes in general (Allen and Parsons, 2010). Sixth, my model is supported by findings from four systematically selected organizations, rather than a single organization or conveniently sampled organizations.

In addition, my model has implications for practitioners. It may guide managers in fostering individualization and standardization simultaneously. In particular, my model may improve managers' understanding of (1) how AIS afford certain capabilities, (2) how standardization and individualization may alternate, and (3) how benefits of standardization complement benefits of individualization. Balancing standardization and individualization is critical for today's organizations. On the one hand side, governmental institutions are continuously passing laws which standardize reporting requirements (United Nations Statistics Division, 2014). However, on the other hand side, employees are increasingly self-determined and individualizing the systems they are working with (Baskerville, 2011; Beck, 2008).

Our work is subject to several limitations. Although I theoretically sampled the investigated cases and considered contextual conditions at the outset of my study, further unobserved effects may have biased my assessments of actualizations. Furthermore, my study focused on reporting capabilities of AIS within vehicle manufacturing companies. As a result, caution is required in generalizing my findings. An examination of further systems in further settings may mitigate these limitations. However, since I focused on reporting as a capability which is provided by AIS across all industries, I believe that both the comparison of cases as well as the resulting model are sufficiently generic. Thus, I have considerable reason to believe that my findings apply to AIS implementations in further industries, too. Nevertheless, future research may address and mitigate these limitations. In addition, future research may build on my study and focus on the identified linkages between standardization and individualization. For instance, an investigation of how organizations may proactively foster discussions about new individual reports and how technical artefacts may support this would be highly relevant for organizations.

7 Conclusion

In the last decade, organizations all over the world increased their investments into implementing standardized AIS. However, due to common problems with standardized AIS such as missing flexibility and long implementation times necessary to change them (e.g., Alter, 2014; Behrens, 2009; Györy et al., 2012), users oftentimes supplement standardized AIS with individual spreadsheets or develop entire workaround systems. Unfortunately, these supplements represent several threats to standardized AIS such as data redundancy and limited reuse of existing reports. Consequently, it is important to understand how organizations may balance standardized AIS with individually developed supplements (Tilson et al., 2010; Yoo, 2013). This gains particular importance in times in which governmental organizations continuously introduce new regulatory and supervisory reporting requirements (Bull, 2013).

To address this challenge I examined report standardization and report individualization within four organizations. I adopted a configurational perspective which allowed us to focus on interconnected IS use processes that need to be studied simultaneously (El Say et al., 2013): AIS standardization and AIS individualization (Baskerville, 2011; Li et al., 2013). Throughout my work I rigorously followed the respective methodological recommendations for such an inquiry (i.e., El Sawy et al., 2013; Wynn and Williams, 2012; Zachariadis, 2013). In particular, I reduced the events for which I found empirical evidence to a set of candidate affordances, then corroborated this set, and finally proposed a model which links AIS standardization and AIS individualization. By linking the two IS use processes standardization and individualization I illustrate a possibility for organizations to trade off the benefits of these two processes. I concluded the paper by discussing the value and limitations of my work.

References

Allen, G. and Parsons, J. (2010). "Is Query Reuse Potentially Harmful? Anchoring and Adjustment in Adapting Existing Database Queries." *Information Systems Research* 21 (1), 56-77.

Alter, S. (2014). "Theory of Workaround." *Communications of the AIS* 34 (55), 1041-1066.

Avital, M. and D. Te'eni. (2009). "From Generative Fit to Generative Capacity: Exploring an Emerging Dimension of Information Systems Design and Task Performance." *Information Systems Journal* (19), 345-367.

Baskerville, R. (2011). "Individual Information Systems as a Research Arena." *European Journal of Information Systems* 20, 251-254.

Beck, U. (2007). "Beyond Class and Nation: Reframing Social Inequalities in a Globalizing World." *British Journal of Sociology* 58 (4), 679-705.

Behrens, S. (2009). "Shadow Systems: The Good, the Bad, and the Ugly." *Communications of the ACM* 52 (2), 124-129.

Benner, M. J. and M. L. Tushman (2003). "Exploitation, Exploration, and Process Management: The Productivity Dilemma Revisited," *Academy of Management Journal* 28 (2), 238-256.

Bernardes, E. S. and M. D. Hanna (2009). "A Theoretical Review of Flexibility, Agility and Responsiveness in the Operations Management Literature." *International Journal of Operations & Production Management* 29 (1), 30-53.

Bhaskar, R. (1979). *The Possibility of Naturalism*. London, UK: Routledge.

Bhaskar, R. (1998a). "General Introduction." In: *Critical Realism: Essential Readings*, Ed. by M. S. Archer, R. Bhaskar, A. Collier, T. Lawson, and A. Norries, London, UK: Routledge, ix-xxiv.

Bhaskar, R. (1998b). "Philosophy and Scientific Realism." In: *Critical Realism: Essential Readings*, Ed. by M. S. Archer, R. Bhaskar, A. Collier, T. Lawson, and A. Norries, London, UK: Routledge, 16-47.

Boudreau, K. (2010). "Open Platform Strategies and Innovation: Grating Access vs. Devolving Control." *Management Science* 56 (10), 1849-1872.

Boudreau, K. (2012). "Let a Thousand Flowers Bloom? An Early Look at Large Numbers of Software App Developers and Patterns of Innovation." *Organization Science* 23 (5), 1409-1427.

Bull, P. (2013). *Statistics for Economic and Monetary Union. Enhancements and New Directions 2003-12*, Frankfurt am Main, Germany: European Central Bank.

Bunker, D., Kautz, K. and A. Anhtuan (2008). "An Exploration of Information Systems Adoption: Tools and Skills as Cultural Artefacts – The Case of a Management Information System." *Journal of Information Technology* 23, 71-78.

Burnett, M. M. and C. Scaffidi (2013). "End-User Development." In: *The Encyclopedia of Human-Computer Interaction*. Ed. by M. Soegaard and R. F. Dam, 2nd Edition, Aarhus, Denmark: The Interaction Design Foundation.

Burton-Jones, A. and M. J. Gallivan (2007). "Towards a Deeper Understanding of System Usage in Organizations: A Multilevel Perspective." *MIS Quarterly* 31 (4), 657-679.

Byard, D., Li, Y., and Y. Yu. (2011). "The Effect of Mandatory IFRS Adoption on Financial Analysts' Information Environment." *Journal of Accounting Research* 49 (1), 69-96.

Bygstad, B. (2010). "Generative Mechanisms for Innovation in Information Infrastructures." *Information and Organization* 20 (3-4), 156-168.

Carlsson, S. A. (2004). "Using Critical Realism in IS Research." In: *The Handbook of Information Systems Research*. Ed. by M. Whitman and A. Woszczynski, Hershey, PA, USA: Idea Group, pp. 323-338.

Ceran, Y., Dawande, M., Liu, D., and V. Mookerjee (2014). "Optimal Software Reuse in Incremental Software Development: A Transfer Pricing Approach." *Management Science* 60 (3), 541-559.

Chakravarty, A., Grewal, R., and V. Sambamurthy (2013). "Information Technology Competencies, Organizational Agility, and Firm Performance: Enabling and Facilitating Roles." *Information Systems Research* 24 (4), 976-997.

Codd, E. F. (1970). "A Relational Model of Data for Large Shared Data Banks." *Communications of the ACM* 13 (6), 377-387.

Danermark, B., Ekstrom, M., Jakobsen, L. and J. C. Karlsson (2002). *Explaining Society. Critical Realism in the Social Sciences*. London, UK: Routledge.

Davenport, T. H. (2014). *Big Data @ Work: Dispelling the Myths, Uncovering the Opportunities*. Boston, MA, USA: HBS Publishing.

DeSanctis, G. and M. S. Poole (1994). "Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory." *Organization Science* 5 (2), 121-147.

Duane, A., and P. Finnegan (2000). "Managing Intranet Technology in an Organizational Context: Toward a Stages of Growth Model for Balancing Empowerment and Control." In: *Proceedings of the International Conference on Information Systems*.

Durcikova, A., Fadel, K. J., Butler, B. S. and D. F. Galette (2013). "Knowledge Exploration and Exploitation: The Impact of Psychological Climate and Knowledge Management System Access." *Information Systems Research* 22 (4), 855-866.

ECB (2014). *Guide to Banking Supervision*, Frankfurt am Main, Germany: European Central Bank.

Eisenhardt, K. M. (1989). "Building Theories from Case Study Research." *Academy of Management Review* 14 (4), 532-550.

Eisenhardt, K. M. (1991). "Better Stories and Better Constructs: The Case for Rigor and Comparative Logic." *Academy of Management Review* 16 (3), 620-627.

Elmes, M., Strong, D., and O. Volkoff (2005). "Panoptic Empowerment and Reflective Conformity in Enterprise Systems-Enabled Organizations." *Information and Organization* 15 (1), 1-37.

El Sawy, O. A., Malhotra, A., Park, Y., and P. A. Pavlou (2010). "Research Commentary – Seeking the Configurations of Digital Ecodynamics: It Takes Three to Tango." *Information Systems Research* 21 (4), 835-848.

Fatout, M. F. (1995). "Using Limits and Structures for Empowerment of Children in Groups." *Social Work with Groups* 17 (4), 55-69.

Fichman, R. and F. Kemerer (1997). "Object Technology and Reuse." *IEEE Computing* 30 (10), 47-59.

Fiss, P. C. (2011). "Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research." *Academy of Management Journal* 54 (2), 393-420.

Forrester Research (2013a). *Competitive Differentiation Through Innovation in Business Intelligence. Making the Most of Existing and Emerging BI, Analytics, and Big Data Tools*. URL: http://www.sapexecutivenetwork.com/phocadownload/forrester_new_strategies_for_improving_business_agility%20through_information_modeling.pdf (visited on 02/28/2014).

Forrester Research (2013b). *The Forrester Wave: Enterprise Business Intelligence Platforms, Q4 2013. The 11 Providers that matter most and how they stack up*. URL: http://www.forrester.com/The+Forrester+ Wave+Enterprise+Business+Intelligence+Platforms+Q4+2013/fulltext/-/E-RES108103 (visited on 03/02/2014).

Frakes, W. B. and G. Succi (2001). "An Industrial Study of Reuse, Quality, and Productivity.*" Journal of Systems Software* 57 (2), 99-106.

Gartner (2014). *Magic Quadrant for Business Intelligence and Analytics Platforms*. URL: http://www.tableausoftware.com/asset/gartner-magic-quadrant-2014-new?cid=70160000000 Z1vV&ls=Paid%20Search&lsd=Google%20AdWords%20-%20Business%20Intelligence%20-%20EM EA%20-%20Other%20-%20Magic%20Quadrant%202014&adgroup=Business%20Intelligence%20-Magic%20Quadrant&kw=bi%20magic%20quadrant&adused=38821286302&distribution=search&gclid=CIruyLz277wCFZHJtAodXmkAtQ (visited on 02/28/2014).

Germonprez, M., Hovorka, D., and F. Collopy (2007). "A Theory of Tailorable Design." *Journal of the AIS* 8 (6), 351-367.

Germonprez, M., Hovorka, D., and U. Gal (2011). "Secondary Design: A Case of Behavioral Design Science Research." *Journal of the AIS* 12 (10), 662-683.

Ghazwaneh, A. and O. Henfridsson (2013). "Balancing Platform Control and External Contribution in Third-Party Development: The Boundary Resources Model." *Information Systems Journal* 23, 173-192.

Gibson, J. J. (1986). *The Ecological Approach to Visual Perception*. Hillsdale, NJ, USA: Lawrence Erlbaum Associates.

Goodhue, D. L. and R. L. Thompson (1995). "Task-Technology Fit and Individual Performance," *MIS Quarterly* 19 (2), 213-236.

Guba, E. G., and Y. S. Lincoln (1989). *Fourth Generation Evaluation*. Newbury Park.

Guilford, J. P. (1967). *The Nature of Human Intelligence*. New York, NY, US: McGraw-Hill.

Györy, A., Cleven, A., Uebernickel, F., and W. Brenner (2012). "Exploring the Shadows: IT Governance Approaches to User-Driven Innovation." In: *Proceedings of the Twentieth European Conference on Information Systems*. Barcelona, Spain, paper 222.

Hall, J. A. (2013). *Accounting Information Systems*, 8th Edition, Mason, OH, USA: Cengage Learning.

Hedstrom, P., and P. Ylikoski. 2010. "Causal Mechanisms in the Social Sciences." *Annual Review of Sociology* 36, 49-67.

Henfridsson, O., and B. Bygstad (2013). "The Generative Mechanisms of Digital Infrastructure Evolution." *MIS Quarterly* 37 (3), 907-931.

IFRS (2013). *IASB and IFRS Interpretations Committess: Due Process Handbook*, London, UK: IFRS.

Im, G. and A. Rai (2014). "IT-Enabled Coordination for Ambidextrous Interorganizational Relationships." *Information Systems Research* 25 (1), 72-92.

Jasperson, S., Carter, P. E., and R. W. Zmud (2005). "A Comprehensive Conceptualization of Post-Adoptive Behaviors Associated with Information Technology." *MIS Quarterly* 29 (3), 525-557.

Kumar, R. L., and A. C. Stylianou (2014). "A Process Model for Analyzing and Managing Flexibility in Information Systems." *European Journal of Information Systems* (23), 151-184.

Langley, A., Smallman, C., Tsoukas, H., and A. H. v. d. Ven (2013). "Process Studies of Change in Organization and Management: Unveiling Temporality, Activity, and Flow." *Academy of Management Journal* 56 (1), 1-13.

Lapointe, L., and S. Rivard (2007). "A Triple Take on Information Systems Implementation." *Organization Science* 18 (1), 89-107.

Lee, A. S. and G. S. Hubona (2009). "A Scientific Basis for Rigor in Information Systems Research." *MIS Quarterly* 33 (2), 237-262.

Leonardi, P. M. (2011). "When Flexible Routines Meet Flexible Technologies: Affordance, Constraint, and the Imbrication of Human and Material Agencies." *MIS Quarterly* 35 (1), 147-167.

Li, X., Po-An Hsieh, J. J. and A. Rai (2013). "Motivational Differences Across Post-Acceptance Information System Usage Behaviors: An Investigation in the Business Intelligence Systems Context." *Information Systems Research* 24 (3), 659-682.

Maas, J. B., Fenema, P. C., and J. Soeters (2012). "Information System Infusion: The Role of Control and Empowerment." In: *Proceedings of the Thirty Third International Conference on Information Systems*, Orlando, FL, USA.

Majchrzak, A. and L. Markus (2012). *Technology Affordances and Constraint Theory of MIS*. Thousand Oaks, CA, USA: Sage Publications.

Markus, M. L. and D. Robbey (1988). "Information Technology and Organizational Change: Causal Structure in Theory and Research." *Management Science* 34 (5), 583-598.

McGrath, K. (2013). "The Potential of Generative Mechanisms for Information Systems Research." *Proceedings of the Thirty Fourth International Conference on Information Systems*, Milan, Italy.

Mehta, M. and R. Hirschheim (2004). "A Framework for Assessing IT Integration Decision-Making in Mergers and Acquisitions." *Proceedings of the 37th Hawaii International Conference on System Sciences*, HI, USA.

Mingers, J. (2006). *Realising Systems Thinking: Knowledge and Action in Management Science*, New York, NY, USA: Springer.

Morioso, M., Erzan, M. and C. Tully (2002). "Success and Failure Factors in Software Reuse." *IEEE Transaction of Software Engineering* 28 (4), 340-357.

Morton, P. (2006). "Using Critical Realism to Explain Strategic Information Systems Planning." *Journal of Information Technology Theory and Application* 8 (1), 1-20.

Myers, M. D. (2008). *Qualitative Research in Business & Management*: Sage Publications.

Myers, M. D., and H. K. Klein (2011). "A Set of Principles for Conducting Critical Research in Information Systems." *MIS Quarterly* 35 (1), 17-36.

Nan, N. (2011). "Capturing Bottom-Up Information Technology Use Processes: A Complex Adaptive Systems Model." *MIS Quarterly* 35 (2), 505-523.

O'Neill, D. (2011). "Business Intelligence Competency Centers: Centralizing an Enterprise Business Intelligence Strategy." *International Journal of Business Intelligence Research* 2 (3), 21-35.

Orlikowski, W. J. (1992). "The Duality of Technology: Rethinking the Concept of Technology in Organizations." *Organization Science* 3 (3), 398-427.

Paulsson, W., and B. Johansson (2013). "Spreadsheet Use in Budgeting: A Dialectic Process Theory Perspective." *Proceedings of the Nineteenth American Conference on Information Systems*, Chicago, IL, USA.

Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods*. 3rd Edition, Thousand Oaks, CA, USA: Sage Publications.

Peirce, C. S. (1896). *Lessons of the History of Science*. Manuscript 1288.

Peirce, C. S. (1898). *Cambridge Lectures on Reasoning and the Logic of Things: Types of Reasoning*. Manuscript 441.

Rappaport, J. (1987). "Terms of Empowerment/Exemplars of Prevention: Toward a Theory for Community Psychology." *American Journal of Community Psychology* 15 (2), 121-148.

Rihoux, B., and C. C. Ragin (2009). *Configurational Comparative Methods: Qualitative Comparative Analysis (QCA) and Related Techniques*. Thousand Oaks, CA, USA: Sage Publications.

Saga, V. L. and R. W. Zmud (1994). "The Nature and Determinants of IT Acceptance, Routinization, and Infusion." In: Diffusion, Transfer and Implementation of Information Technology. Ed. by L. Levine. Amsterdam: North-Holland, 67-86.

SAP (2013). *SAP BusinessObjects BI Clients*. URL: http://www.sdn.sap.com/irj/scn/go/portal/prt-root/docs/library/uuid/a08d564c-556d-3010-1886-ef8d7ab2ee9a?QuickLink=index&overridelayout=true&58879706673596 (visited online 11/09/2014).

Sarker, S., Xiao, X., and T. Beaulieu (2013). "Qualitative Studies in Information Systems: A Critical Review and Some Guiding Principles." *MIS Quarterly* 37 (4), iii-xviii.

Sayer, A. (2010). *Methods in Social Science: A Realist Approach*. 2nd Edition, New York, NY, USA: Routledge.

Simons, R. (1995). *Levers of Control*. Boston, MA, USA: Harvard Business School Press.

Smith, M. L. (2006). "Overcoming Theory-Practice Inconsistencies: Critical Realism and Information Systems Research." *Information & Organization* 16 (3), 191-211.

Smith, W. (2014). "Dynamic Decision Making: A Model of Senior Leaders Managing Strategic Paradoxes." *Academy of Management Journal*, forthcoming (published online ahead of print).

Smith, W. K., and M. W. Lewis (2011). "Toward a Theory of Paradox: A Dynamic Equilibrium Model of Organizing." *Academy of Management Review* 36 (2), 381-403.

Someh, I. A. and G. Shanks (2013). "The Role of Synergy in Achieving Value from Business Analytics Systems." In: *Proceedings of the Thirty Fourth International Conference on Information Systems*. Milan, Italy.

Strauss, A., and J. Corbin (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, CA, USA: Sage Publications.

Strong, D. M. and O. Volkoff (2010). "Understanding Organization-Enterprise System Fit: A Path to Theorizing the Information Technology Artifact." *MIS Quarterly* 34 (4), 731-756.

Strong, D. M., Volkoff, O., Johnson, S. A., Pelletier, L. R., Tulu, B., Bar-On, I., Trudel, J., and L. Garber (2014). "A Theory of Organization-EHR Affordance Actualization." *Journal of the AIS* 15 (2), 53-85.

Teece, D. J., Pisano, G. and A. Shuen (1997). "Dynamic Capabilities and Strategic Management." *Strategic Management Journal* 18 (7), 509-533.

Tilson, D., Lyytinen, K., and C. Sørensen (2010). "Digital Infrastructures: The missing IS Research Agenda." *Information Systems Research* 21 (4), 748-759.

Unger, C., Kemper, H.-G., and A. Russland (2008). "Business Intelligence Center Concepts." In: *Proceedings of the Fourteenth American Conference on Information Systems*. Toronto, Canada, Paper 147.

United Nations Statistics Division (2014). *Handbook of National Accounting: Financial Production, Flows and Stocks in the System of National Accounts*. New York, NY, USA: United Nations.

Volkoff, O., and D. M. Strong (2013). "Critical Realism and Affordances: Theorizing IT-Associated Organizational Change Processes." *MIS Quarterly* 37 (3), 819-834.

Volkoff, O., Strong, D. M., and M. B. Elmes (2007). "Technological Embeddedness and Organizational Change." *Organization Science* 18 (5), 832-848.

Wang, W., Zhang, Y., Song, B., and J. Ren (2014). "How to Understand Post-Acceptance Information System Usage Behaviors: Perspective from IS Success Model." In: *Proceedings of the Pacific Asia Conference on Information Systems*, pp. 1-15.

Wijen, F. (2014). "Means versus Ends in Opaque Institutional Fields: Trading Off Compliance and Achievement in Sustainability Standard Adoption." *Academy of Management Review* 39 (3), 302-323.

Williams, C. K., and E. Karahanna (2012). "Causal Explanation in the Coordinating Process: A Critical Realist Case Study of Federated IT Governance Structures." *MIS Quarterly* 37 (3), 933-964.

Won, M., Stiemerling, O., and V. Wulf (2006). "Component-based Approaches to Tailorable Systems." In: *End User Development (Human-Computer Interaction Series)*. Ed. by H. Lieberman, F. Paterno and V. Wulf: Springer, pp. 115-141.

Wynn, D. Jr., and C. K. Williams (2012). "Principles for Conducting Critical Realist Case Study Research in Information Systems." *MIS Quarterly* 36 (3), 787-810.

Xu, J. D., Benbasat, I., and R. T. Confetelli (2014). "Research Note – The Influences of Online Service Technologies and Task Complexity on Efficiency and Personalization." *Information Systems Research* 25 (2), 420-436.

Yin, R. K. (2003). *Case Study Research. Design and Methods*. 3rd Edition. Thousand Oaks, CA, USA; Sage Publications.

Yoo, Y., Boland Jr., R. J., Lyytinen, K. and A. Majchrzak (2012). "Organizing for Innovation in the Digitized Word." *Organization Science* 23 (5), 1398-1408.

Yoo, Y. (2013). "The Tables have Turned: How can the Information Systems Field contribute to Technology and Innovation Management Research?" *Journal of the AIS* 14, 227-236.

Zachariadis, M., Scott, S., and M. Barrett (2013). "Methodological Implications of Critical Realism for Mixed-Methods Research." *MIS Quarterly* 37 (3), 855-879.

Zeid, A. (2006). "Your BI Competency Center: A Blueprint for Successful Deployment." B*usiness Intelligence Journal* 11 (3), 14-20.