E-Business IT Governance Revisited: An Attempt towards Outlining a Novel Bi-directional Business/IT Alignment in COBIT5

Yannick Bartens
University of Hamburg, IWI
yannick.bartens@studium.uni-hamburg.de

Frederik Schulte
University of Hamburg, IWI
frederik.schulte@uni-hamburg.de

Stefan Voß
University of Hamburg, IWI
Von-Melle-Park 5,
20146 Hamburg, Germany
stefan.voss@uni-hamburg.de

Abstract

In contrast to classical business, e-business highly depends on internet technologies. Business and IT naturally coalesce here. Thus, a customer-driven IT requirement may enforce an adjustment of a business model. This poses new challenges for researchers and practitioners as currently a business-driven alignment paradigm dominates in IT governance. We identify characteristics of e-business and examine how IT governance frameworks can integrate these characteristics under consideration of a bi-directional business/IT alignment process. We use COBIT 5 as a benchmark for our examination, and reveal a need for a modification of the framework to fully cover e-business requirements. Based on the COBIT 5 Goal Cascade, we propose a possible integration of a bottom-up requirements process. Our findings for e-business can build a basis for future research on different business models.

1. Introduction

Due to the recent growth rates of e-business and e-commerce worldwide [1], e-business models have become an important part of the worldwide economy that have transformed brick and mortar business into e-business [2] [3]. This transformation process usually involves drastic changes from previous strategies, as often seen, e.g., in the newspaper industry [4]. Recognizing the nature of e-business models and the foundation of their business base, a pervasive influence of information technology (IT) throughout the whole organization is observable [5].

In recent years the concept of IT governance represents a well-discussed set of concepts for ensuring the 'optimal' utilization of IT for the benefit of a business [6] [7] [8] [9]. With regard to its worldwide and cross-industry spread, COBIT constitutes a popular framework for addressing the challenges of IT governance in a holistic manner. COBIT 5 emphasizes a generic approach, aiming to be customizable into any specific field of application for all kinds of enterprises [10]. As the core of the COBIT 5 framework, the Goals Cascade transfers the generic stakeholder needs into business and IT-related goals, leading off into processes as well as activities, giving a suitable base for our investigation.

E-business models inherit a combination of unique characteristics demonstrating challenges for IT governance [11]. While customer and success orientation are deeply associated with each other, and a recurring issue in business model approaches [12], they entail the reversal of the causal chain of requirements in e-business. Contrary to popular concepts, as depicted by the top-down business/IT alignment approach in COBIT 5, requirements in e-business models can emerge from business operations and be defined by the customer. An example is the business cooperation of T-Mobile and Spotify Inc., where the satisfactory needs of customers implied the adoption of both business models [13].

In this paper we focus on the characteristics of e-business models and their representation within the COBIT 5 framework. Here, the requirements of a bi-directional business/IT alignment can be observed and exhibited in a very distinct and comprehensible manner. After a brief literature review on e-business models, IT governance and related frameworks in Section 2, we investigate the degree of representation of e-business requirements and possible gaps within COBIT 5 following the 'COBIT 5 Goals Cascade.' Thus, we consolidate the characteristics of e-business models and their success factors (Section 3) and examine their appropriate representation in COBIT 5 (Section 4). After that we utilize the unveiled gaps and combine these ascertainments into a proposal for frameworks covering the specific e-business needs in Section 5.

IEEE
computer
society

2. Literature Review

E-business IT governance can be understood as an extension to common approaches of IT governance. In this section we present the current state of the founding elements in literature.

2.1. IT Governance

The growing influence of information technology on business operations makes the control of IT inevitable. Failure entails negative implications in terms of substantial financial or legal risks. For more than a decade, the concept of IT governance, or as it has been recently re-branded: 'Enterprise governance of IT' (EGIT), is being adopted by companies to address this challenge. This paper acknowledges and adopts the sense of the term 'Enterprise Governance of IT' while continuously using IT governance for its description.

While a broad range of definitions on IT governance are proposed in the academic literature, we adopt those influenced by the IT Governance Institute and Van Grembergen (see [14], pg. 3): Enterprise Governance of IT is "an integral part of corporate governance and addresses the definition and implementation of processes, structures and relational mechanisms in the organization that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value from IT-enabled business investments."

2.2. IT Governance Frameworks

Since the beginning of the IT governance movement, numerous frameworks and standards have been released. Often these publications resemble a collection of best practices, approved by their originating context [15]. Most are common in their structured body. Another similarity is given by their aim: They describe goals, processes and organizational aspects of IT management and control [16] [17]. Well known examples are the IT Infrastructure Library (ITIL), COBIT, Capability Maturity Model Integration as well as several proprietary ones. Today a remarkable set of standards and frameworks for guidance and implementation of IT governance can be found.

By now the COBIT framework can be considered an accepted standard in theory and in practice across all industries or even the de facto standard [18]. The framework, updated to version 5 in April 2012,[1] represents a generic and comprehensive catalogue of practice-proven best practices for understanding and implementation of IT governance.

The publication of COBIT 5 achieves the aforementioned alignment of business and IT via the linkage of generic sets of goals. These goals are derived from the needs of enterprise's stakeholders and are cascaded ('COBIT 5 Goals Cascade') from the level of enterprise goals to IT-related goals until the enabler level is reached. The process layer, as the most important enabler, consists of 37 processes organized into five domains. The 'Evaluate, Monitor and Direct' domain (EDM) offers overall governance tasks, representing the now integrated ISO/IEC 38500 standard. The remaining four domains are based on the Plan-Build-Run-Monitor schematics. 'Align, Plan and Organise' (APO) comprises planning tasks; 'Build, Acquire and Implement' (BAI) consists of functions for systems and organizational development, implementation and acquisition of assets; 'Deliver, Service and Support' (DSS) services operations, delivery and incident management; and 'Measure, Evaluate and Assess' covers continual improvement, internal control and compliance.

2.3. E-Business Models

The foundation for e-business models is internet technology and its economic adaption in the form of e-business. Early approaches did not differentiate between e-business and e-commerce [19], where today there is a clear distinction being made [20]. E-commerce nowadays represents a manifestation of e-business. Assuming this point of view, the definition of e-business describes all concepts of utilization of information technology under the premise of optimizing internal and external value-adding business activities. In this context, e-commerce depicts the execution of transaction processes over digital networks [21] [22].

The common idea of looking at business activities as business models dates back to the beginning of the last century [12]. First approaches were based on management theory and, over time, highly influenced either by strategy or organization theory orientation. Apart from that, by the mid 1970s another approach evolved: The concept of business informatics opened a whole new approach, far away from management theory. Therefore, business models are inheriting a strong historic relatedness to e-business.

---

[1] See also: http://www.isaca.org/

Literature shows that e-business models contain a specific set of characteristics [20]. These incorporate various nuances and aspects which feature strong correlations to IT governance. E-business models can be defined as a particular group of business models that conduct all of their value adding activities over the Internet while IT is integrated into business operations [23]. A basis for our research was provided by the publications of Patel [23] [24], which discuss the particularities of e-business models, their implications and distinct exceptions on the governance process. The main argument concerns the emergence of technologies and requirements within the realm of e-business models. In addition to that we consider the recent growth and the rising number of businesses entering or transforming themselves into e-business models.

Under the given circumstances it becomes clear, that the influence of technology has to be managed in an appropriate way. One approach is being represented by the "radical re-direction" and extension of generic IT governance. Patel describes this approach as "E-Business IT Governance." Agile (re-)alignments of the business, customer-centricity and handling of the aforesaid integration of IT are the main drivers. This is encompassed by the term of "emergent organizations." In addition internet technologies are described as fluid [24].

The general approach of the alignment of business and IT, as given by many authors [25] [26], inhibits shortcomings leading to an unsuitable match for usage or adoption in e-business models [23] [24].

Note that Liu et al. [27] propose a governance framework for e-business success by incorporating specific aspects of e-business into an ISO/IEC 38500 and COBIT 4.1 environment. However, most recent developments in e-business as well as correspondingly identified bottom-up requirements are not reflected.

3. Characteristics of E-Business Models with relevance for IT Governance

E-business and classic business models can be distinguished with a characteristics analysis [27]. Below we analyze these characteristics.

3.1. Characteristics

Characteristics of e-business models are widely spread. Notably, single characteristics are not unique to e-business models.

3.1.1. Technology driven alignment. The large influence of IT and the accompanying focus on it is well discussed. Likewise, it can be considered as common knowledge. Technology in general, and in particular the Internet, can be considered as the foundation of e-business models. This extreme dependency requires high availability, reliability and capacities [24]. Differences in technology standards have to be managed and, in case of border crossing operations and multinational companies, regional aspects and restrictions have to be kept in mind. Above all, security issues have to be considered, not only to ensure proper operations, but also to build trust on the customer side. Many important and quite recent challenges arise in the form of management of new technologies, which might entail major groundbreaking differences compared to previous approaches. These technologies may be related to leapfrogging decisions but also as disruptive technologies, which have to be observed carefully and eventually incorporated quickly. It becomes evident that in e-business a fusion of business and IT is necessary, as it is in other classes of business models. In literature, a linkage between business and IT is often stipulated and by now thoroughly represented [8]. It is commonly referred to as "fusion of business and IT" or "business/IT alignment."

Due to the technological drive, change and alignment requirements emerge from operations mainly influenced by customer needs and behavior [28]. This encompasses bottom-up alignment in addition to established top-down approaches, as they currently dominate alignment concepts in generic IT governance [29]. In the context of technology driven alignment, all identified characteristics develop strong potential for bottom-up inputs. Although being focused on service-oriented architectures, Chen emphasizes the importance of different approaches on business/IT alignment including top-down and bottom-up [29]. This is best shown in his example on outlining bottom-up introduction of new services. One could argue that considering both paradigms together somewhat depicts a bi-directional approach.

3.1.2. Universal convergence. Besides observing IT as key influence on business operations the tendency to universal convergence can be found in three areas. These areas are technology, offered goods and services as well as hybrid business models. All of these are caused by the attempt to satisfy customer requirements and wishes [30].

In terms of technology, rapid development and changes are the main reason for the steadily growing convergence. This can be shown in the recent evolutions in the smartphone and mobile market.

Offered goods and services are seemingly influenced by the efforts of the network participants on focusing on inherent key competencies while integrating the offerings of external service providers. Lastly, the development of hybrid business models can be observed in the restructuring of a company's value stream when combining online business with brick and mortar stores.

3.1.3. Network orientation. In the literature, network orientation within e-business models depicts another key characteristic [11]. This exemplifies the usage of the given opportunities offered by internet technology. Still, contemplation is not exclusively focused on networking technologies. Yet general business networks with diverse relationships, primarily exchange-centered, are perceptible. Many reasons for the network orientation can be found. For instance, the focus on key competencies induces companies to source services from network partners. In addition, higher customer expectations and focus on competencies call for integrated solutions which can often only be accomplished by smart sourcing [20]. Likewise, network orientation raises the flexibility of a company due to the possibility of offering certain solutions without being forced to stockpile all elements.

3.1.4. Exchange of digital goods. Another internet-based distinction is given by the exchange of digital goods as part of business transactions [19] [31]. Exchange is mainly conducted over digital networks. Therefore, often products and services are provided as digital goods. Replication of issues is cost efficient and done easily without any loss in quality. Though certain technical or legal steps have to be considered to prevent unauthorized reproduction. Again, security ensures reliability of transactions and revenue, but also reassures the customer. At this juncture the IT architecture and service management come into focus, while the portfolio management sets business wide decisions and implicates operational influence.

3.1.5. Indirect revenue streams. Often indirect revenue streams are used to support or even represent the main revenue stream [11]. Indirect revenue streams are present when not only the main service but ancillary services are commercialized. Common examples are the display of advertisements or services or the disposition of user profiles. Historically, companies chose this way of revenue generation to slowly introduce users to the new way of business associated with online business [19]. Users became accustomed to free of charge services, resulting in a low willingness to pay. Furthermore,

negative side effects of the actions of ancillary services commercialization are often ignored. Either way direct or indirect, IT strategy and IT service management is given the role of designing the main revenue stream and ensuring business profits.

3.1.6. Highly dynamic environment. E-business models are subject to a highly dynamic environment. Overall, e-business can be considered a highly competitive sector. Companies are required to keep up with the pace of technology changes as well as adjust to changing customer needs. Companies operating within this field of tension are described as emergent organizations [24]. Through the low entrance barriers and easy to copy business functions, growth rates are steadily increasing, resulting in even higher competition [32].

Reconsidering the high influence of IT on the business models themselves, disruptive technologies, e.g., cloud computing or smartphones, play an overwhelmingly important role. Yet for e-business companies, generally the adoption and integration of new technologies is easier to accomplish than the readjustment of their business model to the quick change in behavior and satisfactory needs of customers.

3.1.7. Compliance requirements. Overarching the business model and its operations, external laws and regulations have an influence and provide restrictions and requirements [33]. On top of sector-independent regulations as for IT and business in general, specific other policies for e-business apply [34]. Tangible examples are on the one hand PCI-DSS for regulated credit card-based transactions, where key contributors are Visa and MasterCard/Maestro and on the other hand country-specific data privacy and protection acts, e.g., the EU Data Protection Directive as well as the FTC Fair Information Practice.

3.2. Success factors

There are a number of success factors, which mostly evolve out of the context of the aforementioned characteristics or can be considered their successful transformation [35].

3.2.1. ePricing. The successful participation and management of ePricing represents a major success factor [36]. Since the operation is technology based, management of operations is dependent and relates to its mechanisms. Pricing as a superior strategic and tactical management task has to be provided with required information and suitable tools for participating in ePricing environments. Hence major

input is demanded from IT architecture and internal services. Though, IT strategy and portfolio management need to support ePricing on a higher level.

3.2.2. Individualized products and services. Individualized offerings are dependent on corresponding process and organizational design [19]. A company being capable of providing such products and services usually meets the discussed characteristics and successfully positions oneself within the areas of tension of network orientation, universal convergence trends, the dynamic environment and possibly digital goods exchange and suitable revenue streams [27] [35]. In this particular case, all IT governance domains are called to support the fulfillment of this challenge – if intended. IT sourcing as service management in combination with strategy (here IT and business strategy) are responsible for building an adequate base for a capable product/service portfolio.

3.2.3. 1-to-1 marketing/community building. 1-to-1 marketing as well as community building [37] [38] [39] are going hand in hand with the trend of universal convergence and the implications of indirect revenue streams. On top of that the highly dynamic environment sets the direction. Trust, satisfaction and involvement are the drivers.

The strategic decision to comply with the requirements for actions is more or less self-imposed, though the operational implementation has to be well managed and executed. In particular, service management and design is pivotal to satisfy customer needs, whilst other domains of IT governance set the general direction at a higher level.

3.3 Summary

As demonstrated above, all characteristics and success factors show a strong connection to IT governance tasks. Often the connection is focused on strategic principles and alignment tasks. As for COBIT, these disciplines are considered key, thus a comparison of COBIT and distinctive requirements of e-business models should be undertaken.

4. Analysis and findings

In this section we present findings regarding the representation of e-business model's characteristics and success factors within the COBIT 5 framework. Beyond that all findings will be described in the related paragraphs. The description will be oriented towards respective processes.

4.1. Research approach

The applied research methodology is based around the collection of detailed information regarding the central aspects of each characteristic and success factor, including a broad group of various sources. As seen in the previous sections, as our first step we focused on the collocation of characteristics and success factors. In a second step the condensed aspects are guided down the COBIT 5 Goals Cascade, starting from the high level Stakeholder needs, beyond enterprise and IT-related Goals down into the most specific Process Goals, Practices and Activities. While taking the generic approach of COBIT into account, the degree of representation of all characteristics and success factor is investigated, resulting in a suitable overview (see Table 1 as an example).

Table 1. Aspect analysis for ancillary services commercialization

Indirect revenue streams		
Aspect: Ancillary services commercialization		
Issue: Ad-blockers putting business models at risk		
When operating ad-display as a major or exclusive action for funding, as a form of indirect revenue streams, business models can be easily abrogated by customers using ad-blocking systems. Customer action can be considered an immediate influence, business hazard or an extreme risk.		
Enterprise Goals		
3	Manage business risks	
6	Customer-oriented service culture	
8	Agile responses to a changing business environment	
9	Information-based strategic decision making	
	IT-related Goals	
	4	Manage IT-related business risks
	6	Transparency of IT costs, benefits and risk
	8	Adequate use of applications, information and technology solutions
	9	IT agility
	14	Availability of reliable and useful information for decision making
	17	Knowledge, expertise and initiatives for business innovation
		Processes
		EDM03
		APO04
		APO08
		APO12
		BAI03
		BAI05
		BAI06
		BAI08

EDM03	Ensure Risk Optimization
APO04	Manage Innovation
APO08	Manage Relationships
APO12	Manage Risk
BAI03	Manage Solution Identification and Build
BAI05	Manage Organizational Change Enablement
BAI06	Manage Changes
BAI08	Manage Knowledge

The degree of representation was measured by assessing and matching the elements of identified characteristics and success factors onto the corresponding goals (on all layers), processes and activities along the COBIT 5 Goals Cascade. In addition we illustrate mismatches between COBIT 5 and our findings for each characteristic and success factor before we condense these in the following section. In this paper the term mismatch defines gaps, missing elements or links and differences between e-business requirements and the contents of COBIT 5. Gaps are mostly represented by the level of specificity versus generality, missing elements/links result from distinct e-business peculiarities, while differences are inhered from procedural or organizational circumstances in e-business.

As shown in Table 1, the analysis process was commenced on the superior level of enterprise goals. Here the first relevant links to the peculiarities of indirect revenue streams and the aspect of ancillary services commercialization could be found. Major interconnections were found in four enterprise goals. Therefore, these enterprise goals were cascaded along the COBIT 5 Goals Cascade and via the mapping of enterprise goals and IT-related goals (see Appendix B of the Enabling processes document [40]). Again, a set of the most relevant goals was chosen. Consequently, another iteration of mapping was carried out, this time via Appendix C (of [40]), with the aim of identifying the most relevant processes. In this case the result was a group of eight processes. Lastly, on the final and most specific layer, the process descriptions and partly the corresponding activities were consulted and an examination regarding possible mismatches was conducted.

Analyzing the relevant aspects of indirect revenue streams and their impact on IT governance, it is obvious that customer behavior represents a risk requiring an unforeseen severity. Generally, for all aspects strong interactions with EDM and the APO domain (in particular APO01, 02, 03) are evident. Other alignment, planning or organization processes will be consulted according to the requirements related to the IT management.

4.2. Analysis of technology driven alignment

Generally when operating e-business models, there is a profound focus on operating reliably. This is related to the foundation on primarily one technology and the inherent dependency. Therefore, besides the general technological focus, availability has a pronounced importance (BAI04).

The overall business operations have to be embedded within adequate settings. The EDM domain, as well as strategic surroundings, provides good guidance and a generic representation of e-business model characteristics. Furthermore, processes for innovation/agility as well as supporting information for targeted decisions are important. Technological requirements regarding the described compliance to relevant standards are to be seen in BAI0I, BAI03.

COBIT achieves cohesion via linking enterprise goals to IT-related goals and operationalizing them through the given reference processes [10] [41] [40]. This shows that COBIT is exclusively focusing the alignment of business and IT in a top-down approach. Overall bottom-up benefits and risks (as evolving from customer needs in e-business) are not represented in COBIT. This becomes particularly tangible when consulting the Goals Cascade, the external stakeholder questions (see [10], Figure 7) or when reflecting the principle of separating governance from management in combination with an end-to-end coverage of the enterprise. On a finer scale, indicators are given when analyzing the process descriptions and their linkages via inputs/outputs as well as the mappings enclosed within the framework.

However, in e-business the observable fusion can rather be rephrased as a merger. In certain parts of operations functions, processes and responsibilities merge into a dynamic and fluent bundling [24] [42] [32] in order to achieve an extraordinary degree of agility, and fulfill upcoming desires in a timely manner. This merger contradicts the general approach as given by many frameworks, i.e., a clear distinction between business and IT cannot be made [28].

Apart from that, the huge influence and importance of the customer creates a major challenge. Requirements, change requests and innovations relevant for the well-being of a company arise from the bottom up [28] [43] [32] [44] [29] [45]. In this realm of business models, the customer, not the business, issues requirements.

In COBIT, the business side is enabled to designate requirements, which are to be fulfilled by IT. Recognizing our findings, we see a main difference to the approach invoked by the process definitions and descriptions of COBIT. Especially innovation monitoring lacks the direct influence of the customer as needed in adequate consumerization handling – in COBIT 5, 'groups of experts' are to be consulted instead of the customer himself (see [40], p. 71, APO04.03 activities 3/4).

When combining these two prerequisites, bottom-up requirements by the customer [28] [29] clash into merged and 'de-distinctioned' business/IT processes and functions [42] [32]. It could be stated that this

discharges the order of generic structures and responsibilities of COBIT by inversing the causal chain. In conclusion, the combination of these two key findings unveils a mismatch in COBIT 5.

4.3. Universal convergence

In terms of tackling the upcoming challenges of universal convergence, innovation management (APO04) and change handling (BAI05, BAI06) must be emphasized and well represented in the framework.

Hybrid business models lie in the responsibility of enterprise management and are not exclusively part of IT Governance. Still, strategic IT-aspects are to be found in the APO domain as well as in the IT-related goal of meeting the business requirements (07) and providing adequate systems (08, 12).

Additionally, when integrating foreign services into their own value chain, business requirements have to be met again, as well as sourcing and supplier management (APO10) thoughtfully executed. The strong focus on customer needs, behavior and ingrowing requirements to perform and stay successful is perfectly observable and exemplified with disruptive technologies – representing general trends of convergence.

4.4. Network orientation

Network participation has to be understood as a measure to offer a portfolio of competitive products and services as a result of customer orientation (enterprise goals 2, 6). These business management decisions drag along major requirements for sourcing-related issues, within the business just as on the customer side (APO08, 09, 10). On the other hand, business requirements are influenced by customer preferences (as described before) and thus play a substantial role. The desired flexibility increases the need for agility and capability of performing changes quickly.

4.5. Exchange of digital goods

As the base for distribution of digital goods, adequate systems have to be provided (BAI03). The handling of digital goods entails fundamental differences for business operations with tangible goods. In a second step, risks, security and availability issues have to be considered. Future risks, requirements and innovations have to be evaluated in advance and with forethought. The management of costs per transaction can be considered either strategically (partial APO05) or part of budgeting

(APO06) and optimization of operative factors (APO08, 09 and BAI01, 02, 03). A special focus must also be put on the restriction of unauthorized replication (for instance digital rights management).

4.6. Indirect revenue streams

On top of the main portion as elaborated in the example, ancillary services commercialization brings up a variety of compliance requirements in the remaining case of utilization of user data/profiles. The aforementioned requirements depend on the kind and extent of which user data is utilized, and the sovereign territory in which collection or commercialization is made use of (IT-related goal 02 and connected processes).

Taking another look at the elaborated example, innovation processes and user behavior go hand in hand, but imply preceding business management directions and decisions. It has to be emphasized that here, as in the whole realm of e-business models, the (end) user becomes main recipient of provided services.

4.7. Highly dynamic environment

Again, innovation management has to be emphasized. Considering the previous factors and aspects, technology orientation, competition and customer influence emerge into a complex group of requirements. These requirements ask for an extraordinary way of adapting the business to trends, technologies and behavior. Quick adaption and adjustments of the business model are necessary. This falls also in the business management domain as well as EDM and related activities.

4.8. Compliance requirements

Following the COBIT 5 approach and goals cascade, the management of compliance and regulatory requirements are represented in a sophisticated way. Due to the holistic integration of their outreaches in the EDM domain and APO01, 02, 03, a clear guidance is given.

4.9. ePricing

In ePricing initiatives, the right combination of information and adequate systems is mandatory. For both, COBIT 5 provides generic processes covering the required actions and connected setting. These can be found in BAI01, 02, 03 and 08. They are derived from the enterprise goals 02 and 06.

4.10. Individualized products and services

As a combination or result of the previous aspects within universal convergence, network orientation and the dynamic environment a suitable coverage in the COBIT framework is given. Additionally, the suitable design of the responsible processes and systems can be related to BAI01, 02, 03, and on a superior level in the management of service levels (APO09). If needed, even management of suppliers (APO10) and quality (APO11) can be addressed.

4.11. 1-to-1 marketing/community building

As proclaimed in the aspect description, this characteristic can be considered in line with the enterprise goal of a customer-oriented service culture. Following the Goals Cascade, connections to the management of relationships (APO08) and human resources (APO07) are recognizable. Besides those well-tended relations and trained employees, available information and appropriate systems/infrastructure are needed.

4.12 E-Business representation in COBIT 5

As a result, regarding the generic structure of COBIT 5, all relevant aspects are fully represented in the framework. However, when taking the in-depth research and analysis of e-business models and their characteristics into account, a number of mismatches were identified which will be elaborated and condensed in the next section. It becomes highly evident that in e-business the alignment of business and IT is enriched by an additional direction/ approach, namely bottom-up. As exhibited by means of the example, COBIT 5 is not taking this need for a bi-directional approach into account.

5. Proposed Framework

As discussed, we acknowledge the contiguity of technology, business, business operations and the customer, and describe this as a merger of the (usually) physically and logically separated business and IT side. Figure 1 shows a visualization of the bi-directional alignment needed in e-business models. While "classic" business/IT alignment procedures arise from the top, technology driven requirements by the customer enter the IT governance organization from the bottom through the business operations, which in e-business models are likely to close ranks or "merged" with the IT side of the business. To further align the different inputs, bi-directional

interfaces on the side of generic IT governance are needed (bold arrows).

Where adoption of needs and quickly changing behavior has to happen at a faster pace, high agility is necessary. Due to the technologic foundation, an above average degree of interaction with the customer occurs. When considering current trends as disruptive technologies or consumerization, these observations exceed their impact to a new extent.
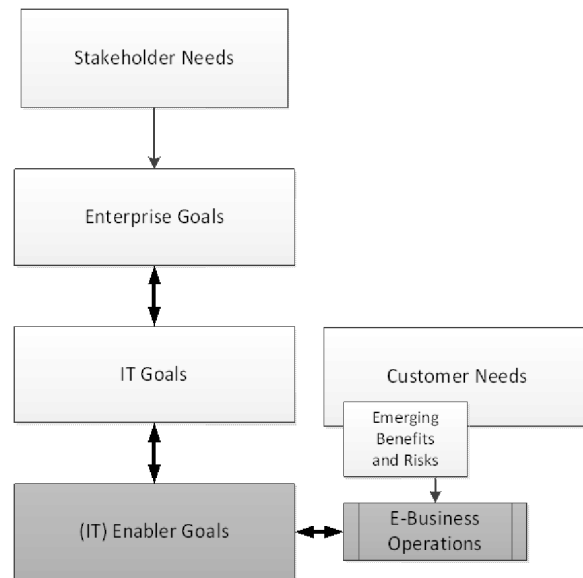

Figure 1. Bottom-up requirements depiction

The described merger seems to be a viable approach. On the flipside, the issued requirements emerge out of the operational context. The identified success factors of ePricing and 1-to-1 marketing/community building expose this. The combination of these findings calls for a redirection in IT governance of e-business models.

The key ideas for a successful implementation within a fully supportive framework for IT governance of e-business models can be described as follows:

- Detachment from strict top-down strategies and processes. At a glance a supportive framework would need to be focused around highly dynamic and accelerated processes compared to generic approaches. The proposed solution would include procedures bridging the gap between business and operations. This leverages all operational bottom-up requirements more directly and faster for the evaluation and eventual implementation.
- Integration of the customer in an advanced suggestion scheme to gain further and earlier

information on bottom-up input – possibly even the chance of creating the opportunity to influence customer behavior actively.

- Advanced (automated) information collection, management, evaluation and redistribution within the company and all relevant aspects of operations to achieve awareness of upcoming bottom-up influences.

- Specified risk management for emerging issues as described in the aspects of indirect revenue streams and digital goods exchanging. For risks, when entering bottom-up, the special need for early, innovative and dependable solutions consistent with customer requirements has to be taken into account.

- A close interaction and integration of network partners is advised. When participating in network organizations with the aim of increasing flexibility, suppliers and partners are required to be dealt with on a partnership basis. The constrained supervision and sole focus of meeting service level agreements is not suitable in terms of bi-directional inputs.

Apart from these proposals, an ideal framework would integrate various relevant standards and regulatory obligations for the whole chain of operations. This would include all generic rule-sets for IT as well as e-business IT- and operations-specific standards.

6. Conclusion

Based on the observation of an increasing number of business transformations towards e-business, we have examined IT governance requirements for e-business models. We have identified and described specific characteristics and success factors in e-business. Regarding these e-business characteristics we have analyzed their representation within COBIT 5 as an established IT governance framework. As a sequel we provided requirements and solution proposals for e-business compliant frameworks of IT governance.

The results of our work draw a clear picture in terms of the need for a bottom-up business/IT alignment in IT governance. The technologic drive and its integration into e-business operations are enriching the current approaches with another dimension, making business/IT alignment bi-directional. This leads to a paradigm shift in IT governance and a novel understanding of the alignment process.

We postulate that COBIT 5 covers a broad range of requirements, enabling a context-specific implementation, but—in contrast to its generic claim —it does not represent the elaborated need for bi-directionality in business/IT alignment. Our bottom-up approach provides a suitable solution for the requirements of e-business models. In order to achieve the intended coverage within COBIT or other IT governance frameworks, a full description and cascade of their relation to bottom-up impacts would have to be integrated.

Finally, we decided to suggest modifications to COBIT 5 instead of proposing a new and independent framework due to two factors: Firstly, the position of COBIT 5 as a standard reflects its reputation and proliferation. Secondly, we assume that the suggested modifications are useful in addition to the framework, and easily integrated.

A potential next step in future research would be the evolution of Liu et al.'s [27] framework to COBIT5 and adopting the idea of bi-directional/ bottom-up alignment. Moreover, the most relevant issue, whether the findings correlate to sectors other than e-business, remains for future research.

7. References

[1] IDC, "Global revenue from internet-based applications and associated hardware from 2009 to 2014," 2009. http://www.statista.com/statistics/164043/sales-development-with-internet-based-applications-from-2009/. [Accessed 10 May 2013].

[2] S. Dutta and B. Biren, "Business transformation on the internet," *European Management Journal,* 19 (5), pp. 449-462, 2001.

[3] P. Fingar and R. Aronica, Death of "e" and the Birth of the Real New Economy, Tampa: Meghan-Kiffer Press, 2001.

[4] W.K. Smith, A. Binns and M.L. Tushmann, "Complex business models: managing strategic paradoxes simultaneously," *Long Range Planning,* 43 (2-3), pp. 448-461, 2010.

[5] P.B. Evans and T.S. Wurster, "Strategy and the new economics of information," *Harvard Business Review,* 75 (5), pp. 70-82, 1997.

[6] P. Weill and J.W. Ross, IT Governance: How Top Performers Manage IT Decision Rights for Superior Results, Boston: Harvard Business Press, 2004.

[7] J.W. Lainhart, "Why IT governance is a top management issue," *Journal of Corporate Accounting & Finance,* 11 (5), pp. 33-40, 2001.

[8] S. De Haes and W. Van Grembergen, "IT governance structures, processes and relational mechanisms: Achieving IT/business alignment in a major Belgian financial group," *Proceedings of HICSS38*, IEEE, 2005.

[9] M. Iskandar and N.A.M. Salleh, "IT governance in e-commerce environment: Cases from airline industry," *Proceedings of ICITST 2010*, London, IEEE, 2010.

[10] ISACA, *COBIT 5 Framework,* ISACA, Ed., Rolling Meadows: ISACA, 2012.

[11] S. Breuer, "Beschreibung von Geschäftsmodellen internetbasierter Unternehmen," Universität St. Gallen, St. Gallen, 2004.

[12] B.W. Wirtz, Business model management, Wiesbaden: Gabler, 2010.

[13] N. Oestreich, ""Feels like free"," 18 September 2012. http://www.iphone-ticker.de/telekom-spotify-tarif-vergleich-38485/. [Accessed 3 May 2013].

[14] W. Van Grembergen and S. De Haes, Enterprise Governance of Information Technology: Achieving Strategic Alignment and Value, New York: Springer, 2009.

[15] M. Goeken and S. Alter, "Towards Conceptual Metamodeling of IT Governance Frameworks," *Proceedings of HICSS42*, IEEE, 2009.

[16] A.R. Hevner, S.T. March, J. Park and S. Ram, "Design science in information systems research," *MIS Quarterly,* 28 (1), pp. 75-105, 2004.

[17] W. Van Grembergen, S. De Haes and E. Guldentops, "Structures, processes and relational mechanisms for IT governance," in W. Van Grembergen (ed.) *Strategies for Information Technology Governance*, Hershey, IGI, 2004, pp. 1-36.

[18] T. R. Soomro and M. Hesson, "Supporting best practices and standards for information technology Infrastructure Library," *Journal of Computer Science,* 8 (2), pp. 272-276, 2012.

[19] P. Timmers, Electronic Commerce, Chichester, New York: Wiley, 1999.

[20] B. W. Wirtz, Electronic Business, 3 ed., Wiesbaden: Gabler, 2010.

[21] K.C. Laudon and J.P. Laudon, Management Information Systems, London: Pearson, 2012.

[22] C.T. Romm and F. Sudweeks, Doing Business Electronically, London: Springer, 1999.

[23] N.V. Patel, "An Emerging Strategy for E-Business IT Governance," in W. Van Grembergen (ed.) *Strategies for Information Technology Governance*, IGI, Hershey, 2004, pp. 81-98.

[24] N.V. Patel, "Emergent forms of IT governance to support global e-business models," *Journal of Information Technology Theory and Application,* 4 (2), pp. 33-48, 2002.

[25] J.C. Henderson and N. Venkatraman, "Strategic alignment: leveraging information technology for transforming organizations," *IBM Systems Journal,* 32 (1), pp. 4-16, 1993.

[26] G. Kearns and R. Sabherwal, "Strategic alignment between business and information technology," *Journal of Management Information Systems,* 23 (3), pp. 129-162, 2006/07.

[27] X. Liu, L. Wu, J. Yu and X. Lei, "A holistic governance framework for e-business success," in *Proceedings of ICMeCG 2010*, IEEE, 2010, pp. 142-147.

[28] A.M. Langer and L. Yorks, Strategic IT, Hoboken: Wiley, 2013.

[29] H.-M. Chen, "Towards service engineering: Service orientation and business-IT alignment," in *Proceedings of HICSS41*, IEEE, 2008.

[30] A. Orr, "Convergence: The next big issue," *Target Marketing,* 23 (11), p. 5, 2000.

[31] B. Mahadevan, "Business models for internet-based E-commerce," *California Management Review,* 42 (4), pp. 55-69, 2000.

[32] R. Kalakota and M. Robinson, E-Business 2.0: Road-map for Success, Amsterdam: Addison-Weasley, 2001.

[33] J. Pathak, "Internal audit and e-commerce controls," *Internal Auditing,* 18 (2), pp. 30-34, 2003.

[34] M. Harkness and B.P. Green, "E-commerce's impact on audit practices," *Internal Auditing,* 19 (2), pp. 28-36, 2004.

[35] Booz, Allen & Hamilton, 10 Erfolgsfaktoren im e-Business, Frankfurt am Main: FAZ, 2000.

[36] K. Asdemir, Dynamic pricing and performance based pricing, Dallas: The University of Texas, 2004.

[37] R. Darby and J. Jones, "E-commerce marketing," *Logistics Information Management,* 16 (2), pp. 106-113, 2003.

[38] D. Portuese, E-Commerce and the Internet, Minneapolis: Capella University, 2006.

[39] Biggs, M. "E-commerce success requires commitment to building a proper customer 'community'," *InfoWorld,* 22 (14), p. 68, 2000.

[40] ISACA, *COBIT 5 Enabling Processes,* ISACA, Ed., Rolling Meadows: ISACA, 2012.

[41] ISACA, *COBIT 5 Implementation,* ISACA, Ed., Rolling Meadows: ISACA, 2012.

[42] M. Cochran, "Proposal of an operations department model to provide IT governance in organizations that don't have IT C-level executives," *Proceedings of HICSS43*, IEEE, 2010.

[43] A.A. Mirza and S.S. Chan, "Challenges for managing IT skills portfolio for e-Business," in *Managing IT Skills Portfolios*, Hershey, IGI Global, 2004, pp. 52-80.

[44] M. Kooper, R. Maes and E. R. Lindgreen, "On the governance of information: Introducing a new concept of governance to support the management of information," *International Journal of Information Management,* 31 (3), pp. 195-200, 2011.

[45] T.G.J. Schepers, M.E. Iacob and P.A.T. van Eck, "A lifecycle approach to SOA governance," *Proceedings of the 2008 SAC*, New York, ACM, 2008, p. 1055-1061.