Capital budgeting for information technology service management. Modeling, classifying, and disclosure from a structural capital perspective

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Abstract

***Purpose of the paper**: The study proposes a modeling, classifying and disclosure framework for investment evaluation in Information Technology Service Management (ITSM) considered as a component of structural capital, in order to communicate better with stakeholders in relation to ITSM value.*

***Methodology**: The research is based on a conceptual construction that also takes traditional capital budgeting criteria into consideration for Information Technology (IT) investments, and ITSM investments in particular, contextualizing them within the environment of structural capital.*

***Results**: In order to evaluate ITSM investments, blended methods (quantitative and qualitative) appear to be the most appropriate option, above all in order to better disclose their real value as fundamental components of structural capital to stakeholders.*

***Research limitations**: The study is mainly theoretical, with a single case of indirect practical evidence. Therefore, further empirical investigations would widen the conceptual framework, given growing interest for ITSM.*

***Practical implications**: Given the recent economic-financial crisis, a 'back to basics' tendency has arisen, aiming at assigning the almost exclusive ability of assessment, even for IT investments, to fundamental methods. Appropriate evaluation methods, which are proposed in this study, will enable managers to communicate better with stakeholders about ITSM as a component of the structural capital. The use of blended methods of evaluation for structural investments, particularly ITSM, also highlights other appreciable factors, such as time saving, work wellbeing, pollution reduction, and others.*

***Originality of the paper**: The research focuses on ITSM and its activities, services, processes, procedures, and operations as innovative components of structural capital, proposing a conceptual framework to facilitate better communication to stakeholders in relation to the real value of such structural assets.*

Key words: structural capital; investment disclosure; itsm; information technology service management; capital budgeting; blended methods.

1. Introduction

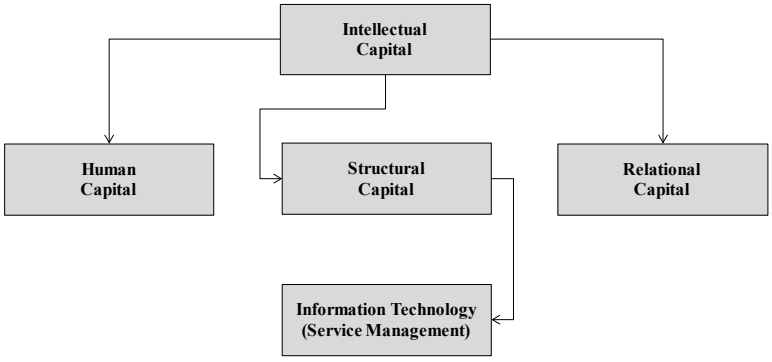
The serious economic and financial crisis of recent years, symbolically sanctioned by the bankruptcy of Lehman Brothers in 2008, started earlier

with the subprime mortgage bubble in the United States. Unfortunately, it is still creeping into many stormy contingencies (the weakness of Greece in the Euro area, the slowdown of BRICS growth, etc.). The crisis furthermore, has forced entrepreneurs, managers, professionals, and scholars to deal with highly problematic situations that are due, in most cases, to excessive financial operations.

In this sense, especially with regard to management responsibilities, many have invoked a 'back to basics' approach (see Blanchard, 2009; Civi, 2013; Broome, 2015). This also seems to be the case of intellectual assets (Beattie and Davison, 2015; Yukselturk and Tucker, 2015).

As shown in Figure 1, we assume that intellectual capital resides in human capital, structural capital and relational capital, according to a classification on which there appears to be a certain consensus (Hormiga *et al.*, 2006). Our study aims at focusing, in particular, on a specific component of structural capital, i.e. activities, services, processes, procedures, and operations regarding Information Technology, specifically considered from the perspective of Information Technology Service Management (ITSM). Generally, the following considerations relative to the capital budgeting of ITSM can be extended to other components of structural capital, providing a more consistent evaluation of the entire intellectual capital.

Fig. 1: Information Technology (Service Management) in the intellectual capital context



Source: authors' elaboration

In reconsidering the evaluation of intellectual assets from the perspective of Information Technology (IT) managers, the most important precept seems to be the necessity to move the methodological center of gravity of capital budgeting from *software efficiency* to *business efficiency*, as nowadays it is clear that a computer science project is satisfactory only if it contributes to the creation and diffusion of enterprise value (Amadi-Echendu *et al.*, 2012). In truth, these efforts of IT management must be adopted from the initial of the IT project management (i.e., the technical and economic evaluation of feasibility), even though, at a strategic level, a problem of competence may obviously arise.

In other words, can the Information Systems Function be recognized and/or delegated (also) with the responsibility of the business decision? This question seems to be quite evident, for example, in the case of electronic business (when IT is the reference platform for carrying out the service) but it should be evident also in other circumstances, seeing as we argue that at its current state, it is simply not possible to avoid such commitment (Laudon and Laudon, 2004; Peppard *et al.*, 2011; Fell, 2013).

Given the indispensability of the contribution of IT managers to business decision making, this study aims to build a theoretical model in which fundamental quantitative and qualitative criteria of capital budgeting can find their place. In particular, the model attempts to pursue a research goal (investigating how it is possible to accurately evaluate an ITSM investment from the perspective of structural capital) and to accomplish a research objective by answering the following research question: «Is it appropriate to limit the evaluation of ITSM investments to ROI - Return on Investment, EVA - Economic Value Added, and/or NPV - Net Present Value?».

2. ITSM from an investment evaluation perspective: literature review and analysis

Within the 'mare magnum' of Information and Communication Technology (ICT), ITSM aims to handle computer science services performance inside and outside an organization. In short, ITSM regards the services which regulate the performance of IT equipment (cf. Young, 2004; Keel *et al.*, 2007; Winniford *et al.*, 2009; Marrone and Kolbe, 2011; Cots *et al.*, 2016). In the borderline case of software houses, clearly, ITSM regards computer science services that are enabled to produce software and not (directly) the software to be sold: in this sense, ITSM is considered from a back office perspective in this study.

In truth, the most modern and authoritative models of IT governance are methodologically oriented towards ITSM (Iden and Eikebrokk, 2013; Vicente *et al.*, 2014), even distinguishing between Information Technology Service *Management* and Information Technology Service *Governance* (Jäntti and Hotti, 2015). Recently, in fact, great ferment has been provoked at international level in the field of IT management in relation to practices (*structural capital*), models (*structural capital*), and certifications (*structural capital; human capital; relational capital* in the sense of reputation), by virtue of different reasons, including two which seem to emerge more clearly.

Firstly, in recent years, IT has represented a fundamental (and sometimes unique) competitive advantage for enterprises engaged in global competition. Such a vision is frankly theoretically wrong as in the current era (when consumption at the end of the supply chain has become more and more sophisticated) brands, ethics, reputations, and so on are very important factors (*relational capital as business capital*), albeit not completely unfounded in the Information and Communication Society.

From an entrepreneurial viewpoint, however, it is essential that perception on the role of IT does not remain merely a declaration of principle - or worse still - only a pretext to gain more powerful positions

in organizational charts and budgets. Honors are balanced by sacrifices and IT managers are requested to collaborate actively, as real managers and not as 'internal consultants', to define business strategy and the related responsibility, especially in terms of risk management (Bentley, 2005; Kerzner, 2005; Gollenia and Uhl, 2012).

Secondly, orientation towards value creation should be a constant principle of good management, not only strategically, but also operatively. Thus, a healthy entrepreneurial rationale is indispensable in any part of IT management, throughout the entire life cycle of the computer science project, in the 'planning' stage (of a managerial nature) as well as in that of 'development' (of a technological nature).

Having verified a definite orientation of modern enterprises towards IT governance, the most intriguing part of this evolution relies consequently in the assessment of the value that is generated by the computer science project. IT managers have to use adequate methodologies, techniques and tools for their capital budgeting in order to direct the project governance correctly, and in this respect, a specific theoretical model seems to be particularly useful.

3. Modeling and classifying evaluation criteria for IT investments: a methodological framework

The economic evaluation of computer science investments has long been investigated by scholars and professionals: nevertheless, the recent success of ITSM seems to require diverse and much more commitment. The ITSM perspective for example, considers back office perspective rigorously because its focus is on IT performances and not on the business object thus significantly complicating the economic-financial evaluation of IT investments.

In truth, it seems that in some of the most recent trends, the entrepreneurial need to link costs and revenues has, to a great extent, restricted the analysis of such evaluations (the above mentioned 'back to basics'). In essence, the only parameters that are acceptable nowadays for the evaluation of IT investments seem to be Return on Investment (ROI) (also to be used for EVA) or the cash flow (to be used for NPV). The importance of such criteria is clear, since they are objective measures (cash even more so than revenues), but in some cases they are very difficult to assess, as the enterprise placed within a systemic space becomes increasingly characterized by continuous and unpredictable relations and interactions, 'between' the internal and 'with' the external resources.

In other words, is it appropriate to focus the evaluation of IT investments 'exclusively' on revenues and cash? Surely these two parameters have the merit of anchoring the theoretical analysis to a level of concreteness (Fell, 2013), which is indispensable to entrepreneurs, who peremptorily require a 'numeric' reference for their ICT expenditure.

Most probably, however, the focus on ROI, EVA, and NPV for IT investments tends to become myopic. This concentration does not consider (i.e. it does not 'feel') other aspects such as positive and/or negative components of value, which different evaluation methods can at least

identify and esteem (maybe by under-measurement, in order to respect a common principle of caution).

In order to analyze potential inconsistencies more in depth and propose possible solutions at the same time, we have attempted to build a theoretical framework for providing investments in ITSM with adequate capital budgeting criteria. Thus, the research is posited on a conceptual construction that finally also takes traditional capital budgeting criteria into consideration for Information Technology (IT) investments, and ITSM investments in particular, contextualizing them within the environment of structural capital.

The ambition of our investigation is to support entrepreneurs, managers, professionals, and scholars by providing a more in-depth comprehension of the link between ITSM as a component of structural capital and appropriate evaluation methods. The methodology we have adopted in this process has been organized into the following steps:

- determination of the main characteristics of an ITSM investment that are potentially important from an evaluation viewpoint;
- engineering of such characteristics into a framework due to the possible combinations of these characteristics;
- pairing/matching some of the most frequently used capital budgeting criteria with potential combinations of the above characteristics.

As regards the first step, three binomial dimensions for an IT investment are taken into account in relation to the construction of a structural (and consequently intellectual) capital perspective:

a) *utility destination*, such as ITSM, even though it is strongly customer-oriented, has a back office, rather than a front office, perspective;
b) *benefit certainty*, which is the most important characteristic of the taxonomy of capital budgeting criteria, along with financial nature (Metallo, 2013). However, in this context a financial criterion, which considers different values at different times, seems to be less relevant because the structural capital perspective is always long term; and
c) *result tangibility*, which clearly is not always evident for technological capital, structural capital, and intellectual capital (in a sort of progression).

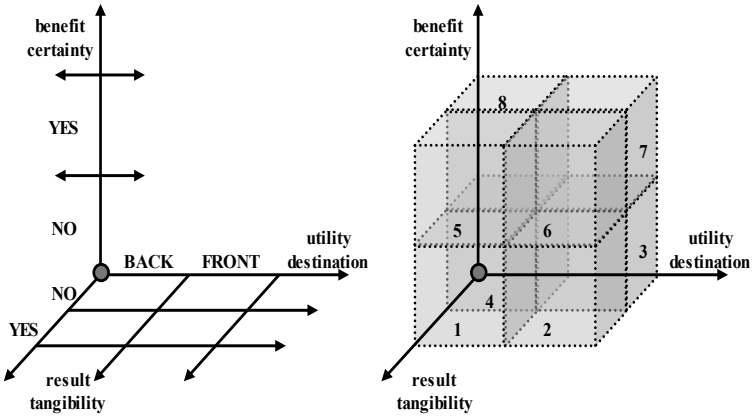
As regards the second step, the graph in Figure 2 is structured as follows:

a) on the X axis, we have placed the utility destination of the computer science investment ('back office', inside the organization: 'IT as a process'; 'front office', outside the organization: 'IT as a product');
b) on the Y axis, we have placed benefit certainty/uncertainty (in a scenario with minor or major predictability); and
c) on the Z axis, we have inserted the result tangibility/intangibility (intended as the fundamental aspects of assets, revenues and cash).

As regards the third step, this theoretical framework provides eight conceptual positions, which can be paired/matched with their most adequate capital budgeting criterion (the proposed criteria have been extracted by the literature review on capital budgeting in general and IT capital budgeting in particular (cf. Irani *et al.*, 2006; Bierman and Smidt, 2007; Festa, 2011; Metallo, 2013):

1: (back office, uncertainty, tangibility): Score
2: (front office, uncertainty, tangibility): Expected NPV
3: (front office, uncertainty, intangibility): ROV (Real Option Valuation)
4: (back office, uncertainty, intangibility): Check List
5: (back office, certainty, tangibility): BSC (ex ante / ex post Balanced Score Card)
6: (front office, certainty, tangibility): NPV
7: (front office, certainty, intangibility): EVA (Economic Value Added)
8: (back office, certainty, intangibility): CBA (Cost-Benefit Analysis).

Fig. 2: Theoretical framework for the modeling, classifying and disclosure of IT(SM) investments



Source: authors' elaboration

Such a framework, based on binomial dimensions, clearly does not aim at completeness (which would simply be impossible because of the width and evolution of capital budgeting criteria), but it aims to express a fundamental coherence for the methodological positioning of the single method of evaluation. Strictly speaking, this theoretical scheme is based on a fundamental observation: 'direct' value creation prevalently emerges in front office relationships, while 'indirect' value creation, in terms of efficacy and efficiency, prevalently emerges in back office relationships.

In this model, qualitative criteria have a larger space in the back office 'segment', even though this consideration could obviously generate evident criticism. In the case of a support investment (according to the traditional classification of the value chain: Porter, 2002) it is also possible to find revenues and/or cash flows (or at least a component of the same) in the sense of a higher saving, which could have been generated by an ITSM project, thus enabling a lower cost, an increase in profit (and, by down-streaming the financial chain, less expenditure and a greater increase in cash inflow, given *ceteris paribus*). Consequently, why shouldn't a stakeholder use 'only' ROI, EVA and/or NPV for the evaluation of ITSM investments, particularly from a structural capital perspective?

4. Evaluation, application, and disclosure of ITSM investments

According to strictly rational business thinking, there are no ultimate reasons to avoid quantitative methods for the estimation of ITSM projects. Rather, they provide entrepreneurs with a concrete key of interpretation. What is not persuasive is their 'exclusive' use, which would definitely be misleading, as IT investments, especially when referring to back office computer science, cannot be appreciated completely, if only the quantitative dimension is counted, while other values, which certainly exist, are not taken into consideration and are thus lost (Baggio and Caporalello, 2003; Lee, 2004). An example is better product quality (*product innovation*), which definitely expresses a higher solidity of the supply (Longbottom and Hilton, 2009), but does not automatically guarantee an increase in revenues or cash flow, as opposed to cost saving. In fact, market impact is less predictable and manageable than internal efficiency.

Furthermore, ITSM investments could certainly enable better quality of the work environment (*process innovation*), with consequent benefits on human resources productivity and business functioning performance. Ignoring these aspects, which are natural characteristics for assets with a back office destination, would mean limiting the effective substance of the investment (Davenport and Short, 2003; Mvungi and Jay, 2009).

An example could probably better clarify this construct. A well-constructed calculation process for measuring ROI, deriving from the adoption of ITSM solutions, is proposed in a Business White Paper by Hewlett Packard ("Measure your ITSM investments", 2013). In this good practice presentation, a table of calculations is set out in order to show the possible benefits associated with single ITSM operations, in this case regarding service desk and call management (see. Table 1), whereby a "… reduction of inbound and outbound service calls, and reduction in the duration of the remaining calls" (p. 13) is achieved.

The method presented above is well engineered and deployed. In the White Paper perspective, the aim is achieved, seeing that the calculation is oriented to give professional evidence of the value that can be generated in terms of ROI (which is considered in the Economic Value Added method in our model).

Upon considering the same investments from an intellectual capital perspective, it is quite evident that improved service desk and call management could also generate time saving for employees (improving work wellbeing and then human capital), procedures (improving organizational efficiency and structural capital), and customers (improving enterprise reputation and finally, relational capital). ROI, EVA, or NPV, as previously mentioned, do not take these values, which in any case exist, into consideration.

Furthermore, a simple 'something else' beyond NPV, as is the case of CBA, seems to be insufficient because in most cases, if not always, it will inevitably be discretionary. In truth, even nowadays (Irani and Love, 2002), an 'ex ante' BSC (which is a blended method) seems to be more complete for the evaluation of ITSM investments because it enables several aspects of overall business performance to be taken into consideration (as is verifiable 'ex post' by an adequate gap analysis).

Tab. 1: ROI expectation deriving from an ITSM investment

ROI example for service desk call management					
US-based financial services firm: ROI by helping eliminate inbound and outbound service desk calls					
Value proposition		Automated incident management reduces costs by providing end user self-service capabilities, which in turn eases the load on the service desk by reducing a number of incoming and outgoing calls.			
Solution benefit summary		End-user, self-service capabilities – to open and check the status of tickets – as well as improvements in operational processes such as incident management can help to ease the load on the service desk significantly by reducing a large number of incoming and outgoing calls.			
Applications		Consolidated service desk.			
			Expected improvement associated with HP software solution		
ROI example	*Metrics*	*Before HP Service Manager*	*Conservative*	*Probable*	*Optimistic*
	New calls/incidents	$1,244,057	20.0%	30.0%	40.0%
	Password resetting	$1,036,720	50.0%	75.0%	100.0%
	Status follow-up calls	$995,252	20.0%	30.0%	40.0%
	General non-IT calls	$870,843	20.0%	30.0%	40.0%
	Outbound calls	$471,236	20.0%	30.0%	40.0%
	Total annual IT cost	$4,618,108			
	New calls/incidents		$995,246	$870,840	$746,434
	Password resetting		$518,360	$259,180	$0
	Status follow-up calls		$796,202	$696,676	$597,151
	General non-IT calls		$696,674	$609,590	$522,506
	Outbound calls		$376,989	$329,865	$282,742
	Projected annual costs		$3,383,470	$2,766,152	$2,148,833
	Projected annual benefit		$1,234,638	$1,851,956	$2,469,275

Source: Hewlett Packard Business White Paper "Measure your ITSM investments", 2013, p. 13.

In practice, it is clear that all enterprise investments in back office and those in ITSM are conceived and implemented in order to generate value, which would become, by down-streaming the chain, more and more evident in terms of revenues and cash. At the same time, however, it is difficult (or worse, misleading) to find, in upstreaming the chain, the single sources of that value, especially due to the highly pervasive role of ITSM, mainly from a structural capital perspective. In this sense, blended methods, like the above mentioned BSC, can support entrepreneurs, managers, professionals, and scholars in making better decisions about ITSM evaluation (*capital budgeting*) and communication (*disclosure*).

5. Results, implications, and conclusion

The main outcome of this research is the construction of a theoretical framework for the modeling, classifying (or positioning'), and disclosure of capital budgeting criteria for evaluating ITSM investments by virtue of

three fundamental dimensions: utility destination, benefit certainty, and result tangibility. The discussion relative to the model has highlighted that basically, qualitative criteria seem particularly appropriate for the back office 'segment' and for ITSM investments, which nowadays represent one of the most important elements of structural capital.

The limitations of the research are a consequence of its very nature, i.e. being a theoretical study: thus, further empirical research is necessary to validate the model presented and the (well-based) assumptions made towards its development. The study also provides a context of prescriptive actions and processes while offering a valuable theoretical basis for empirical development and practical application.

In terms of scientific implications, this result could encourage the adoption, dissemination, and innovation of qualitative techniques for IT project evaluation and for other components of structural capital in order to better communicate the real value of structural investments to stakeholders (Dumay, 2009). In the specific case of ITSM, fortunately, the growing attention of the scientific and professional communities to this field of research enables the proposal of further experimentations in a back office context, also due to the current ferment related to practices, models, and certifications (concurring to boost human capital, structural capital, and relational capital).

In terms of managerial implications, it is clear that without an accurate conception of IT capital budgeting criteria, Information Technology managers (and Information Technology Service managers in particular) will always be forced into a role of secondary importance as regards business strategy beyond their more or less formal recognition in decision making (i.e. the presence of a CIO, *Chief Information Officer*, on the executive board), and this would be applicable to other managers of structural assets (processes, procedures, facilities, etc.). In a healthy business the importance of a resource depends most of all on its capacity to create value obviously (Metallo, 1995), as long as this can be accurately measured, communicated and (in line with the perspective of this study) disclosed (Festa, 2006).

In conclusion, searching for the right balance between quantitative and qualitative evaluations (Anandarajan and Wen, 1999; Dameri, 2005; Schilling, 2005; Saleem *et al.*, 2012) represents a daring challenge for IT capital budgeting, as has been repeatedly highlighted by the scientific literature in the field: this combination also seems theoretically true for other elements of structural capital that are based on the same dimensions (back office perspective, benefit certainty/uncertainty, and result intangibility). A qualitative method is not necessarily 'inaccurate': on the contrary, the indefiniteness of the object under evaluation obliges greater severity in the application of the method in terms of modeling, classifying and disclosure for ITSM investments in this particular study, but also for other structural assets.

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