

Does ROI Matter? Insights into the True Business Value of IT

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Abstract: Ever since the introduction of an 'IT productivity paradox' by Robert Solow, the business value of information technology (IT) has been the topic of many debates by practitioners as well as by academics. In these discussions a distinction can be made between the variance approach, investigating what the relationship between IT investments and organisational performance is, and the process approach, investigating on how this relationship works. Following the process approach, this paper describes a useful framework for assessing the organisational impact of IT. Secondly the paper considers the relation between IT impact and organisational performance and reviews the IT investment evaluation methods. The paper concludes with a proposal for a multivariable value assessment sheet, based on insights derived from the balanced scorecard theory.

Keywords: IT business value, return on investment, real option valuation, balanced scorecard

1. Introduction

The business value of information technology (IT) is a topic that is cause for a lot of discussion. Scepticism roars again in the boardrooms of many companies, as the e-business hype explodes in the face of many 'believers' of the new-economy gospel. Without strong technological developments to thrive upon and an uncertain economic perspective the pressure on IT budgets is high. For investments in IT the requirement of sufficient returns and a clear 'business case' is even more severe than before. Several surveys indicate that the issue of measuring benefits of IT investments is a concern in many organisations (Whitling et al, 1996). Measuring IT benefits and value is frequently reported as one of the most important issues for senior IT management. (Brancheau and Wetherbe, 1987; Niederman, Brancheau and Wetherbe, 1991; Watson, Kelly, Galliers and Brancheau, 1997). Based on research into 'the changing role of finance executives regarding Information and Communication Technology' (Paul and Tate, 2002) it can be concluded that CFOs use typical financial methods to evaluate IT investments. Over 86%, of the 288 CFOs that responded claim to use traditional capital budgeting methods like Return on Investment, Pay-back period, Discounted Cash Flow and Internal Rate of Return. This can be seen in Figure 1. The strong use of financial appraisal techniques is also found in surveys of Ballantine et al. in the United

Kingdom (Ballantine et al, 1997) and Wong and Behling in Australia (Wong and Behling, 1997).

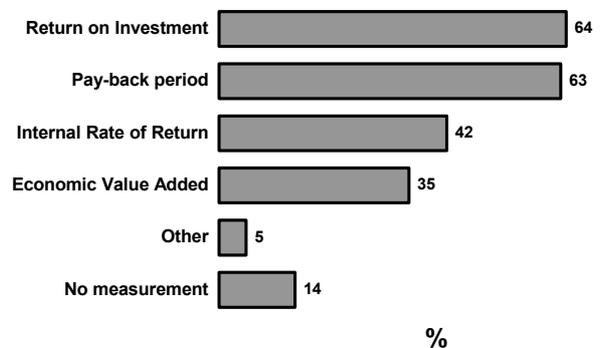


Figure 1: Use of investment evaluation methods by CFOs.

However, CIOs tend to estimate the use of these financial methods a lot lower. Of the 456 CIOs and senior IT managers that responded in the research into 'the issues and challenges facing senior IT executives' (IDG Research and Getronics, 2002) only 18% indicated using Return on Investment. As can be seen in Figure 2, for the CIOs the mere effects of the investment, like decreased costs and increased productivity, topped the list. The different results of the research illustrate the problems in capturing the full business value of IT investments in an understandable measure. This paper aims to give some insight into the concepts, possibilities and limitations in this quest for value.

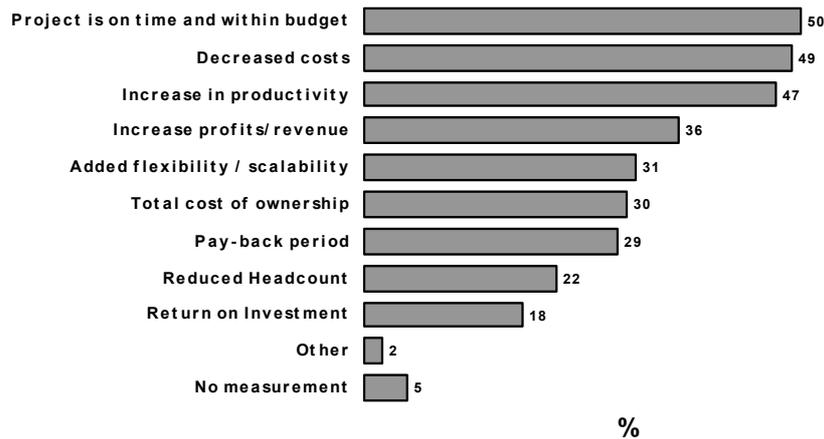


Figure 2: Use of investment evaluation methods by CIOs.

2. The quest for business value

In research into the value of IT two approaches can be distinguished: the variance approach and the process approach (Davaraj and Kohli, 2002).

2.1 The variance approach

The variance approach measures the relationship between IT investments and organisational performance in terms of higher revenues, lower costs, improved market share, etc. This approach focuses on the 'what' question. *What* is the relationship between IT investments and organisational performance? Over the years, a

vast amount of work has been done regarding this relationship. Several studies showed that the relationship between IT investments and organisational performance could not be proven (Loveman, 1988; Salmela, 1997). This result became known as the 'IT productivity paradox' (Brynjolfsson, 1993). Probably the best-known statement about this paradox was done by Robert Solow when he stated: 'You can see the computer age everywhere but in the productivity statistics'. Notorious as this 'IT productivity paradox' may be, it does not turn up in all studies about IT returns. Table 1 provides an overview of selected firm-level studies.

Table 1: Selected firm-level studies of IT returns (Dedrick et al., 2003).

Study	Data Sample	Findings
IT and Firm Performance		
Strassmann (1990)	38 U.S. companies	No correlation between IT spending and firm performance.
Loveman (1994)	60 Business units in 20 U.S. companies	IT investments add nothing to output.
Barua et al. (1995)	Same as Loveman (1994)	IT improves intermediate output if not final output.
Brynjolfsson and Hitt (1993)	Large U.S. manufacturers	Gross-marginal product of IT is over 50% per year in manufacturing.
Brynjolfsson and Hitt (1995)	Large U.S. manufacturers	Firm effects account for half of productivity benefits of earlier study.
Lichtenberg (1995)	U.S. firms, 1989-1991	IT has excess returns; one IS employee can be substituted for six non-IS employees without affecting output.
Brynjolfsson and Hitt (1996)	367 Large U.S. firms	Gross return on IT investments of 81%. Net return ranges from 48% to 67% depending on depreciation rate.
Brynjolfsson and Hitt (1996)	370 U.S. firms	IT investments increase firm productivity and consumer welfare, but not profitability.
Dewan and Min (1997)	300 Large U.S. firms	IT is a net substitute for both capital and labour, and shows excess returns relative to labour input.
Black and Lynch (1997)	1621 U.S. manufacturing establishments	Productivity not affected by presence of particular management practice but by implementation, especially degree of employee involvement.
Brynjolfsson et al. (1998)	Sample of Fortune 1000 U.S. firms, 1987 - 1994	The stock market value of \$ 1 of IT capital is the same as \$ 5 - \$ 20 of other capital stock.
Gilchrist et al. (2001)	Sample of Fortune 1000 U.S. firms	IT productivity is greater in IT producer firms than in user firms and in durable manufacturing.
Gilchrist et al. (2001)	French firms	Gross returns to IT investments are positive and greater than returns to non-IT investments.

The advantage of this approach is that it reveals statistically 'proven' effects of IT. These effects are of particular relevance for the development of economic policy. The disadvantage of the approach is that the effects are valid in general,

but might not appear for a particular investment in a particular company. This notion is illustrated in table 2, which shows another overview of firm-level studies.

Table 2: Selected firm-level studies of IT returns if combined with organisational transition (Dedrick et al., 2003).

Study	Data Sample	Findings
Organisational Complements and IT Returns		
Bresnahan et al. (2002)	400 Large U.S. firms, 1987 – 1994	The effects of IT on labor demand are greater when IT is combined with particular organisational investments.
Brynjolfsson et al. (1998)	Sample of U.S. firms, 1996	Decentralised organisational practices, in combination with IT investments, have a disproportional positive effect on firm market value.
Ramirez et al. (2001)	200+ U.S. firms	Firm use of employee involvement and total quality management enhances IT returns.
Francalanci and Galal (1998)	52 U.S. life insurance companies, 1986 - 1995	Productivity gains result from worker composition (more informational workers) and IT investments.
Deveraj and Kohli (2002)	8 hospitals, over 3 years	IT investment combined with business process reengineering positively and significantly influences performance.
Tallon et al. (2000)	300+ U.S. firms, 1998	Perceived business value of IT is greater when IT is more highly aligned with business strategy.

These studies however analysed the returns of IT investments in combination with organisational and process changes. The results of these studies show that the return on IT is influenced by the organisational transition that accompanies it. The same IT investment therefore can have a positive return in organisation A and a negative or neutral return in organisation B. This raises the question how IT is used in an organisation, a question that is better addressed with the process approach. For corporate decision makers therefore the variance approach is of limited use.

2.2 The process approach

On a company level more insight into the 'how' question is required. *How* do IT investments improve organisational performance? This question is addressed in the process approach (Mooney et al., 1995). Soh and Markus synthesised the different models of the process approach into a comprehensive framework for the IT value creation process (Figure 3, Soh and Markus, 1995). This paper is constructed along this framework. First we will explore the relation between IT expenditures and IT assets: the IT efficiency question. In the next paragraph the organisational impacts of IT will be discussed in search of IT effectiveness. The following paragraph considers the relation between IT

impact and organisational performance: the question of business and IT alignment.

The paper will be concluded with an overview of investment valuation techniques and a proposal for a more balanced understanding of the value of IT.

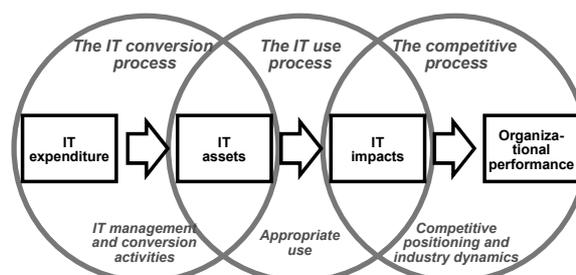


Figure 3: The process approach for understanding IT value. (Soh and Markus, 1995)

3. IT efficiency

One of the core concepts of the process approach is the time dimension of IT value (Bannister, 2001). Most technologies have a life cycle, i.e. value dissipates over time, utilising available technologies as optimally as possible and switching to new technologies at the right moment are the keys to a minimal cost of managing and maintaining the IT in an organisation. A well-established concept in this area is that of the Total Cost of Ownership (TCO). TCO covers all costs related to the asset. All cost meaning both

registered and unregistered 'hidden' costs, for example peer support in solving a problem. Regarding the optimal use of technologies, and the effects on the TCO, a lot of research has been done by the Gartner Group. The relationship between TCO and the life cycle of a technology is a less researched field (Davaraj and Kohli, 2002). Figure 4 shows the expected relationship between the TCO and the life cycle of a technology.

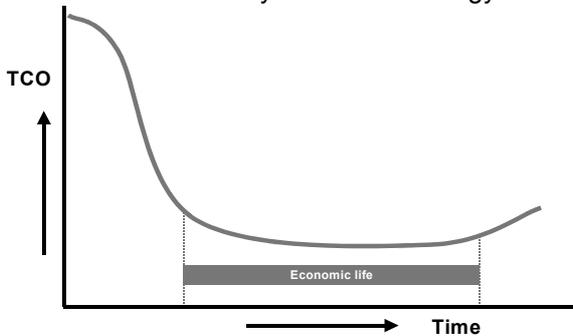


Figure 4: The expected relationship between TCO and the life cycle of a technology.

In its younger years, the knowledge and utilisation of a technology are less developed, resulting in a relatively high TCO. If the technology evolves into an industry standard, the TCO will decline as the technology matures. At the end of its life cycle the use of the technology will decline and the TCO will rise again as a result of scarcity of resources. Its economic life has passed and the technology is outperformed, probably both technically and economically, by a newer technology. An example of this lifecycle is the rise of MS-DOS and its replacement by MS-Windows as the standard operating system for personal computers. Within a

technology a similar life cycle pattern can be expected for successive versions or releases. For a discussion about the value of IT, it should be understood that TCO does not express a value. TCO expresses a cost! This cost reflects the IT Efficiency challenge; one of the most important challenges for CIOs and IT Executives:

How to minimise the cost of utilising, managing and maintaining the current IT, whilst delivering the agreed 'quality of service'? Notwithstanding the fact that TCO has no value on its own, a decline in TCO has! IT investments that result in a higher IT efficiency, for example the implementation of a IT management suite, contribute to a lower TCO of the managed IT systems or components. The decline of TCO that can be achieved is a return on the investment involved.

4. IT effectiveness

Another challenge for CIOs is the question: How to maximise the 'business value' of IT investments? This challenge addresses not the efficiency of IT, but its effectiveness. How does IT contribute to the business strategy and goals?

4.1 Understanding the impact of IT

The impact of IT on business is rapidly shifting from an efficiency enhancing production factor towards a source of business innovation. This development is illustrated in Figure 5.

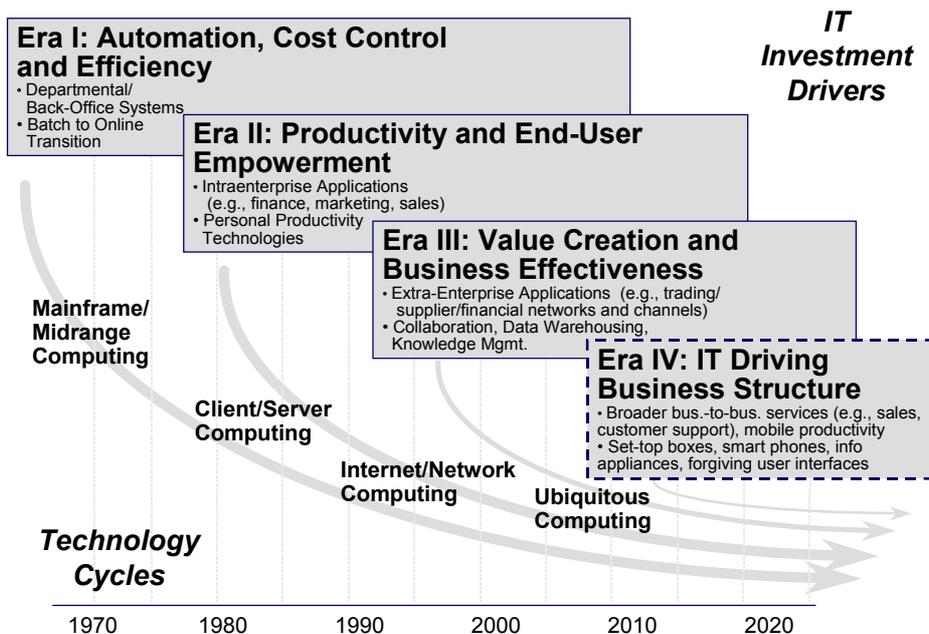


Figure 5: The development of IT. (Gartner Group)

The changing role of IT has to be reflected in the way IT investments are evaluated. The traditional 'IT-economics' focus on cost savings should evolve to also include productivity and business value drivers. This notion has inspired several authors (e.g. Hammer and Mangurian, 1987, Riggins, 1999, Smit and Silvius, 2001) to provide frameworks for identifying value of IT solutions. From these frameworks a common understanding arises that IT can make a business more *efficient*, more effective, more flexible and/or more innovative. These four 'sources of value' identify the way IT creates value for an organisation. The four terms mentioned summarise the development of the value of IT over the past decades. Starting from a calculation tool to improve efficiency in administrative processes, the opportunity to provide decision makers with more detailed information much quicker than before arose, hereby improving the effectiveness of the organisation. In recent years it has become clear that a revolutionising technology like the Internet can open up new markets, new products or provide new means of developing customer loyalty, thereby innovating the business of a company. So, from an enabler of business IT developed into an innovator of business. The latest notion is that the lower cost of communication, which IT provides, enables organisations to swap resources more easily, e.g.

moving business activities offshore, thereby enhancing the managerial flexibility.

4.2 Understanding more of the impact of IT

Thus, for a better understanding of the impact of IT on an organisation we should consider its effect in terms of efficiency, effectiveness, innovation and flexibility. Logically, these 'sources of value' can be applied to the external positioning of the organisation or to the internal business processes.

Understanding the external positioning marketing, provides us with the four 'P's: Price, Product, Placement and Promotion. Combining the sources of value with these fields of competition provides a practical 'grid' to identify the possible effects of an IT investment. For example, an IT system that allows a company to differentiate its prices is identified on the grid as having an impact in the field effectiveness combined with price. To understand how IT adds value to the internal business processes, these processes are categorised in main business functions as illustrated in Figure 6. The 'Generic Business Model', as developed by James Martin and Associates, distinguishes as main business functions: adding value, innovating, controlling resources en directing

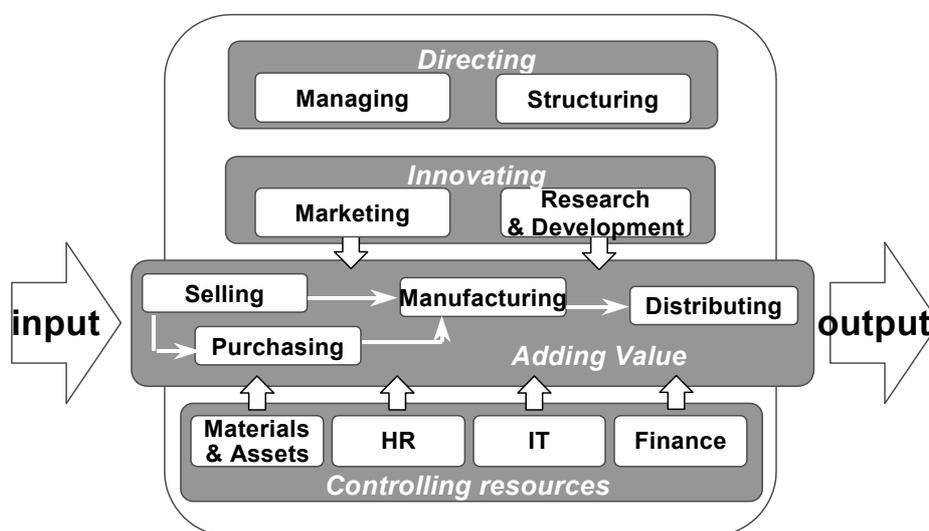


Figure 6: The generic business model.

An example of an IT investment with impact in the directing function is the implementation of a management information system that allows for better decision-making. When the variables of the 'external impact', the four 'P's, and the variables of the 'internal impact', the business functions, are plotted across the sources of value, a graphical grid can be constructed to identify the impact of IT investments on an organisation. This 'IT value grid', as shown in Figure 7 with a number of sample impacts, provides a useful aid to

understand, communicate and discuss the impact of an IT investment. Without this understanding, any discussion about the value of IT will be without foundation. A preliminary understanding however is that the relation between IT and business value is not always straightforward. Business applications will usually have an identifiable impact on business processes, but for components of the IT infrastructure their effect is mostly indirect as enabler of applications.

		4 sources of value			
		Efficiency	Effectiveness	Innovation	Flexibility
4 dimensions of competition	Price		Enable for price differentiation		
	Product		Enable for customization	Enable build to order	
	Promotion	Enable one-to-one marketing		Create new promotion channels	
	Placement		Enable when/where you want delivery		
4 groups of business processes	Value Adding	Increase use of production resources	Allow for outsourcing	Create new channels	Allow for deferral of investments
	Innovating	Allow for interactive marketing		Allow for collaboration	
	Directing		Speed-up decision making		Be informed anytime, anywhere
	Controlling resources	Automate supportive tasks			Increase scalability of resources

Figure 7: The IT value grid. (Smit and Silvius, 2001 and Targowski, 2004)

These 'levels' of impact brought us to distinguish three categories of IT 'value drivers', which are shown in Figure 8. The first category, 'IT Business Value Drivers' consists of business applications with a direct impact on the business. The second category is the 'Derived IT value drivers' and consists of the IT infrastructure and the data architecture of the organisation. The third category, 'IT value enablers', consists of the variables regarding the organisation of IT in the company.

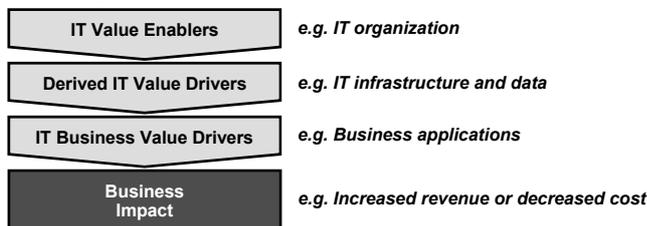


Figure 8: The complex relation between IT and business value.

5. Business and IT alignment

After creating a thorough understanding of how an IT investment influences the business, the next step is to come to understand the returns of this impact. Since IT itself has no returns, the returns are always in 'the business', it is helpful to have a close look at the business. First of all the strategy and goals of the business have to be considered. After all, it is this strategy IT should align with.

5.1 Aligning with business strategy

In modern business strategy literature, three dominant strategies are identified: Product Leadership, Customer Intimacy and Price Leadership (Treacey and Wiersema, 1997), which is illustrated in Figure 9.

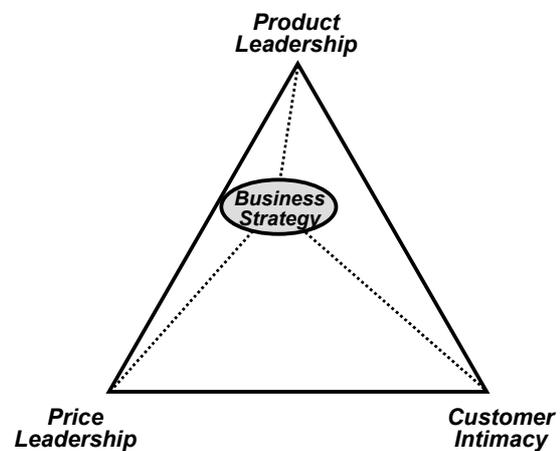


Figure 9: Typology of business strategy

In a Price Leadership strategy the organisation only survives if it realises high volumes with low costs. IT investments that create business efficiency, for example an ERP system that optimises the utilisation of resources, are particularly relevant in this type of strategy. In Product Leadership strategy the Unique Selling Proposition of the company is that of high quality of products and services. For these companies the ability of IT systems to enable this quality would therefore probably be of greater value than the efficiency of the company. For example, a smart warehouse management system that enhances order fulfilment by optimising stock levels could fit this strategy. Finally, in a Customer Intimacy strategy the organisation will benefit most from IT systems that strengthen their ability to tailor their offer to the customer's needs. An example of such a system could be a CRM application for a fashion retailer that allows him to capture the measurements, preferences and buying history of his individual customers.

The manner in which business strategy gives input to the evaluation of IT investments can be summarised as follows.

Table 3: Relationship between business strategy and dominance of the sources of value.

Dominant Business Strategy		Corresponding dominant source of value
Price Leadership	<>	Business Efficiency
Product Leadership	<>	Business Effectiveness
Customer Intimacy	<>	Business Innovation

A possible weakening of the argument made above is that all 'sources of value', efficiency, effectiveness, innovation and flexibility, are always relevant, regardless the strategy. This is true of course, but the analysis of the business strategy provides an indication of the relative weight of the criteria used in the evaluation of IT investments. However we should add that another angle is missing: the business process.

5.2 Aligning with business processes

Not all business processes 'make the difference' in the strategy of a company. In the typology of business processes provided by the Generic Business Model (Figure 6) typically the 'adding value' and 'innovating' processes create the Unique Selling Propositions of the organisation. Logically, the impact of business strategy on the valuation of IT investments will be most relevant for investments in IT systems with an impact on these 'adding value' and 'innovating' business processes. Supporting processes like facility management or personnel administration are also important but do not typically have a direct effect on the external positioning of the organisation. For IT investment supporting these business processes, 'business efficiency' will therefore be the most important source of value. Adding the volatility of the business function can further expand the alignment between the sources of value and the business process. Logically, the more volatile the business process, the more valuable becomes the flexibility that IT can add to that business process. An overview of the relationship between business strategy, business processes and the sources of value of IT is shown in Figure 10.

Several studies also show the nature of the 'adding value' business processes as a factor of influence in the value of IT investments. Studies that show returns on IT investments (Harris and Katz, 1991) typically concentrated on information intensive industries like financial services, whereas studies that concentrated on manufacturing or information non-intensive

industries (Loveman, 1988; Olson and Weill, 1989) found no returns from IT.

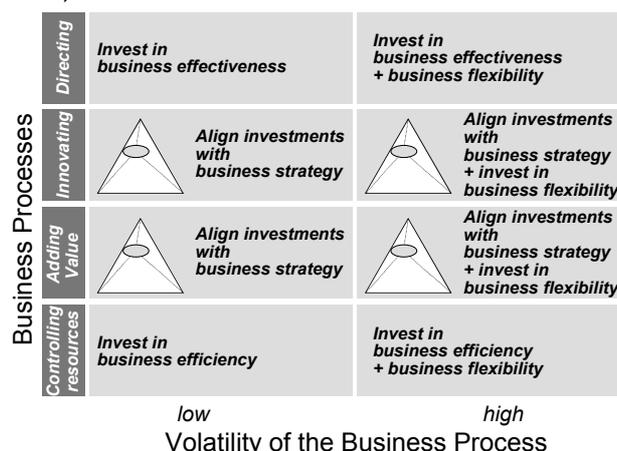


Figure 10: The relation between business processes, business strategy and the sources of value of IT investments.

6. Valuing investments

After creating an understanding of the impact of IT on business and the relevance of this impact in relation to the business strategy, the issue of valuation is next on the list. This is a typical economic issue for which it is irrelevant whether the investment is in IT or in any other resource. As long as the effects of the investment are understood, calculating the value of it is merely a financial technicality. This sounds almost too good to be true. Indeed, it is not quite that simple. Valuation methods all have assumptions and limitations.

6.1 Traditional valuation methods

Table 4 provides an overview of these valuation methods and their most important qualities and limitations.

The shortcomings of these methods are especially clear when IT investments are made to participate in today's E-Business economy. In this arena it is hard to make informed decisions when many variables are in flux. Traditional calculation methods are all limited in their ability to cope with risk and managerial flexibility. For example if a project proves to be a success, it can be sped up. If however the market deteriorates, the investment outlays of the project can be lowered or postponed. Despite the logic of this, in reality management adapts plans based on actual conditions all the time; this flexibility is not adequately valued in any of the valuation methods mentioned earlier. The result is an inadequate decision process for new projects. In some cases this even results in competitive investment proposals being rejected. Therefore it is clear that

companies need to come up with new ways of judging IT investments.

Table 4: Overview of investment valuation methods.

Valuation method	Qualities	Limitations
Return on investment	Easy to calculate Easy to interpret (a simple percentage) In line with the financial administration	Outcome sensitive to amortisation method Ignores the time-value of money Ignores risk
Pay-back period	Quite easy Intuitively coping with risk	Ignores part of the revenues Simplistic, does not determine value
Internal Rate of Return	Includes the time-value of money Easy to interpret (a simple percentage) Based on cash-flows	Complex Not in line with the financial administration Ignores risk Multiple outcomes, or none, possible
Discounted Cash Flow / Net Present Value	Includes the time-value of money Based on cash-flows Copes with risk	Complex Complex to interpret Not in line with the financial administration Not conclusive in case of projects with different durations
Economic Value Added	Includes the opportunity value of money In line with 'shareholder value'	Value calculation based upon one of the other methods Not in line with the financial administration

6.2 Valuing flexibility

A new insight is provided by the Real Options Valuation (ROV) theory. With ROV an additional value is calculated on top of the Net Present Value (NPV) of a project. This 'flexibility value' values the optionality of the investment. Optionality reflects the ability to alter the investment outlay and the timing of outlays based on changes in the competitive environment. ROV treats the possibilities of adapting the investment plan as (real) options. The opportunity to invest

can be seen as a call option, involving the right to acquire an asset for a specified price (investment outlay) in a future moment. A call option gives the holder the right, for a specified price within a given amount of time, to exercise the option to acquire the underlying asset. The techniques derived from option pricing, quantify the management's ability to adapt its future plans to capitalise on favourable investment opportunities or to respond to undesirable developments in a dynamic environment by cutting losses. The ROV model is shown in Figure 11.

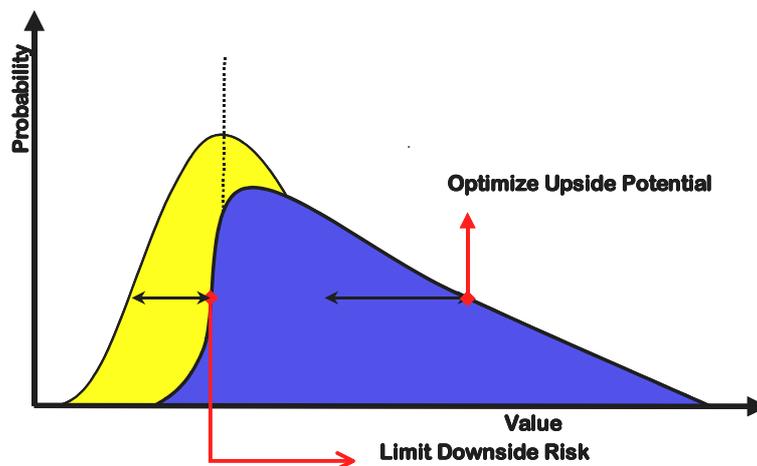


Figure 11. The effect of real options on value. (Smit and Silvius, 2001)

Downside risk is limited by enabling investors/ management to abandon the investment or to wait with future investments. Upside value is optimised by enabling investors/ management to expand

investment, to progress with projects or to seek other opportunities for the initial investment. The Value of the real-option depends on three major elements:

- Maturity of the option;
- Business or project risk;
- Interest rates.

A valuable insight that can be gained from option theory is the effect of changes of the variables of the investment on the value of the investment. Table 5 shows these effects. An interesting fact is that, for example, an increase in the volatility of the returns decreases the NPV, but increases the ROV! Corporate strategists embrace the ROV approach, acknowledging the importance of active managerial flexibility in adapting to a changing market environment.

Table 5: The effect of changes in the variables of the underlying investment.

		<i>Effect on NPV</i>	<i>Effect on ROV</i>	<i>Effect on the sum of NPV and ROV</i>
Present Value of the cash-flows	↗ :	↗	↗	↗
Height of the investment	↗ :	↘	↘	↘
Volatility of the returns	↗ :	↘	↗	?
Level of the interest	↗ :	↘	↗	?
Maturity of the option	↗ :	↘	↗	?

6.3 Taking the competition into account

Another addition to the traditional valuation methods is the notion that the returns of an investment are not only influenced by the organisations own decisions, but also by the decisions of the competition. For example the first telecom operator that implements an innovative new service will enjoy, temporary, first mover advantages that the other players will miss when they implement the same service. Combining the real options approach with game theory, taking into account competitive counteractions, closes the gap between traditional corporate finance theory and strategic planning. Management investment decisions are made with the explicit recognition that they may invite competitive reaction, which in turn impacts the value of the firm's investment opportunity. The strategic value of early commitment in such cases must be set off against the option value of waiting and may potentially justify early investment. These

decisions are often seen as strategic games against both nature and competition. Of course, in many cases the players may not exactly be 'symmetrical', with one of them enjoying a more dominant market power position. The value of organisational capabilities and of a firm's bundle of corporate real options, like uncertainty itself, is idiosyncratic to each firm. Similarly, the exercise price of a corporate real option may be idiosyncratic, depending on what other resources and assets the firm already has. Exercising the option to launch a new Windows-based software package, for instance, will be less expensive for Microsoft than for another player, by virtue of its earlier strategic investments and complementary assets that enable dominance in the desktop market. The firm pre-empted competition and captured a dominant share of the market by setting the product standard early on. Analysis of competitive behaviour and the effects on the valuation of real options is executed using elements of the Game Theory.

A 'Grab the dollar' game, for example, is a strategic context that is often associated with IT investments. Firms obtain a negative payoff when they end up investing simultaneously. 'Grab the dollar' illustrates the situation where the current market prospects are only favourable if one of the players invests, but simultaneous investment results in a battle with an expected negative payoff. Only the first player captures the dollar (e.g., patent), but when they all enter the market, they all end up losing the battle. A dominant firm has an advantage to win this simultaneous game.

6.4 A complete valuation framework

Based on the insights provided by the real options and game theories the traditional NPV calculation can be and should be expanded to include the effects of managerial flexibility and competitive behaviour. This 'Expanded NPV' can be calculated as: Expanded NPV = NPV + Flexibility value + Strategic value

Figure 12 summarises this more complete valuation framework. This framework provides a better understanding of the value of IT investments.

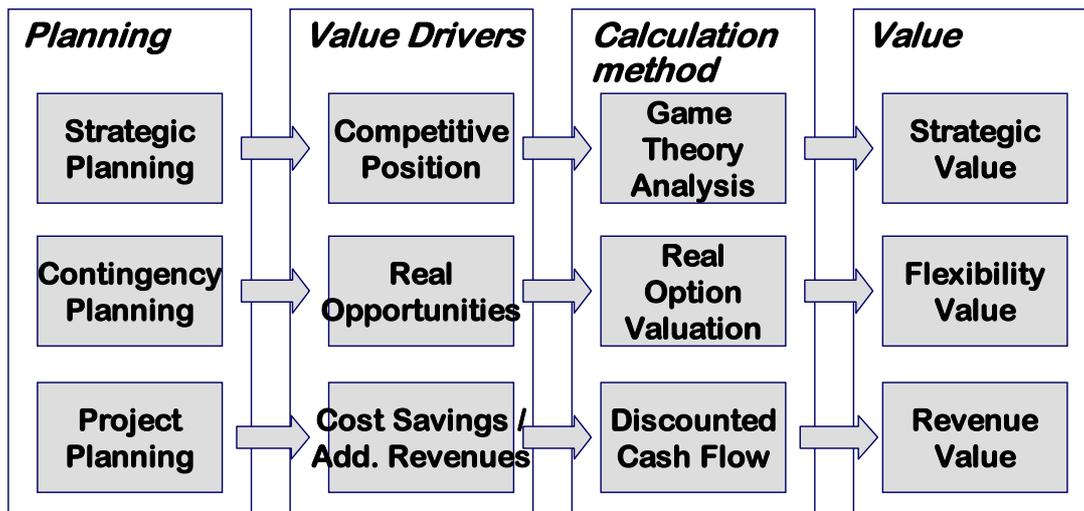


Figure 12: A complete valuation framework

What does this mean for the calculation of the value? In theory the knowledge is available to calculate a ‘complete’ value according to the framework. This calculation however will be complex and hard to understand in boardrooms. It is a drawback not to be taken lightly. The tendency to fall back on simple and comprehensible calculation methods leads to systematic underestimation of the value of IT investments especially when their effects are more than just efficiency improvement. This pitfall should be well understood. Financial theory just cannot provide us with a simple and undisputed figure or percentage that expresses the complete value of an investment. It is therefore the opinion of the economist Professor Michael Brennan that

‘It is better to have the approximately optimal solution to the right problem than the exact solution to the wrong problem!!!’

(Actual quote on the 2000 Real Options Group conference, May 2000).

This opinion may not be very satisfying but it is not without grounds. A last insight to be added is the characteristic of the investment under scrutiny. For an IT system with a mainly internal ‘business efficiency’ impact, the additional ‘flexibility value’ and ‘strategic value’ will not be that significant. However, if an IT system has impact on the external positioning of the organisation, the additional value elements will be significant for a good valuation of the investment. Logically a relationship between the impact of the investment and the relevance of the different value elements can be suspected, as is shown in Figure 13.

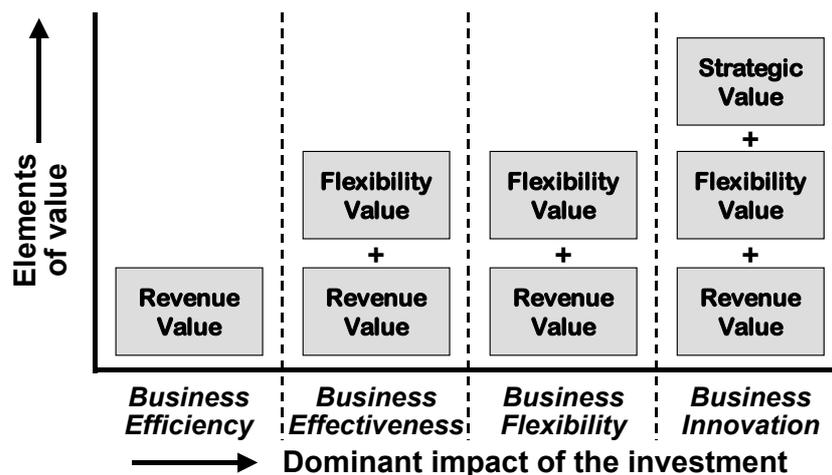


Figure 13: The relationship between the impact of an investment and the relevance of different value elements.

7. Conclusion

The value of IT is a much discussed and often misunderstood subject. This paper aims to add new insight to the discussion by providing a

practical grid in understanding the impact of IT investments on the organisation and by showing the conceptual relationships between IT value and business strategy and functions. In its use of the

latest developments in financial theory this paper hopefully develops a more complete framework for the valuation of IT projects. This framework warns about rushing into possibly wrong decisions about IT investments based on incomplete calculations of value. Different evaluation and valuation methodologies reveal different aspects of value. However, we are still far away from a simple and easy-to-understand calculation method unveiling the complete and true value of any investment. A boardroom focus on simple Return on Investment metrics therefore should be qualified as either mismanagement or macho-talk.

Company executives should focus their attention on creating a thorough understanding of how an investment in IT impacts the business of the organisation, instead of focus on oversimplified value calculations based on questionable assumptions.

Since a simple Return of Investment calculation cannot capture all elements of value, a more balanced approach is appropriate. Figure 14 shows a possible example of an 'IT investment Balanced Scorecard'.

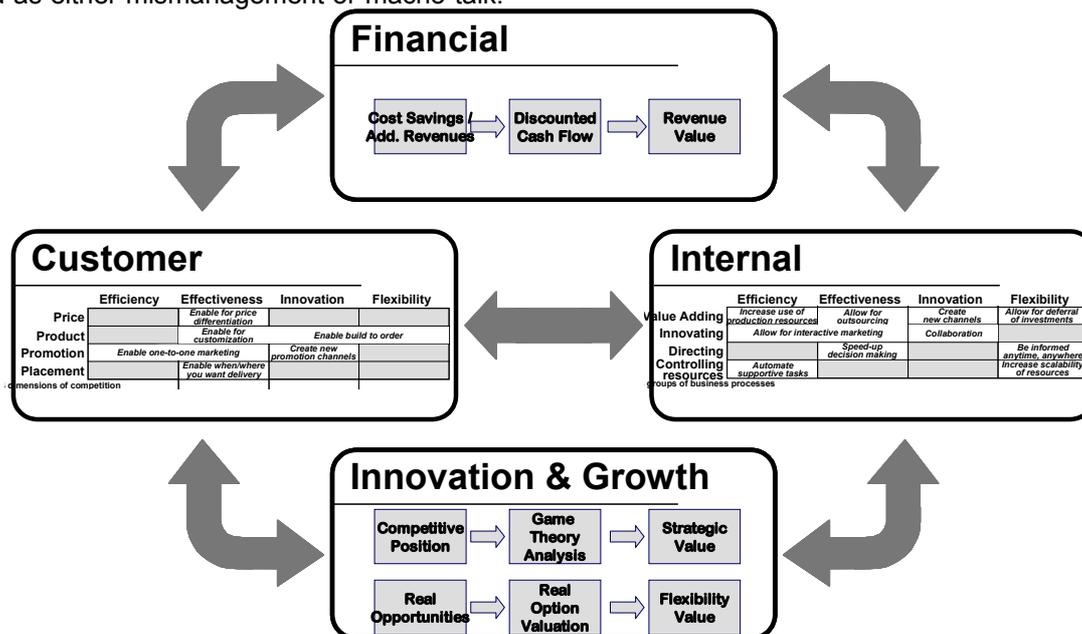


Figure 14: An IT investment Balanced Scorecard.

In this scorecard the financial perspective can be filled with the traditional Return on Investment calculation. This scorecard is enriched with the customer perspective showing the impact of the investment on the marketing proposition of the organisation. The internal perspective shows the

impact of the investment on the business processes. The innovation and growth perspective finally shows the future options and possible competitive effects of the investment.

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