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The Impact of IT Outsourcing on IT Effectiveness

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Word count:
9040

Abstract

Companies with an effective IT system can make better decisions, plan better, and ultimately achieve better results. The question for companies remains whether to make those effective systems themselves or outsource them to suppliers who have, in many cases, more knowledge and expertise. Companies are outsourcing IT to a higher degree, given the increase in spending on outsourcing IT. However, are the IT systems more effective when companies outsource those systems? This research aims to assess the impact of IT outsourcing on IT effectiveness to answer that question.

An online survey was distributed to CIOs and IT managers in the Netherlands to test the effect of IT outsourcing on IT effectiveness. In total, 121 respondents filled in the survey altogether. Using univariate regression analysis, the different variables were analyzed. For the statistically significant results, a moderator was tested to see any differences between the firm's size and the sector it operates in. The results show some interesting statistically significant findings of IT outsourcing variables on IT effectiveness.

The results are mixed, with positive and negative outcomes in IT Effectiveness.

Positive results:

- Security management on Systems are easy to use;
- Internal networks on System downtime is minimal;
- Break/fix services on Systems can react to your shifting needs and Systems are flexible;
- Test management on IT Effectiveness and Systems have fast response time and System use is easy to learn.

Negative results:

- Realization not IT changes on Systems meet your expectation and Your company's intranet is easy to navigate;
- Coordinate IT on Systems meet your expectation;
- Define information supply policy on System use is easy to learn;
- System integration on Systems are easy to use.

These results suggest that managers need to consider what aspects of IT they want to outsource because some of these aspects will be more effective when outsourced and some are not. The outsourcing activities with positive results are more suitable for outsourcing. The outsourcing activities with negative results are better to perform in-house.

Table of Contents

Abstract	2
Introduction	5
Literature review	6
Outsourcing	6
IT outsourcing	6
Motives for IT Outsourcing.....	8
IT effectiveness	12
Hypotheses	13
First hypothesis.....	13
Second hypothesis	13
Third hypothesis	14
Methodology	15
Research Design.....	15
Measurements survey.....	15
Scope of IT Outsourcing	15
Scope of IT effectiveness	16
How to measure?.....	17
Data collection and analysis	17
Results	18
Reliability	18
Descriptive statistics.....	18
Regression analysis	20
Moderator effects	22
Discussion	25
Interpretations.....	25
Theoretical implications	27
Practical implications	27

Limitations, Recommendations	27
Conclusion.....	28
Bibliography	29
Appendix	35

Introduction

The impact of information technology (IT) on business strategy, value creation, and decision-making led many organizations to rethink the role of IT and reconsider traditional operating systems and business processes. IT refers to all the software and hardware that a company uses to achieve its objective. (Laudon & Laudon, 2015). As products and processes become increasingly complex, customers' needs rapidly change. With a competition that has increased over the past 30 years, businesses need to adopt new ways to thrive in the 21st century. This climate calls for a reduction in the time required to design, develop and manufacture a product while claiming cost reductions, greater reliability, quality improvement, and sustainability. Therefore, companies are applying various techniques, management processes and developing strategies to match market requirements better.

For most of these products and processes, the knowledge and resources required do not always exist inside the organization. Therefore, companies seek collaborations by buying components or outsourcing (Chiou, 2011; Gunasekaran & Ngai, 2007). Developments in IT have significantly reduced transaction costs, allowing organizations to focus on their core competencies and purchase non-core products and processes from suppliers (Cunha & Putnik, 2006; Hamel, 1991; Prahalad & Hamel, 1990). This is reflected in the value of the global IT outsourcing market with USD 318.5 billion in 2020, and it is expected to reach USD 425.19 billion by 2026, registering a CAGR of 4.5% (Mordor Intelligence LLP, 2021).

The need among companies is to innovate and develop IT systems that can be applied to make information accurate and accessible quickly on demand. This has led to the development of IT systems that can make information accurate, and easily accessible. With an effective IT system, an organization can make better decisions, plan better, and ultimately achieve better results (Pérez-Aróstegui, Bustinza-Sánchez, & Barrales-Molina, 2015).

There has been much research in the literature on outsourcing IT in different countries in recent years (Lacity M. , Khan, Yan, & Willcocks, 2010; Lacity, Khan, & L.P, 2009; Derksen B. , 2013; Delen, 2005; Gianotten & Riet, 2008; Outvorst, Donatz, & Pols, 2005). As there is on the effectiveness of IT (Seddon, Graeser, & Willcocks, 2002; Tallon, Kraemer, & Gurbaxani, 2000; Remenyi & Money, 1991; Ness, 2005; Gupta, Kanungo, Kumar, & Sahu, 2007; DeLone & McLean, 2003; Chebrolu & Ness, 2013; Chang & King, 2005). However, the existing literature remains inconclusive about the effect of outsourcing IT on the effectiveness of the IT systems.

Seeing the increase in expenses for IT and the argument that outsourcing of IT significantly reduced transaction costs, among others, the question remains whether IT outsourcing (ITO) is beneficial for a company and contributes to its systems' performance and, in that turn, makes companies achieve better results. Therefore the research question is as follows: **What is the impact of outsourcing IT on the effectiveness of the IT systems?**

The paper proceeds as follows. The following section reviews the literature, looking more closely at IT outsourcing and IT effectiveness elements. This is followed by a description of the research design and methodology. Next, the research results are presented, and the paper concludes with a discussion and recommendations on the direction for future research.

Literature review

The next section reviews the literature on outsourcing, IT outsourcing, and IT effectiveness.

Outsourcing

Lysons and Farrington (2006) describe outsourcing as a "management strategy of transferring important non-core functions to specialized, efficient external suppliers." Thus, it is a process by which companies purchase products or services from external suppliers instead of conducting the activities themselves or internally by their employees. Outsourcing allows the company to focus more on its core business and outsource its non-core activities. This improves organizational performance because the focus is on the company's core activities (Obeng & Anim, 2015). However, according to Holcomb and Hitt (2007), this does not mean that these services are less critical to the firm's performance by outsourcing various services.

Outsourced activities can include information technology (IT), facilities management, and catering services (Holcomb & Hit, 2007). Outsourcing an entire process is not very common among companies. As a result of rapidly changing global markets and fierce competition from multinational corporations, many companies are being forced to reprioritize their operations by reassessing their activities (Ok, 2011).

Due to this globalization, companies are forced to think of new ways to stay competitive (Susomrith & Brown, 2013) through restructuring, have more flexible operations, and reduce expenses through outsourcing, i.e. buying activities performed initially internally. Embleton and Wright (1998) argue that outsourcing has been stimulated by the rise of technology that took hold in the 1990s, which created a new opportunity for offering and buying outsourcing activities.

IT outsourcing

IT is one of the most costly components of an organization (Jafari, 2014), and as described in the introduction, more and more money is being spent on IT outsourcing (ITO). ITO has become a popular mechanism whereby an external supplier provides various IT services to reduce costs. Suppliers, for example, with many clients, can operate at a larger scale than single companies. Furthermore, the size of the suppliers can help them lower costs in negotiating with hard- software providers. Another reason why companies choose for ITO is to improve their performance (Barthelemy, 2001). The knowledge of an internal IT department is not always up to date with current technology. The only job of the supplier is to follow the trends and provide advanced software and systems. Suppliers have more expertise than

their customers because they face more diverse problems. They may also have employees specializing in areas that customers only encounter once.

To explore precisely how ITO works, an overview is first given of what components ITO consists of. Apte et al. (1997) used a survey with 275 respondents to investigate IT Outsourcing (ITO) in the United States, Japan, and Finland. Despite the fact that the survey was performed several years ago, it gives an idea of what questions to ask about IT outsourcing. Integrated system development, data center operation, data communications network, support operation, software development, software maintenance, disaster recovery, training and education, customer phone support, data entry, transaction processing, and back-office administrative tasks were identified as potential ITO functions by Apte et al. (1997).

Table 1 shows the various approaches to IT outsourcing proposed by various writers provided by Derksen (2013). ITO is centered on functional areas because the client organization's organizational structure is centered on IT management functional areas.

Table 1. ITO characteristics

(Delen, 2005)		(Gianotten & Riet, 2008)		(Noordam & Derksen, 2008)	
Area	Subject	Area	Subject	Area	Subject
Technical management	Server, workplaces, LAN, WAN.	Infra-structure management	Technical application management, Application hosting, Security management, External networks.	Technical management	Database management, technical design, system security, architecture & network management, Technical knowledge & skills.
		End-user management	Internal networks, file, print, mail servers, workspace automation, help & service desk, break/fix services.	Application management	Data model management, application management (configuration), application security, application knowledge.
Application management	Software.	Application management	Systems development - integration Functional application Management, test management.	Data management	Data management Application & integration knowledge & skills.
Functional management	User management & functional maintenance.			Functional management	Data management, Functional design & Management Authorization management, process & application. Knowledge & skills.
Operational business management	Business processes.			Process management	Information & data management, Process- & procedures management, risk management,

IT strategy /- planning	IT policy & strategic planning.	authorities & responsibilities management, Process knowledge & skills.
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According to Delen (2005), technical and application management can be readily outsourced. Other topics that can be effectively outsourced, according to Delen, include incident, problem, and change management. IT management operations that are more tactical, such as service level management, are more difficult to outsource. Delen says that outsourcing IT policy and strategic planning is uncommon. In functional areas, a standard way to explain ITO is described.

Delen and Looijen (1992) created three different fields of ITO, namely, functional management, application management, and technical management. According to Van Outvorst et al. (2005), functional management is the performance of operational activities that ensure that the information services work properly in daily practice. Technical management is concerned with the IT infrastructure's management, maintenance, and renewal. The third type of management is application management. Application management deals with managing and maintaining the organization's information systems.

Using the three different layers, Meijer (2003) and Derksen (2008) created an overview of the subjects within these various ITO fields, as shown in Table 2.

Table 2. Functional areas IT management

Functional management	Technical management	Application management
Supporting user organization	Office automation support	Change applications (incident, changes)
Define requirements for changes	Workplace automation support	Monitor application performance
Realization not IT changes	Network management	Supports application policy/future mode of operations
Coordinate IT	Manage information system	
Define information supply policy	Service managers, technical operators, system managers	
System owner, CIO, functional management, information management		

Motives for IT Outsourcing

Now that the classification of ITO has been made, it is essential to identify the motives for ITO. In the literature, there are many similarities in why companies choose for ITO (Delen, 2005; Mclvor, 2008; Koh, Ang, & Yeo, 2007; King & Malhotra, 2000; Gorla & Lau, 2010; Aubert, Party, & Rivard, 1998;

Artunian, 2006). Of course, the considerations for outsourcing IT vary from organization to organization. Nevertheless, several considerations can be identified that recur regularly in publications. Below is an overview of considerations when a company chooses for ITO.

- 'skyrocketing costs' of automation departments;
- technological flexibility (rapid adoption of new technology);
- control of IT activities;
- solving staffing issues;
- focusing on core competencies.

Palvia (1995) mentions another consideration for outsourcing IT: increasing competition and global expansion in growing markets are forcing management to move away from hierarchical management of specific areas -including IT- to more hybrid forms of management involving specialized, external partners (Palvia, 1995).

The considerations for outsourcing IT can be broadly divided into three categories:

- financial-economic considerations;
- strategic considerations;
- management and personnel considerations.

The most crucial consideration for outsourcing IT is often financial, which is not surprising with the increasing international competition and globalization of the world market. The financial considerations can be subdivided into opportunities to make savings, a seemingly better cost control, and simplified administration.

Financial-economic considerations

Reason 1: savings

In principle, savings can be realized through economies of scale in hardware, software, and staff. Experience shows that savings can indeed be realized in the short term. However, in a large number of cases (18%), the savings are less than expected, and in an equal number of cases, the costs are even higher (Willcocks, Fitzgerald, & Lacity, 1996)

The reasons cited for disappointing savings are:

- the uptake of standard IT services has grown beyond expectations, and any standard service above what was agreed has to be paid to the provider separately;
- the contract with the provider is based on the necessary services. For additional special services, much more must be paid;
- hidden costs: outsourcing costs a lot of (management) time, in addition to the cost of consultants and lawyers.

It is not surprising that outsourcing does not consistently deliver the savings one expects: the IT provider has different interests than the buyer and will charge a margin.

This does not change that many organizations can make substantial savings on IT (Battles & Mark, 1996). The question is whether IT providers should be allowed to reap the benefits of these savings or whether companies should address these problems themselves by not outsourcing activities and keeping them in-house.

Reason 2: cost control

IT outsourcing is often used to make the cost of IT transparent and keep it under control. Research shows that the 'in-house' prices are usually unclear, making it difficult to value the IT provider's offer.

This can lead, for example, to the provider examining very closely what the actual cost of IT services is and, on that basis making an offer that is significantly below that of the in-house department. What is often overlooked here is that the internal department is more expensive because it does much extra work and is flexible. The extras and flexibility of the provider must be paid for later.

Reason 3: administrative measures

In the short term, there are accounting benefits: there is much less hardware on the balance sheet, fixed costs become variable costs, and investment in IT becomes less. In many cases, the IT provider even pays for taking over the hardware at the start of the agreement.

For the organization, this has the advantage that the freed-up resources can be used elsewhere (e.g., in case of acquisitions), but those opportunities must be there. In addition, the benefits that can be achieved in the short term are certainly less favorable when viewed in the long term. In the case of a long-term contract, the 20% saved in the first year is already more expensive in the third year than market developments, given the constantly falling prices in the IT world (Lacity, Willcocks, & Feeny, 1995).

Strategic considerations

Strategic considerations also often underlie the outsourcing of IT. These include considerations such as: focusing on core competency, increasing innovative capability, increasing flexibility, and reducing uncertainty. These areas of outsourcing IT as a strategic choice are briefly highlighted below.

Focus on the core competency

The underlying idea is that top management will have their hands free to focus on other tasks after outsourcing. Nothing could be further from the truth. Managing an IT provider requires just as much control as managing an internal IT department, except that the IT provider is more remote and, therefore, more challenging to manage (Pankowska, 2019).

If "the line" needs to be strengthened, outsourcing the IT department is not a solution because it does not free up management time.

Innovation

The reason for outsourcing IT is that providers are better at IT and have faster access to the latest developments. This is partly true: the buyer can access the provider's technology. But the provider is only one of the parties in IT land, which closes the organization to innovations from other parties.

Innovating requires available resources, an organic and flowing process organization, and the will to undertake and experiment. These necessities are not guaranteed by outsourcing. Of course, innovation can be bought, but partners also have limitations. The learning capacity of the organization decreases by outsourcing IT. Because the strategic importance of an IT application often only becomes clear when the organization starts working with the application. The moment the system is outsourced, it can hinder the full exploitation of its strategic potential. It is no wonder that the provider is less inclined to innovate than the user.

Uncertainty reduction

The developments in IT are uncertain, and for organizations, this can be a consideration for outsourcing. Earl (1996) argues otherwise: the greater the chance these uncertainties will have real consequences, the better an organization would like to be in control.

Outsourcing IT to better focus on strategy implies that IT has no strategic significance. IT is just as closely linked to a company's strategy as any other department. The critical question is how IT can be deployed to realize the company's strategy/objectives. In a situation where IT has been outsourced, this is inherently more difficult because the goals of the two companies are different.

Providers are not strategic partners of the user organization because the profit motive is not shared. An internal IT department can be as efficient and competitive as an external provider (Palvia, 1995).

In addition, outsourcing the entire, IT leads to a blurry strategic focus. A significant problem with outsourcing is that it focuses on the how of IT, not the what (Earl, 1996).

Management & personnel reasons

The labor market is tight, and IT people speak a different language. The IT department is not performing well. Enough reasons to outsource IT. Below are briefly discussed the management and personnel reasons for outsourcing IT.

Performance

Slack management and poor performance as reasons for outsourcing: when outsourced, the need for good management remains so that the organization is an informed buyer and a demanding customer (Earl, 1996). To reduce the risk of outsourcing failure, the organization must first be able to manage IT. Customers may eventually leave because of poor IT performance because managing to outsource is at least as difficult as managing an internal IT department, however, it is done more remotely.

No control over the IT department

Senior management may feel that they have no control over IT and that costs are constantly rising. Outsourcing makes this someone else's problem. This is not possible. The moment the organization is unable to manage IT and, for that reason, leaves it to a third party, the organization is still unable to adequately manage the relationship and control of this third party (Barthelemy, 2001).

Inexperienced staff

The danger with outsourcing is that the supplier takes over the inexperienced staff and then puts them back to work at the same organization, leaving the organization with nothing more than the loss of direct control. Capable IT people are rare, whether outsourced or not.

The problems with IT in terms of managing and staffing are apparent. Yet these are not good reasons for outsourcing. On the contrary, the literature shows that outsourcing leads to a worsening situation in the areas of management and personnel.

They also discovered that outsourcing has various advantages, including cost savings, cost predictability, reduced demand for IT personnel, and a better emphasis on strategic IT use (Apte, et al., 1997).

In summary, there are good arguments on why companies choose for ITO. But for all the arguments the research has shown more drawbacks than advantages for the different motives.

IT effectiveness

Any business's profitability depends on determining the influence of technology. However, determining this impact is challenging since IT departments have an impact on the operation of other departments, and these concerns are difficult to distinguish (Zhang, Stafford, Murad, Risher, & Simmons, 2018). IT effectiveness (ITE) increases organizational needs and personal productivity, according to Zhang et al. (2018), and is thus a good tool for measuring the impact on IT systems. The enhanced efficiency of IT systems can help an organization's effectiveness. Furthermore, IT efficiency used to be measured by the availability of IT infrastructure, but today it is measured by the trustworthiness of business services and the end-user experience. Table 3 provides an overview of several authors who described how to measure IT effectiveness.

Table 3. Measurement of IT effectiveness

Measurement of IT effectiveness	Source
Performance of systems, information efficacy, and service quality	(Chang & King, 2005)
Quality of information, systems, and services, as well as intent to use and usage, user happiness, and net advantages	(DeLone & McLean, 2003)
Improved efficiency, effectiveness, communication, decision-making, the responsiveness of the organisation, and the complete IT systems	(Gupta, Kanungo, Kumar, & Sahu, 2007)

User-satisfaction	(Remenyi & Money, 1991)
Overall service quality, customer satisfaction with Information Technology	(Chebrolu & Ness, 2013)

DeLone and McLean (1992) built their initial model by categorizing over a hundred IT "dependent variables" into six categories and developing a model to characterize the interactions between the categories. They came to the conclusion that IT success should be assessed across various dimensions, and they suggested that more studies need to be done to validate their model. Since then, other scholars have tested and expanded on this idea (Ballantine, et al., 1996; Grover, Seung Ryul Jeong, & Segars, 1996; Rai, Lang, & Welker, 2002). In a subsequent study (2003), DeLone and McLean updated their model based on the findings of other researchers.

There are six aspects to quantify IS success in the modified Delone and Mclean (2003) model: Quality of information, systems and services, intent to use and usage, user happiness, and net advantages. As seen in Table 3, some other writers confined their coverage to one or two dimensions.

Hypotheses

First hypothesis

Since there is no prior research about the two separate constructs of ITO and IT effectiveness, it is essential to investigate the relationship to determine whether IT systems work more efficiently when companies participate in ITO. Seeing the arguments described in the motives why companies choose for ITO and, in particular, the Strategic considerations and Management & personnel reasons, there are many arguments why the outcome of ITO is negative. Therefore, the IT system should not work more effectively, and the first hypothesis is as follows: 1. **“ITO negatively contributes to IT Effectiveness.”**

Second hypothesis

There are different perspectives on the distinctions between industries in terms of ITO. A difference is drawn primarily between two classifications: manufacturing and services. The concept underlying this classification is that organizations in the services sector do not rely as much on ITO as companies in the manufacturing sector because IT is frequently viewed as an essential component of service companies' main business (Sobol & Apte, 1995). However, Loh and Venkatraman (1992) discovered no difference in IT outsourcing between manufacturing and service organizations. Furthermore, Sobol and Apte (1995) discovered that the difference between both sorts of organizations is not statistically significant in terms of both domestic and worldwide IT outsourcing levels.

In contrast to the above findings, Han et al. (2006) found that organizations in the service industry utilize IT outsourcing substantially more than firms in the manufacturing industry.

Brynjolfsson and Hitt (1996) used an approach to identify differences across sectors that involves grouping firm-level data by sector and estimating separate regressions for each sector. They found that the effectiveness of IT was positive and significant in two sectors (sustainable and unsustainable

manufacturing) and statistically different in the remaining four sectors (mining, transportation and utilities, trade, and other services). Studies focused on companies also reveal differences across industries in IT effectiveness (Berndt & Morrison, 1995; Morrison, 1997). There is also evidence that computer-producing industries use IT more effectively than others (Jorgenson & Stiroh, 1995; Stiroh, 1998). So differences in IT Outsourcing among the sector and differences in IT Effectiveness leads to the second hypothesis. So for the second hypothesis, this study aims to investigate whether there are differences among the company's sector. The second hypothesis is as follows: 2. **“The sector in which the company operates moderates the effect of IT outsourcing on IT Effectiveness.”**

Third hypothesis

The size of a company can affect the availability of resources, for example, IT skills, within the organization. Many smaller companies do not have designated IT departments (Rohde, 2004). Small companies are likely to have fewer IT skills within their organization and are more likely to rely on outsourcing providers' services (Chan & Chung, 2002). Many of their IT-related functions are outsourced by necessity.

Outsourcing decisions are made on an ad hoc basis rather than as part of a longer-term strategic plan. Thus, outsourcing in small businesses is typically not a strategic phenomenon (Al-Qirim, 2003). Small organizations, by their nature, are less complicated. Because of the lesser complexity, smaller organizations may more readily discern between commodity and strategic IT operations. These firms have fewer opportunities to conduct a non-core function internally due to the low frequency of numerous IT operations and a lack of internal IT personnel. As a result, these small businesses will outsource many non-core services. These functions are comparable to those that more giant corporations outsource. However, due to a lack of resources, small companies frequently outsource certain tasks (Rohde, 2004).

Kimberly & Evanisko (1981) describe that firm size is usually used as a control variable. To determine the firm size, several criteria can be met. Some examples are; the net worth of the total firm assets, total investments, number of employees. According to Askaranyen & Smith (2008) the ideal definition of the criteria to use depends on the purpose of the study and may differ across countries and types of industries. Forsaith and Fuller (1995) claim that firms are most often classified based on the number of people they employ. According to Chen & Hambrick (1995) there are several differences between large and small firms. Smaller firms have advantages built on speed, flexibility, and niche-filling ability. In contrast, large firms benefit from having a large sum of money to exercise bargaining power over suppliers and customers. In addition, they are better able to compete on broad strategies and reputation (Dean, Brown, & Bamford, 1998).

However, firm size has also received increased attention as a moderator effect in several studies (Stock, Greis, & Fischer, 2002; Temtime, 2003; Gopalakrishnan & Bierly, 2006; Corsino, Giuseppe, & Micciolo, 2011; Varum & Rocha, 2012). The size of the firm (based on the number of employees) may

also moderate the relationship between IT outsourcing and IT effectiveness. Therefore, the third hypothesis is as follows: 3. **“The size of the company moderates the effect of IT outsourcing on IT Effectiveness.”**

Methodology

Research Design

This quantitative research aimed to investigate the relationship between outsourcing IT by organizations and its influence on the effectiveness of its systems. The study was designed to examine the extent to which individual constructs of ITO correlate with individual elements or aspects of IT effectiveness.

To test the first hypothesis, SPSS was used. In SPSS, a univariate analysis was used to test the relationship between the ITO and ITE variables. For the second and the third hypothesis, SPSS was also used. To test a moderator effect for these two hypotheses, an SPSS attachment was used called PROCESS, designed by Hayes (2017). Hayes described the attachment as follows: "PROCESS is an OLS and logistic regression path analysis modeling tool for observable variables. It is widely used in the social, business, and health sciences for estimating direct and indirect effects in single and multiple mediator models (parallel and serial), two and three-way interactions in moderation models, simple slopes, and regions of significance for probing interactions, and conditional indirect effects in moderated mediation models with a single or multiple mediators or moderators, and conditional indirect effects in moderated mediation models with a single or multiple mediators or moderators."

Measurements survey

Previous research was used as the basis for some construction components. The literature review revealed no previous studies that had measured the relationship between ITO and IT effectiveness. Still, some authors provided the features and instrumentation needed to measure each construct separately for the current study. In particular, the analyses of Chan and King (2005), and Derksen (2013), and their survey formats, were used to achieve construct measurement.

Scope of IT Outsourcing

A variety of IT disciplines are used to calculate the amount of ITO. This study focuses on the four distinct layers of IT management ITO1, ITO2, ITO3, and ITO4. According to Delen (2005), Gianotten (2008), and Derksen (2008), the scope is divided into recognized components of ITO and is also used by Derksen (2013). Table 4 provides an overview of ITO characteristics, which are also used in the survey.

According to Lacity et al. (1996), organizations need to look carefully at which specific IT activities are being outsourced. Thus, outsourcing these services may differ between the entire outsourcing of an activity or a partial one. This variable is treated as a continuous variable to identify how companies

outsource certain activities properly. Therefore, the different activities are classified based on a percentage since the degree of each activity can potentially differ.

Table 4. ITO scope

Functional area	Activity	Subject with activity
Technical management	Infrastructure management (ITO1)	Technical application management (ITO5) Application hosting (ITO6) Security management (ITO7) External networks (ITO8)
	End-user management (ITO2)	Internal networks (ITO9) File, print, mail servers (ITO10) Workspace automation (ITO11) Help/service desks (ITO12) Break/fix services (ITO13)
Functional management (ITO3)	Requirements definition (ITO14)	
	User and acceptance tests (ITO15)	
	Realization not IT changes (ITO16)	
	Coordinate IT (ITO17)	
	Define information supply policy (ITO18)	
Application management (ITO4)	System development (ITO19)	
	System integration (ITO20)	
	Functional application management (ITO21)	
	Test management (ITO22)	

Scope of IT effectiveness

To measure the effectiveness of IT, a combination of the research by Delone and Mclean (2003), and Chang and King (2005) is used. Overall system performance used by Chang and King is described as: "Assesses the quality aspects of systems such as reliability, response time, ease of use, and the various impacts that systems have on the user's work." According to Delone and Mclean, system performance assesses the quality aspects of systems and the various effects on the user's work. Chang also reviewed two dimensions from Delone and Mclean's model, namely, "system quality" and "intension to use and, and use." These are used to create recognizable questions and used in the survey. An overview of these questions is presented in Table 5.

Table 5. Measurement of IT effectiveness scope

Measurement of IT effectiveness scope	
Systems have fast response time (ITE2)	Systems are cost-effective (ITE8)
System downtime is minimal (ITE3)	Systems can react to your shifting needs (ITE9)
Systems are well integrated (ITE4)	Systems are flexible (ITE10)
Systems are reliable (ITE5)	Systems are easy to use (ITE11)
Systems are accessible (ITE6)	System use is easy to learn (ITE12)
Systems meet your expectation (ITE7)	Your company's intranet is easy to navigate (ITE13)

How to measure?

As mentioned earlier, the variable for ITO is treated as a continuous variable to identify the extent to which companies outsource certain activities properly. Therefore, the different activities are classified based on a percentage since the degree of each activity can potentially differ. Table 6 provides an overview of the classification of this variable. To determine the effectiveness of the IT systems, a questionnaire was prepared based on a Likert scale, Table 6 provides an overview. These two measurements are in line with the previous studies. To measure IT effectiveness as a whole, a standardized variable is created (IET1), a mean variable of all the variables for IT effectiveness.

Table 6. Survey measurements

Degree of ITO	Scope based on the contract relative to the total IT budget	Effectiveness measured on general features of IT systems
None / not significant	< 10 %	Strongly disagree
Limited	10 – 25 %	Disagree
Partly	26 – 50 %	Neutral
Significant	51 – 75 %	Agree
Completely	75 % >	Strongly agree

Data collection and analysis

Data were collected using an online survey tool called Qualtrics. An email with the link to the survey was distributed to potential participants. The email file was purchased through Boldata and contained 4,179 email addresses. The targeted participants of this survey were IT managers and CIOs in the Netherlands and in total 350 people filled in the survey so the response-rate was 8,37%. After data cleaning, a total of 121 participants remained who had fully completed the questionnaire. In the form of a zip file containing a Microsoft Excel spreadsheet, the survey results were downloaded from Qualtrics. The data were then imported into SPSS software for statistical analysis and formatting. The strength of each relationship between the different ITO variables and IT effectiveness was calculated for each

construct based on the correlation coefficients and the statistical significance level. The results of this research are presented in the results section.

Results

In the following section, an overview of the results is presented. First, an Cronbach's Alpha test is performed to measure the constructs' reliability. Second, we take a closer look at the sample's descriptive statistics. Third, the regression analysis is given, and at last, an overview of the moderating effects is presented.

Reliability

Cronbach's alpha is used to measure the degree of consistency (internal consistency) between multiple survey questions. Ferketich (1991) recommends that corrected item-total correlations should be between .30 and .99 for high reliability.

Table 7. Reliability scores

Construct	Cronbach's Alpha	N of Items
Infrastructure management (ITO1)	,844	4
End-user management (ITO2)	,911	5
Functional management (ITO3)	,861	5
Application management (ITO4)	,808	4
IT Effectivness (ITE1)	,816	12

As presented in Table 7, all the constructs have a Cronbach's Alpha score $>.8$, which is considered a high-reliability score.

Descriptive statistics

From the sample of N 121, 49.6% had a business that operates in the manufacturing sector. Services were the second sector with 50.4% of the total sample, as presented in Table 8.

Table 8. Descriptive statistics distribution sector

Sector	Frequency	Percent	Valid Percent	Cumulative Percent
Manufacturing	60	49,6	49,6	49,6
Services	61	50,4	50,4	100,0
Total	121	100,0	100,0	

Table 9 provides an overview of the number of employees and the IT expenses. The number of employees working at the companies ranges from 4 persons to 300.000 with a median of 250 employees per company. The IT expenses from the sample range from €10.000 up to €6.000.000.000 with a median of €1.000.000.

Table 9. Descriptive statistics employees and IT expenses

		Number of employees	IT expenses in thousands
N	Valid	121	116
	Missing	0	5
Mean		5288,60	235136,5
Median		250,0	1000,0
Std. Deviation		32630,07	976275,22
Range		299996	6000000,0
Minimum		4	,00
Maximum		300000	6000000,0

Table 10 summarizes the classification for firm size. According to Forsaith and Fuller (1995), firm size based on the number of people they employ is a proper classification to determine the firm's size. In order to divide the sample into two groups, small and large companies, the median was used to make a difference. The group "0" represents all companies with less than 250 employees. The group "1" represents all companies with more than 250 employees.

Table 10. Firm size

Groups	Frequency	Percent	Cumulative Percent
0	62	51,2	51,2
1	59	48,8	100,0
Total	121	100,0	

Regression analysis

The following section presents an overview of the regression analysis to test the three hypotheses. As shown in Table 11, there is no statistically significant relationship between the four ITO constructs and the overall IT Effectiveness (ITE1), with a confidence interval of 95%, so the first hypothesis, **“ITO negatively contributes to IT Effectiveness.”** is **not supported**. The only statistically significant relationship is between “Application management” (ITO4) and “Your company's intranet is easy to navigate” (ITE13), with $p=0,13$, which is highlighted in green. In the analysis, the control variables Sector and Firm Size are also taken into account.

Table 11. Results regression analysis main effects

		IT Effectiveness	Fast response time	Minimal downtime	Well-integrated systems	Reliable systems	Accessible systems	Systems meet your expectations	Cost-effective systems	Systems respond to shifting needs	Flexible systems	Systems are easy to use	System use is easy to learn	Intranet easy to navigate
Infrastructure management	Sig.	,522	,342	,868	,610	,357	,749	,332	,736	,142	,365	,715	,586	,635
	B	-,037	,079	-,014	,054	-,070	-,025	-,093	,036	-,154	-,102	-,035	-,056	-,061
End-user management	Sig.	,796	,315	,128	,398	,552	,544	,639	,675	,774	,850	,653	,277	,794
	B	,014	-,079	,122	-,085	,042	,046	,042	-,043	,028	-,020	,041	,106	-,032
Functional management	Sig.	,266	,966	,070	,919	,281	,151	,383	,236	,754	,972	,405	,332	,187
	B	-,085	,005	-,205	,014	-,109	-,153	-,111	-,171	-,044	,005	,106	-,133	-,226
Application management	Sig.	,362	,914	,682	,720	,362	,729	,677	,941	,148	,402	,587	,999	,013
	B	,055	-,009	,036	,040	,073	,029	-,042	-,008	,160	,099	-,055	,000	,340
	R2	,018	,010	,045	,007	,019	0,21	0,51	0,30	,031	,018	,010	,015	0,53

If we take a closer look at all the individual variables of ITO and ITE, there are more significant statistics. Table 12 summarizes all the significant effects with a 95% confidence interval. In Table 13 in appendix A, an overview of all the effects of the relationship between the variables ITO and ITE is presented

Table 12. Sig. effects variables

Variable 1	Variable 2	Sig.	B
Security management (ITO7)	Systems are easy to use (ITE11)	,002	,220
Internal networks (ITO9)	System downtime is minimal (ITE3)	,018	,179
Break/fix services (ITO13)	Systems can react to your shifting needs (ITE9)	,027	,184
Break/fix services (ITO13)	Systems are flexible (ITE10)	,034	,192
Realization not IT changes (ITO16)	Systems meet your expectation (ITE7)	,021	-,205
Realization not IT changes (ITO16)	Your company's intranet is easy to navigate (ITE13)	,002	-,394
Coordinate IT (ITO17)	Systems meet your expectation (ITE7)	,049	-,276
Define information supply policy (ITO18)	System use is easy to learn (ITE12)	,012	-,276
System integration (ITO20)	Systems are easy to use (ITE11)	,024	-,224
Test management (ITO22)	IT Effectiveness (ITE1)	,022	,171
Test management (ITO22)	Systems have fast response time (ITE2)	,018	,261
Test management (ITO22)	System use is easy to learn (ITE12)	,049	,262

There are some relationships with a negative B. This means that when a company does more outsourcing in that area, the worse the score for that IT effectiveness variable becomes, which is in line with the first hypothesis. An example is ITO16 (Realization not IT changes). If companies outsource this activity, there is a significant negative relationship on Systems meet your expectation (ITE7) and on Your company's intranet is easy to navigate (ITE13). Another example is when companies outsource System integration (ITO20). The data suggest that when companies outsource this activity, the worse the score for Systems are easy to use (ITE11) becomes. If companies outsource Coordinate IT (ITO17), the worse the score becomes for Systems meet your expectation (ITE7). Furthermore, if companies outsource Define information supply policy (ITO18), the systems use is not easier to learn (ITE12).

The ITO variable with the most significant effects on several ITE variables and a positive B is ITO22(Test management). ITO22 has a significant impact on ITE1(IT Effectiveness), ITE2(fast response time), and ITE12(System use is easy to learn), which is not in line with the first hypothesis. This means that if companies outsource this IT activity, the scores for that IT effectiveness variables improve. Furthermore, the positive statistically significant relations are ITO7(Security management) on ITE11(Systems are easy to use), Internal networks (ITO9) on System downtime is minimal (ITE3), and

Break/fix services (ITO13) on Systems can react to your shifting needs (ITE9) and on Systems are flexible (ITE10).

Moderator effects

Table 14 presents a summary of the moderator effects. Here, two different variables were tested in line with hypotheses 2; “The sector in which the company operates moderates the effect of IT outsourcing on IT Effectiveness.” and 3; “The size of the company moderates the effect of IT outsourcing on IT Effectiveness.”. The moderator Firm size and Sector are included in the equation over the significant relationships between ITO and ITE. The direct effects of Firm size and Sector are also included in the equation. There are only two significant relationships in both the equation, so the second and third hypotheses are **not supported**.

Table 14. Moderating effects

Variable 1	Variable 2	Sig.	B
Security management*Firm size	Systems are easy to use	,849	-,024
Internal networks*Firm size	System downtime is minimal	,987	-,001
Break/fix services*Firm size	Systems can react to your shifting needs	,545	-,068
Break/fix services*Firm size	Systems are flexible	,882	,018
Realization not IT changes*Firm size	Systems meet your expectation	,370	-,121
Realization not IT changes*Firm size	Your company's intranet is easy to navigate	,141	-,274
Coordinate IT*Firm size	Systems meet your expectation	,673	-,352
Define information supply policy*Firm size	System use is easy to learn	,016	,418
System integration*Firm size	Systems are easy to use	,535	-,082
Test management*Firm size	IT Effectiveness	,553	-,056
Test management*Firm size	Systems have fast response time	,915	,016
Test management*Firm size	System use is easy to learn	,939	-,013
Security management*Sector	Systems are easy to use	,183	,097
Internal networks*Sector	System downtime is minimal	,756	,020
Break/fix services*Sector	Systems can react to your shifting needs	,006	,224
Break/fix services*Sector	Systems are flexible	,079	,156
Realization not IT changes*Sector	Systems meet your expectation	,406	,086
Realization not IT changes*Sector	Your company's intranet is easy to navigate	,424	-,119
Coordinate IT*Sector	Systems meet your expectation	,545	-,113
Define information supply policy*Sector	System use is easy to learn	,101	-,217

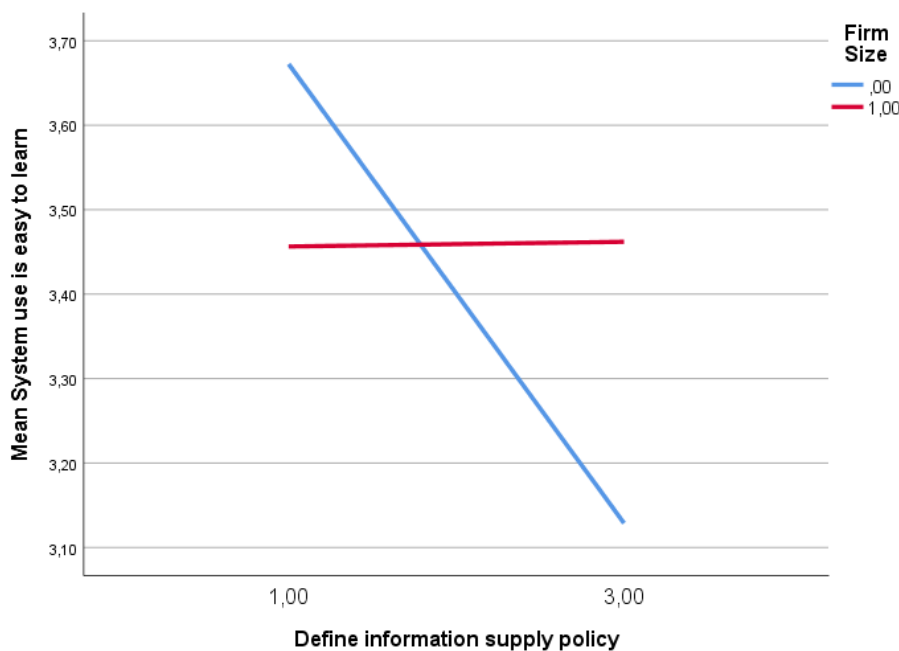
System integration*Sector	Systems are easy to use	,094	,140
Test management*Sector	IT Effectiveness	,959	,005
Test management*Sector	Systems have fast response time	,615	-,070
Test management*Sector	System use is easy to learn	,854	,032

It is interesting to take a closer look at the relationships that are significant to examine the differences between Firm Size and Sector.

With a confidence interval of 95%, the only significant interaction effects here are Define information supply policy(ITO18)*Firm size on System use is easy to learn (ITE12) with $p=.016$ and Break/fix services(ITO13)*Sector on Systems can react to your shifting needs (ITE9) with $p=.006$. With a confidence interval of 90%, the interaction effects between Break/fix services*Sector on Systems are flexible, and System integration*Sector on Systems are easy to use are significant. In all the other equations, both Firm size and Sector are not significant predictors in the model.

To visualize the moderating effect of the two significant effects with a 95% confidence interval, two graphs are presented in Figure 1 and Figure 2. Figure 1 provides a visualization of the moderating effect between; Define information supply policy(ITO18)*Firm size on System use is easy to learn (ITE12). The set is divided by two separate firm size groups, 0 and 1. Group 0 is all the companies with <250 employees in the company. Group 1 is >250 employees. When considering the moderator Firm Size, there is a statistically significant difference between the two groups. For group 0, there is a statistically significant effect with $p=.000$, as shown in Figure 1. For group 1, there is not a statistically significant effect with $p=.7794$.

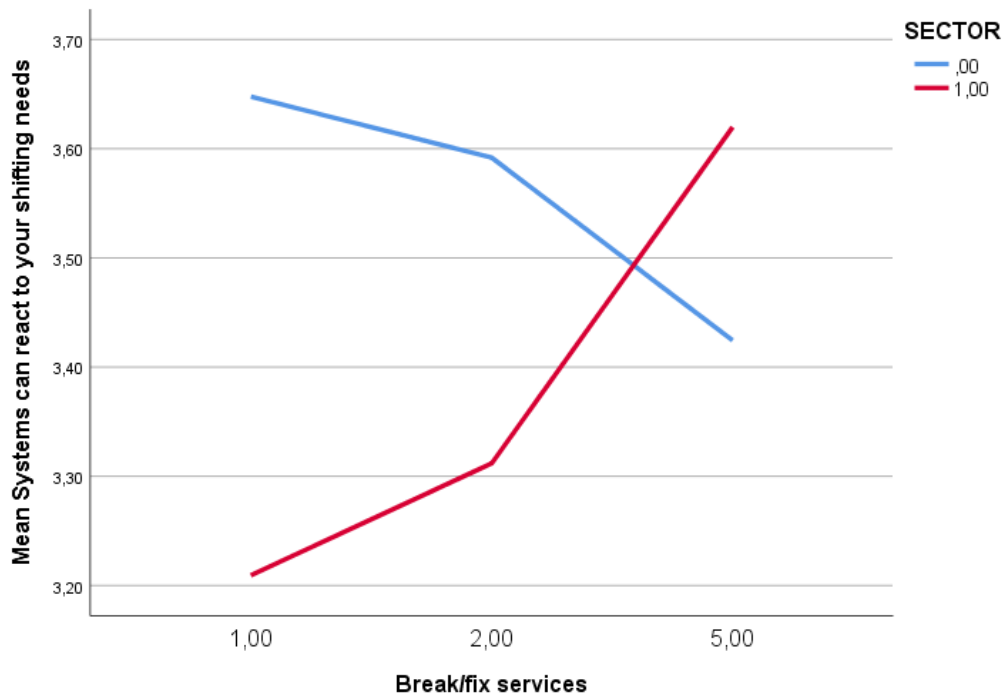
Figure 1. Moderating effect Firm Size



As shown in Figure 1, companies with less than 250 employees that outsource Define information supply policy (ITO18) more, score worse on Systems use is easy to learn (ITE12). For group 1, there is no statistically significant difference when taking the moderator Firm size into account.

Figure 2 provides a visualization of the moderating effect between; Break/fix services(ITO13)*Sector on Systems can react to your shifting needs (ITE9). Sector is divided into two groups; 0= Manufacturing, 1= Services. There is a statistically significant difference between the two groups when considering the moderator Sector. The moderator Sector has a $p=.03$ value which is significant.

Figure 2. Moderating effect Sector



The interesting thing to see here is the difference in the different sectors. When companies in the manufacturing sector outsource Break/fix services to a higher degree, the systems will not respond better to shifting needs. On the other hand, when companies from the service sector outsource this, you see that the systems actually respond better to shifting needs.

Discussion

This section further explores the significance, and in doing so, the importance and relevance of the results. The emphasis is on explaining and evaluating the results and connecting the literature review and the research questions.

Interpretations

This study aims to examine the influence of ITO on IT effectiveness. Although there are not many significant relationships between the constructs, some individual relationships can be discovered that significantly impact each other.

Hypothesis 1, which suggests that outsourcing IT negatively impacts IT effectiveness, is not supported since there is no significant relationship between the different ITO constructs on ITE. This is not in line with the literature review where we concluded that there would be a negative relationship between the two variables. The only statistically significant relationship between the construct is “Application management” and “Your company's intranet is easy to navigate.” This indicates that a higher proportion of outsourcing Application management is associated with a higher performance of a company's intranet. This is not in line with the literature review, in which it was stated that there are more drawbacks for companies who participate in ITO. One reason for the lack of a significant relationship may be due to the scope of the study. The scope focuses primarily on the performance of the systems themselves, and the database is built on the interpretation of the CIOs who completed the survey. As a result, the actual user experiences of the users may not be reflected in the results.

Nevertheless, the results from the individual variables of ITO on ITE show some interesting results. In the literature review, the arguments for outsourcing IT were made clear, but the counter-arguments about why companies would be better off in-sourcing IT were more evident. Relationships can be found that support the literature review, and these are examples with a negative B. This means that when a company does more outsourcing in that area, the IT effectiveness decreases for that variable, which is in line with the first hypothesis. An example is Realization not IT changes and, Coordinate IT. If companies outsource these activities, the data suggest that the systems do not meet the company's expectations. Furthermore, if companies outsource Define information supply policy, the use of the system is not easier to learn. So companies can better insource those activities because the IT effectiveness does not increase when they outsource those activities.

There are also results where companies would do well to outsource specific activities, which is the opposite of the literature review. For example, when companies participate in a higher degree of outsourcing “Test management,” their overall IT effectiveness improves. Thus for companies who want to improve the overall effectiveness of their IT systems, it can be concluded that it is beneficial to outsource their Test management. Next, the systems have a faster response time, and the companies'

systems are easier to learn. Another interesting result is when companies have a higher degree of outsourcing “Break/fix services.” If companies choose to outsource this aspect to a higher degree, the companies’ systems can better react to shifting needs, and the systems are more flexible.

If companies are looking for ways to make their systems easier to use, they can outsource Security management. This is because a higher level of outsourcing of this component leads to better effectiveness on those different parts. On the contrary, if companies outsource System integration, the systems are not easier to use. The examples described above indicate benefits for companies that outsource IT. Thus, the impact of different ITO activities on IT effectiveness cannot be lumped together since various ITO activities have a different effect on ITE.

Hypothesis 2 and 3, which suggest that the size of the company and the sector of the company have an interaction effect on the significant relationship between ITO and ITE, are only supported in two relationships. This is not in line with the literature review, which suggests that there would be more statically significant moderator effects. This is another result that was not reasonably expected. During the hypothesis writing process, clear arguments had been found as to why differences could exist between Sector and Firm Size. Only for the following relationships is it essential to see which sector the company operates in and its firm size.

When looking at the moderator effects of the size of the company and the company’s sector, there are two different relationships with a significant relationship. The effects are Define information supply policy*Firm size on Systems use is easy to learn and Break/fix services*Sector on Systems can respond to your shifting needs. In the first case, the relationship between Define information supply policy and Systems use is easy to learn differs between the company's size. Companies with less than 250 employees that outsource Define information supply policy more, score worse on Systems use is easy to learn.

In the second case, the interesting thing to see is the difference in the different sectors. When companies in the manufacturing sector outsource Break/fix services to a higher degree, the systems will not respond better to shifting needs. On the other hand, when companies from the service sector outsource this, the systems actually respond better to shifting needs. This is in line with the literature where it was concluded that there are differences between the sector in terms of ITO and ITE.

In summary, there are certain parts that companies can outsource because it improves the Effectiveness of that particular part. There are also relationships, in line with the first hypothesis, where it is disadvantageous for companies when you outsource that specific activity. For most relationships, it does not matter what sector the company operates in or how large it is since no significant relationships were found.

Theoretical implications

ITO and ITE received a lot of attention in different contexts (Dibbern, Goles, Hirschheim, & Jayatilaka, 2004; Lacity M. , Khan, Yan, & Willcocks, 2010; Lacity, Khan, & L.P, 2009; Derksen B. , 2013; Delen, 2005; Gianotten & Riet, 2008; Outvorst, Donatz, & Pols, 2005) to name a few. However, the relationship between IT outsourcing and IT effectiveness remained unclear in how it was measured in this research. This paper aimed to fill this gap in the literature and find any statistically significant relationships between the two variables. As described earlier, the three different hypotheses were not adopted because the overall construct has no significant effects. This is not in line with the literature review where we concluded that there is a negative influence of ITO on ITE. However, some individual variables have a significant impact on each other, from which we can conclude that there are some interesting findings between ITO and ITE. This contributes to the literature because it extends the knowledge there is on the effect of ITO on ITE.

Practical implications

Although the three different hypotheses were not accepted, there are a few takeaways for managers who deal with IT departments in their organizations. For example, it is highly recommended for managers looking for an easy-to-navigate intranet to outsource Application management. Another key takeaway is that when companies outsource Test management, their overall IT effectiveness improves, and the systems have a faster response time. Furthermore, the companies' systems are easier to learn.

The literature review shows that, despite the benefits of ITO, there are also some opposing sides of ITO. Users' discontent with outsourced systems is generally due to the external service provider's lack of commitment and failure to fully comprehend users' information demands, according to Gorla & Somers (2014) and Kern & Willcocks (2000). As a result, the providers' lack of commitment prohibits the systems from performing properly and as intended. When outsourcing various components of their IT systems, managers must keep this in mind.

Limitations, Recommendations

This study has the following limitations, from which further possibilities for future research are developed. First, existing results show that the degree of ITO overall is not correlated with ITE. The current study does not consider other ITE factors such as user satisfaction, improved organizational responsiveness, information systems as a whole, and service performance. Some of these variables can also be considered when ITE is measured. The current study can be expanded by including these additional variables, and the results can be integrated into the construct to provide a broader picture of ITE.

Second, since the ITE variables aim to measure the interaction between the user and the system, and the current research only focuses on the perspective of the CIO, future research can aim at asking the employees how they perceive the ITE variables.

Third, since several ITE measures, such as response time and downtime, can also factually measure what is acceptable or not to response time, future research could aim to measure these variabilities rather than asking how response time is perceived. That way, there is a more reliable indicator of what is acceptable or not. An extended response time for one user may be acceptable for another.

Apte et al. (1997), showed differences between countries to different ITO characteristics. This study only asked Dutch CIOs how they perceived their IT systems. Future research could focus on other countries to determine if these results apply there.

Conclusion

This research focused on identifying the relationship between IT outsourcing and IT effectiveness with the research question: *“What is the impact of outsourcing IT on the effectiveness of the IT systems?”*. Based on quantitative analysis, with data from 102 different Dutch companies, it can be concluded that some relationships impact each other. Although the overall hypotheses are not supported, interesting relationships were found. For example, IT outsourcing variables, such as Test management, positively influence overall IT effectiveness. Furthermore, this ITO component positively impacts a faster response time, and the system use is easier to learn.

Another interesting example is Realization not IT changes and, Coordinate IT. If companies outsource these activities, the data suggest that the systems do not meet the company's expectations. Furthermore, if companies outsource Define information supply policy, the use of the system is not easier to learn.

For companies who participate in outsourcing Break/fix services and Define and supply policy, it is beneficial to look at the size of the company and the sector in which it is operating. The data suggest that those moderators change the strength of the statistically significant relationships.

These results indicate that it is essential for CIOs to determine which IT components they want to outsource because they can have different effects on IT effectiveness.

Bibliography

- Al-Qirim, N. (2003). The strategic outsourcing decision of IT and eCommerce: The case of small businesses in New Zealand. *Journal of information technology case and application research*, 32-56.
- Apte, U., Sobol, M., Hanaoka, S., Shimada, T., Saarinen, T., Salmela, T., & A.P.J., V. (1997). Is Outsourcing Practices in the Usa, Japan and Finland: A Comparative Study. *Journal of Information Technology*, 289-304.
- Artunian, J. (2006). The seven deadly sins of outsourcing. . *Computerworld*, 56-58.
- Askarany, D., & Smith, M. (2008). Diffusion of Innovation and Business Size: A Longitudinal Study of PACIA. *Managerial Auditing Journal*, 900-916.
- Aubert, B., Party, M., & Rivard, S. (1998). Assessing the risk of IT outsourcing. *Proceedings of the Thirty-First Hawaii International Conference on System Sciences*, 685-692.
- Ballantine, J., Bonner, M., Levy, M., Martin, A., Munro, I., & Powell, P. (1996). The 3-D Model of Information Systems Success. *Information Resources Management Journal*, 5-15.
- Barthelemy, J. (2001). The Hidden Costs of IT Outsourcing. *MIT Sloan management review*.
- Battles, B., & Mark, D. (1996). How otherwise good managers spend too much on information technology. *McKinsey Quarterly*, 116-127.
- Berndt, E., & Morrison, C. (1995). High-tech capital formation and economic performance in US manufacturing industries An exploratory analysis. *Journal of econometrics*, 9-43.
- Brynjolfsson, E., & Hitt, L. (1996). Paradox lost? Firm-level evidence on the returns to information systems spending. *Management science*, 541-558.
- Chan, M., & Chung, W. (2002). A framework to develop an enterprise information portal for contract manufacturing. *International Journal of Production Economics*, 113-126.
- Chang, J., & King, W. (2005). Measuring the Performance of Information Systems: A Functional Scorecard. *Journal of Management Information Systems*, 85-115.
- Chebrolu, S., & Ness, L. (2013). How Does Alignment of Business and IT Strategies Impact Aspects. *International Journal of Applied Management and Technology*, 1-15.
- Chen, M., & Hambrick, D. (1995). Speed, Stealth, and Selective Attack: How Small Firms Differ from Large Firms in Competitive Behaviour. *Academy of Management Journal*, 453-482.
- Chiou, C.-H. (2011). Dynamic capabilities, collaborative network and business model: An empirical analysis of Taiwan HTC Corporation. *African Journal of Business Management*, 294-305.

- Corsino, M., Giuseppe, E., & Micciolo, R. (2011). "R&D, Firm Size and Incremental Product Innovation. *Economics of Innovation and New Technology*, 423-433.
- Cunha, M., & Putnik, G. (2006). Identification of the Domain of Opportunities for a Market of Resources for Virtual Enterprise Integration. *International Journal of Production Research*, 2277-2298.
- Dean, T., Brown, R., & Bamford, C. (1998). Differences in Large and Small Firm Responses to Environmental Context: Strategic Implications from a Comparative Analysis of Business Formations. *Strategic Management Journal*, 709-728.
- Delen. (2005). *Decision & Controlfactoren voor sourcing van IT*. Amsterdam: Universiteit van Amsterdam.
- Delen, G., & Looijen, M. (1992). *Beheer van informatievoorziening, SDM-reeks*. Rijswijk: Capgemini publishing.
- Delone, W., & Mclean, E. (1992). Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 60-95.
- DeLone, W., & McLean, E. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems*, 9-30.
- Derksen, B. (2013). *Impact of IT Outsourcing on Business and IT Alignment*. Vrije Universiteit.
- Derksen, B., & Noordam, P. (2008). *Modellen die werken, kwaliteit in bedrijven informatievoorziening*. Boekdrukkunst uitgeverij .
- Dibbern, J., Goles, T., Hirschheim, R., & Jayatilaka, B. (2004). Information systems outsourcing. *ACM SIGMIS Database: the DATABASE for Advances in Information Systems*, 6-102.
- Earl, M. (1996). The risks of outsourcing IT. *Sloan Management Review*, 26-32.
- Embelton, P., & Wright, P. (1998). A practical guide to successful outsourcing. *Empowerment in Organizations*, 94-106.
- Ferketich, S. (1991). Focus on psychometrics: Aspects of item analysis. *Research in Nursing & Health*, 165-168.
- Forsyth, D., & Fuller, D. (1995). "Defining Enterprises by Size: Australian Empirical Evidence on the Interchangeability of Alternative Definitions at the Industry Level. *Australian Bulletin of Labour*, 109-118.
- Gianotten, J., & Riet, S. v. (2008). *Outsourcing performance 2009: research & outlook*. Giarte Media Group.

- Gopalakrishnan, S., & Bierly, P. (2006). The Impact of Firm Size and Age on Knowledge Strategies During Product Development: A Study of the Drug Industry. *IEEE Transactions on Engineering Management*, 3-16.
- Gorla, N., & Lau, M. (2010). Will negative experiences impact future IT outsourcing? *Journal of Computer Information Systems*, 91-101.
- Gorla, N., & Somers, T. (2014). The impact of IT outsourcing on information systems success. *Information & Management*, 320-335.
- Grover, V., Seung Ryul Jeong, & Segars, A. (1996). Information systems effectiveness: The construct space and patters of application. *Information & Management*, 177-191.
- Gunasekaran, A., & Ngai, E. (2007). Knowledge management in 21st century manufacturing. *International Journal of Production Research*, 2391-2418.
- Gupta, M., Kanungo, S., Kumar, R., & Sahu, G. (2007). A Study of Information Technology Effectiveness in Select Government Organizations in India. *Vikalpa: The Journal for Decision Makers*, 7-21.
- Hamel, G. (1991). Competition for competence and inter-partner learning within international strategic alliances. *Strategic Management Journal*, 83-84.
- Han, K., Kauffman, R., & Nault, B. (2006). Economic contributions of IT outsourcing: An industry-level analysis. *Carlson School of Management, University of Minnesota*.
- Hayes, A. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Publications.
- Holcomb, R., & Hit, A. (2007). Toward a model of strategic outsourcing. *Journal of Operation Management*, 464-481.
- Jafari, S. (2014). Strategic Cost-Cutting in Information Technology: toward a Framework for Enhancing the Business Value of IT. *Iranian Journal of Management Studies*, 21-39.
- Jorgenson, D., & Stiroh, K. (1995). Computers and growth. *Economics of innovation and new technology*, 295-316.
- Kern, T., & Willcocks, L. (2000). Exploring information technology outsourcing relationships. *The journal of strategic information systems*, 321-350.
- Kimberly, J., & Evanisko, M. (1981). Organizational Innovation: The Influence of Individual, Organizational, and Contextual Factors on Hospital Adoption of. *Academy of Management Journal*, 689-713.

- King, W., & Malhotra, Y. (2000). Developing a framework for analyzing IS sourcing. *Information & management*, 323-334.
- Koh, C., Ang, S., & Yeo, G. (2007). Does IT outsourcing create firm value? *Proceedings of the 2007 ACM SIGMIS CPR conference on Computer personnel research: The global information technology workforce*, 87-91.
- Lacity, M., Khan, S., & L.P, W. (2009). A review of the IT outsourcing literature: Insights for practice. *The Journal of Strategic Information Systems*, 130-146.
- Lacity, M., Khan, S., Yan, A., & Willcocks, L. (2010). A Review of the it Outsourcing Empirical Literature and Future Research Directions. *Journal of Information Technology*, 395-433.
- Lacity, M., Willcocks, L., & Feeny, D. (1995). IT Outsourcing: maximize flexibility and control. *Harvard Business Review* , 84-93.
- Lacity, M., Willcocks, L., & Feeny, D. (1996). The value of selective IT outsourcing. *Sloan Manage. Rev.*, 13-25.
- Laudon, K., & Laudon, J. (2015). *Essentials of MIS*. New York: Pearson.
- Levina, N., & Ross, J. (2003). From the vendor's perspective: Exploring the value proposition in information technology outsourcing. *MIS quarterly*, 331-364.
- Loh, L., & Venkatraman, N. (1992). Determinants of information technology outsourcing: A cross-sectional analysis. *Journal of Management Information Systems*, 7-24.
- Lysons, K., & Farrington, B. (2006). *Purchasing and Supply Chain Management*. Pearson Education.
- Mclvor, R. (2008). How the transaction cost and resource-based theories of the firm inform outsourcing evaluation. *Journal of Operations Management*, 45-63.
- Meijer-Veldman, M. (2003). *ASL en Iso 9001:2000*. Retrieved from <https://www.maise.nl/0303-10Mei%20ASL%20en%20ISO9000.pdf>
- Meijer-Veldman, M. (2003). *ASL grote stap naar INK-niveau III*. Retrieved from <https://www.maise.nl/0312-54Mei%20ASL%20en%20INK.pdf>
- Mordor Intelligence LLP. (2021). *IT Outsourcing Market - Growth, Trends, COVID-19 Impact, and Forecasts (2021 - 2026)*. Mordor Intelligence LLP.
- Morrison, C. (1997). Assessing the productivity of information technology equipment in US manufacturing industries. *Review of Economics and Statistics*, 471-481.
- Ness, L. (2005). Assessing the Relationships among IT Flexibility, Strategic Alignment, and IT Effectiveness: Study Overview and Findings. *Journal of Information Technology Management*, 1-17.

- Noordam, P., & Derksen, B. (2008). IT beheer objecten. Universiteit van Amsterdam.
- Obeng, M., & Anim, S. (2015). Outsourcing strategies of mining industries: an empirical evidence. *International Journal of Supply Chain Management*, 90-101.
- Ok, S. (2011). International outsourcing: empirical evidence from the Netherlands. *Journal of Business Economics and Management*, 131-143.
- Outvorst, F. v., Donatz, R., & Pols, R. v. (2005). Introductie BiSL, een. *IT Service Management best practices, deel 2*, 65-80.
- Palvia, P. (1995). A dialectic view of information systems outsourcing: Pros and Cons. *Information & Management*, 265-275.
- Pankowska, M. (2019). Information Technology Outsourcing Chain: Literature Review and Implications for Development of Distributed Coordination. *Department of Informatics, University of Economics in Katowice*.
- Pérez-Aróstegui, M., Bustinza-Sánchez, F., & Barrales-Molina, V. (2015). Exploring the relationship between information technology competence and quality management. *BRQ Business Research Quarterly*, 4-17.
- Pols, R. v. (2005). *Strategisch beheer van informatievoorziening met ASL en BiSL*. Den Haag: Academic Service.
- Prahalad, C., & Hamel, G. (1990). The Core Competence of the Corporation. *Harvard Business Review*, 79-91.
- Rai, A., Lang, S., & Welker, R. (2002). Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis. *Information Systems Research*, 50-69.
- Remenyi, D., & Money, A. (1991). A User-Satisfaction Approach to IS Effectiveness Measurement. *Journal of Information Technology*, 162-175.
- Rohde, F. (2004). IS/IT outsourcing practices of small- and medium-sized manufacturers. *International Journal of Accounting Information Systems*, 429-451.
- Seddon, B., Graeser, V., & Willcocks, L. (2002). Measuring Organizational IS Effectiveness: An. *The Data Base for Advances in Information Systems*, 11-28.
- Sobol, M., & Apte, U. (1995). Domestic and global outsourcing practices of America's most effective IS users. *Journal of Information Technology*, 269-280.
- Stiroh, K. (1998). Computers, productivity, and input substitution. *Economic Inquiry*, 175-191.
- Stock, G., Greis, N., & Fischer, W. (2002). Firm Size and Dynamic Technological Innovation. *Technovation*, 537-549.

- Susomrith, P., & Brown, A. (2013). Motivations for HR outsourcing in Australia. *International Journal of Human Resource Management*, 704-720.
- Tallon, P., Kraemer, K., & Gurbaxani, V. (2000). Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach. *Journal of Management Information Systems*, 145-173.
- Temtime, Z. (2003). The Moderating Impacts of Business Planning and Firm Size on Total Quality Management Practices. *The TQM Magazine*, 52-60.
- Varum, C., & Rocha, V. (2012). The Effect of Crises on Firm Exit and the Moderating Effect of Firm Size. *Economic Letters*, 94-97.
- Willcocks, L., Fitzgerald, G., & Lacity, M. (1996). To outsource IT or not?: recent research on economics and evaluation practice. *European Journal of Information Systems*, 143-160.
- Zhang, X., Stafford, T., Murad, A., Risher, A., & Simmons, J. (2018). HOW TO MEASURE IT EFFECTIVENESS: THE CIO'S. *Journal of Information Technology Management*.

Appendix

Tabel 13. Results regression analysis separate effects

		ITE1	ITE2	ITE3	ITE4	ITE5	ITE6	ITE7	ITE8	ITE9	ITE10	ITE11	ITE12	ITE13
ITO5	Sig.	,658	,466	,993	,657	,667	,550	,703	,132	,339	,257	,203	,835	,776
	B	-,020	-,049	-,001	,039	,027	-,040	-,028	,134	-,080	-,104	-,093	-,017	-,029
ITO6	Sig.	,437	,397	,218	,377	,116	,748	,285	,343	,636	,533	,399	,336	,753
	B	-,031	,050	,076	-,068	-,087	-,019	-,070	-,073	-,035	-,050	-,054	-,068	,028
ITO7	Sig.	,060	,531	,751	,158	,963	,172	,120	,156	,382	,256	,002	,195	,674
	B	,081	,040	-,021	,118	-,003	,086	,110	,119	,069	,098	,220	,100	,041
ITO8	Sig.	,248	,621	,192	,629	,973	,520	,191	,306	,088	,395	,191	,956	,482
	B	-,040	,025	-,070	,033	,002	-,033	-,075	-,069	-,111	-,060	-,073	,003	-,055
ITO9	Sig.	,460	,233	,018	,177	,295	,641	,126	,320	,987	,912	,407	,474	,200
	B	,036	,086	,179	-,128	,071	,033	,123	,094	-,001	-,011	,065	,062	-,142
ITO10	Sig.	,530	,195	,515	,080	,662	,322	,449	,649	,382	,473	,801	,318	,598
	B	,032	-,097	-,050	,173	-,031	,073	,063	,045	,082	,073	,020	,090	-,060
ITO11	Sig.	,467	,915	,688	,805	,628	,154	,433	,381	,511	,275	,660	,241	,438
	B	-,035	-,008	-,029	-,023	,032	-,099	-,061	-,081	-,058	-,104	,034	-,100	,083
ITO12	Sig.	,192	,304	,986	,656	,246	,763	,134	,154	,063	,161	,519	,438	,679
	B	-,063	-,073	-,001	-,041	-,077	,021	-,118	-,133	-,166	-,135	-,050	,067	-,045
ITO13	Sig.	,404	,614	,416	,131	,480	,675	,690	,818	,027	,034	,694	,559	,287
	B	,037	,033	,056	-,131	,044	,027	,029	-,020	,184	,192	-,028	-,046	,107
ITO14	Sig.	,847	,938	,997	,422	,243	,881	,937	,573	,810	,954	,696	,458	,890
	B	-,013	,008	,000	-,102	-,106	-,014	,008	-,072	-,029	,008	,041	,087	,020
ITO15	Sig.	,398	,922	,616	,720	,736	,701	,137	,357	,225	,617	,282	,744	,198
	B	,063	,011	-,058	-,052	,035	-,042	,184	,134	,169	,075	,130	-,044	,219
ITO16	Sig.	,103	,409	,261	,638	,901	,551	,021	,460	,686	,849	,182	,419	,002
	B	-,088	-,066	-,093	,049	-,009	-,047	-,205	-,077	-,040	,020	-,116	-,078	-,394
ITO17	Sig.	,176	,995	,348	,660	,071	,317	,049	,161	,138	,491	,270	,514	,176
	B	-,115	-,001	-,122	-,072	-,214	-,124	-,276	-,232	-,233	-,117	-,150	-,099	,260
ITO18	Sig.	,349	,138	,486	,632	,625	,850	,774	,641	,883	,951	,655	,012	,099
	B	-,057	-,134	-,065	,056	,041	-,017	,029	-,055	,016	-,007	-,044	-,276	-,228
ITO19	Sig.	,156	,551	,265	,818	,842	,394	,133	,639	,177	,282	,106	,871	,343
	B	,069	,043	,083	,022	,013	,060	,120	,044	,121	,105	,127	-,014	,104
ITO20	Sig.	,168	,159	,183	,471	,652	,596	,074	,559	,526	,574	,024	,411	,410
	B	-,084	-,127	-,125	-,085	-,038	-,047	-,180	-,069	-,071	-,069	-,224	-,089	,114
ITO21	Sig.	,723	,813	,965	,737	,982	,091	,385	,084	,994	,506	,622	,547	,480
	B	-,018	,018	-,003	,034	-,002	-,128	-,073	-,174	,001	-,069	,041	,055	,082
ITO22	Sig.	,022	,018	,166	,184	,097	,121	,204	,140	,442	,532	,090	,049	,672
	B	,171	,261	,158	,191	,171	,168	,155	,213	,105	,093	,202	,262	,071

	R2	,189	,158	,136	,094	,101	,104	,245	,153	,177	,143	,241	,194	,205
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