

# Insourcing and outsourcing of IT in Small- and Medium-sized Enterprises

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## ABSTRACT

The insourcing and outsourcing practices in IT are an area with little research in small- and medium-sized enterprises (SMEs) from the Netherlands. The aim of this paper is to identify current practices of these SMEs related to IT insourcing and outsourcing. This is done by, firstly, conducting a literature review to find practices which are used in countries like the USA, Canada and New Zealand. Furthermore, hypotheses are defined based on the survey data from “Nationaal Onderzoek data en digitalisering in de logistiek”. Afterwards, hypothesis testing is done and the results are compared to the findings’ conclusions with critical assesment on the differences in the studies. A limitation of this research is the availability of knowledge specific to Logistic SMEs in terms of IT management.

## Keywords

IT management, Larger companies, SMEs, insourcing, outsourcing

## 1. INTRODUCTION

In today’s world, there exist gigabytes of data [2, 8, 9] and many IT related issues around this. One particular issue larger companies face is the substantial amount of data that they need to process in order to run as efficient as possible [13]. However, they must decide on how to process this information. They may take the so called “*in-house*” approach in which they develop their own IT department, also called *insourcing*. In this case the department is readily available for them at all time. The other approach is to outsource. Here they search for an outside firm (hence the term *outsourcing*) that approaches and resolves their IT needs and data processing.

There are certain factors companies look into when considering both the approaches. For outsourcing, aspects such as access to a larger talent pool and a sustainable set of skills, operational expertise, capacity management and cost restructuring [3, 15] are considered. For SMEs, it may be hard to have their own IT department due to the cost of maintaining it. That is why they choose to outsource more and to hire either just one IT specialist, a person with a diploma in IT/Computing, or to assign the IT work to one

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of their already employed staff [6]. A survey in IT management of SMEs in the United States of America (USA) and Canada has shown that the SMEs from the USA are more developed in IT due to the use of Information Requirement Analysis (IRA) [14]. Furthermore, they found that in the USA, people have higher education which impacts the performance of the SMEs. This is referred to as “individual characteristics” by the author.

In this research, firstly literature review is made of IT management related papers to conclude current management practices related to insourcing and outsourcing. Secondly, hypotheses are defined based on the data from the survey “Nationaal Onderzoek data en digitalisering in de logistiek” conducted by TLN, Evofenedex and Beurtvaartadres. Finally, the hypotheses are tested through data analysis for Dutch Logistic SMEs. For this analysis, SMEs are defined by the EU definition [5] for organisation size. Meaning that organisations with less than or exactly fifty people are considered “Small Enterprise”. A medium-sized firm is one with between fifty-one and 250 employees. Lastly, large companies are those that have a headcount exceeding 250.

## 1.1 Problem Statement

There is research done into how SMEs manage their IT [6, 14]. However, there has been little research into specifically insourcing and outsourcing of Dutch Logistic SMEs. This paper aims to give an answer to whether the aforementioned SMEs follow similar concepts as SMEs in countries from other parts of the world.

### 1.1.1 Research Questions

The above laid out problem statement leads to the following research question:

*Do insourcing and outsourcing IT practices found in other countries apply to Dutch Logistic SMEs?*

This research question can be answered with the help of the following sub-questions:

1. Which insourcing practices do SMEs from different countries use in IT?
2. Which activities are outsourced by Dutch Logistic SMEs currently?
3. Is there a correlation between size of the organisation and outsourcing of IT?

## 1.2 Preliminary Search

To correctly begin research, one must find relevant information on the topic. In this case making use of platforms like Google Scholar, Scopus, Science Direct and ResearchGate. The terminology used includes but is not limited to

“IT outsourcing”, “IT management”, “SMEs” and “Information Systems”. In this section, the discovered related literature is discussed.

In the field of IT management in SMEs there have been numerous researches in which management guidelines are given or survey are used to give managing practices. One such survey is that of *Montazemi (2006)* [14]. In it, he concludes differences between IT management in the United States of America and Canada. Furthermore, he suggests which of these are positive influences towards IT performance. There is also extensive research done related to how IT is managed and what are benefits for the organisation in terms of performance and non-monetary benefits [18, 6].

Research related to IT outsourcing follows a similar trend to that of IT management. There are surveys and research that concludes benefits and drawbacks to outsourcing. One such research is that of *Palvia (1995)* [15] in which the author gives positive points and pitfalls of outsourcing. Another interesting research is that of *Apte et al. (1994)* [4] as it gives IT activities categorisation and which are most common targets for outsourcing. Finally, there is a survey paper of *Akbari and Hopkins (2016)* [3] which investigates the outsourcing practices in Iran and gives their point of view on reasons to outsource.

### 1.3 Structure of paper

The paper is divided into four parts. Section 2 deals with the definition of the research methodology and laying out each phase of the research. Each phase is given its own subsection, definition and relevance to the next section. The next part of the paper, or Section 3, establishes the results of each individual phase. This is done through either tables or text summaries. Section 4 is the discussion related to some of the findings in the literature and hypotheses testing. Finally, comes the conclusive section 5 in which the research questions are answered and the research is concluded.

## 2. RESEARCH METHODOLOGY

The success of this research relies on four phases. These phases are “Literature Review”, “Hypotheses Definition”, “Survey Data Processing” and “Answering Research questions”. Each phase is given an explanation in the sections below.

### 2.1 Literature Review

In this phase, more literature is found if needed, otherwise, already found literature is reviewed to gain knowledge on the IT insourcing and outsourcing practices. The methodology in this part of the research is based on the *Watson and Webster* [20]. This way the needed information and managing techniques can be found through practices in other countries. Afterwards, a summary is given with the help of tables which is then used for the later comparison with the hypotheses conclusions.

### 2.2 Hypotheses definition

This is the next phase of the research in which the hypotheses are defined. These hypotheses are based on the questions from the survey. The hypotheses are related to management systems or software processing of data in the Dutch Logistic SMEs. The final hypothesis of this paper aims to find a correlation between organisation size and amount of outsourcing. Thus, it is defined as “*There is correlation between size and amount of outsourcing*”.

## 2.3 Survey Data Processing and hypotheses testing

This is the section in which the relevant data from the Dutch survey is filtered. The filtration is based on the data needed for the hypotheses testing which is also done during this phase. The level of significance for each test is 0.05 or 5%. The test for each of the defined hypotheses is the  $\chi^2$  good-of-fit test. However, another test is used to evaluate the correlation hypothesis. Namely, Pearson’s correlation test and its result is an  $r$  value that shows how much the two variable are correlated. To test the significance of the correlation, a  $t$ -value is calculated using the formula

$$t = \frac{r}{\sqrt{1-r^2}} * \sqrt{n-2}$$

where  $r$  is the correlation coefficient that is given by

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

and  $n$  is the population size which in this case is 655. Afterwards, a  $p$ -value is found through a table with degrees of freedom equal to  $n - 2$ . This test is used to find a correlation, however, the data and scope of this research are not enough to establish the cause of this supposed correlation.

### 2.4 Answering Research Questions

After the aforementioned phases have been completed, the phase of answering the research questions begins. In here the data gathered from phase One and Three is used to correctly give an answer to the Research questions defined in the section *Research Question*. This is the final phase which concludes the research.

## 3. RESEARCH RESULTS

In this section, the results of the research shall be discussed and provided with each phase. Beginning with phase one which is literature review.

### 3.1 Literature review

The conducted literature review found which IT management characteristics influence the performance of the implemented IT. As well the review found benefits and activities of outsourcing.

#### 3.1.1 Search process

The beginning of the search uses more broader terms without specifics. The search was conducted only using Google Scholar due to it giving a collection of results from multiple databases. Just like in *Preliminary Search* the terms used were:

- IT management
- IT outsourcing
- Information Systems
- SMEs

Each individual term gave search results of at least one million articles. More specifically IT management gave 7,350,000 results, IT outsourcing - 1,140,000, Information systems - 7,340,000 and SMEs - 1,180,000. These results are a large amount that need to be reviewed. Due to this, combinations of the terms are used to be able to narrow down the results to be more relevant to the research. The results were as follows - IT management in

SMEs - 935,000, IT outsourcing in SMEs - 79,500, Information Systems in SMEs - 691,000. Although, there is a big decrease (between 87.3% and 93.0%) in the number of articles found by the new search queries, they are still a big amount. The next step was to use typical search engine syntax and in this case it is the use of quotes to group terms that need to be found together. Now the new search terms are defined as follows:

- “IT Management” in SMEs
- “IT Outsourcing” in SMEs
- “Information systems” outsourcing pros

The above terms yielded the following respective results - 7,490, 5,410, 11,900. The first inclusion criteria was to scan the top results of the searches based on abstracts and conclusion to check for their relevance to the topic of this research. The relevance is found by checking whether the articles include benefits or concepts related to insourcing or outsourcing. Another inclusion criteria was how many citations the article has. However, this is more relevant to older articles which is elaborated in the *Discussion* section of this paper. Finally, a forward search is done on older article to find newer research that cites the original articles.

The search terms and their respective results have been summarise in the table below:

Initial search terms	Article Amount	Decrease
IT management	7,350,000	Initial round
IT Outsourcing	1,140,000	Initial round
Information systems	7,340,000	Initial round
SMEs	1,180,000	Initial round
<b>Second round search terms</b>		
IT management in SMEs	935,000	87.3%
IT Outsourcing in SMEs	79,500	93.0%
Information systems in SMEs	691,000	90.6%
<b>Final round search terms</b>		
“IT Management” in SMEs	7,490	99.2%
“IT Outsourcing” in SMEs	5,410	93.2%
“Information Systems” outsourcing	11,900	98.3%

Table 1: A summary of the search process and the decreases after each change

Finally, the following articles have been selected with their concepts presented in the matrix depicted in table 2.

Articles	Concepts		
	IT management in SMEs	IT Outsourcing in SMEs	Information Systems outsourcing
Abouzeedan et al. (2006)[1]	X		
Akbari et al. (2016)[3]		X	
Apte et al. (1991)[4]			X
Cragg et al. (2010)[6]	X		
Gonzalez et al. (2005)[10]			X
Montazemi et al. (2006)[14]	X	X	
Palvia (1995)[15]			X
Raymond et al. (2019)[17]	X		
Raymond et al. (2011)[18]	X		
Ward et al. (1996) [19]	X		

Table 2: The concept matrix of the articles

### 3.1.2 Insourcing

Raymond et al. (2011) [18] concluded that performance is affected by the strategy and sophistication of IT within SMEs. Sophistication refers to the way in which IT is implemented into the firm. This is either if IT is used for management, or if it is used to improve technology and production [18]. Furthermore, strategy defines how IT is used to gain benefits. These benefits can be better operational efficiency (i.e. automating repetitive tasks), improving management through faster data gathering and to use IT to gain a competitive edge [19]. Raymond et al. (2019) [17] further confirm the relation of strategy

to IT performance within SMEs. However, the authors have done this through a chain of connections that lead to improved IT performance. They found that performance is directly influenced by IT alignment (ITA) capabilities. ITA is how much an organisation has aligned their IT use with their overall business goals. This can be important for SMEs as the best way to use IT is by aligning it with the overall goals. Furthermore, the research found a connection of ITA with the environment and IT Governance of SMEs. Having this relation also means that the latter influences IT performance through ITA.

Montazemi (2006) [14] conducted a survey of several Canadian and US SMEs to try and find any differences between the two. The study found that US SMEs are significantly better performing in several aspects. These aspects are IT management, Task-technology fit (which can be seen as IT Alignment) and the characteristics of the people employed in the SMEs. The characteristics referred to the education and knowledge of IT and it was found that in the US, people are more knowledgeable and more highly educated which in turn boosted the IT performance of the SMEs. Cragg et al. (2010) [6] give a breakdown of IT sophistication into four sections based on previous literature. The sections are planning, leading, controlling and organising. The study, conducted in New Zealand, found that all four dimensions have a significant impact on the performance of the IT within the firm. From a developing SMEs’ perspective, it is most beneficial to have good planning and leading. Furthermore, the researchers believe that leading is the most significant of the four dimensions. Finally, Abouzeedan et al. (2006) [1] found another benefit that comes with successful IT. That is the benefit of exploring wider areas of influence or also known as globalisation. This is a great benefit for expanding SMEs as that would further extend there business together with creating connections.

### 3.1.3 Outsourcing

Regarding outsourcing, Palvia (1995) [15] provides two different point of views on implementing outsourcing and the pros and cons of outsourcing based on the two approaches. The benefits are as follows: Cost Control, Financial reasons (such as not having the capital to develop in-house), improved Management IS (MIS) control, technology access and strategic focus (meaning that the organisation can focus on their strategy). Cost control is a very important benefit for SMEs as that would allow them to better balance their costs and not have the big investment towards an IT department. On the other hand, the study found a negative side of outsourcing. The pitfalls established are coordination costs (meaning coordination of in-house IT and the outsourcing vendor), lack of flexibility and control, and personnel upheaval. For SMEs, coordination costs can be a dangerous pitfall as it can become a threat for their survival if they become too large. Furthermore, Gonzalez et al. (2005) [10] found through a survey of large Spanish firms that personnel upheaval is a concern when going for outsourcing, although it is ranked low on importance. Apte et al. (1991) [4] established a detailed categorisation of types of IS activities in outsourcing:

1. Data entry and simple processing
2. Facilities management
3. Support operations
4. Contract programming
5. System integration

For the success of a developing SME, it is beneficial to outsource the activities related to the first three categories. *Palvia (1995)* puts these into a greater category, called *operations*, based on *Grover et al. (1994)*'s [12] differentiation of functions into two category. The final two are put into the other category of *applications*. Furthermore, *Palvia* shows that the facilities management the most common outsourcing activity in the Banking industry. *Akbari and Hopkins (2016)* [3] further confirmed the pros and cons given by *Palvia (1995)* through a study of Iran and outsourcing. The study found that indeed cost control is the most important to SMEs. Together with that, it concluded that risk management, technology access and wider knowledge are also benefits towards outsourcing.

### 3.1.4 Summary of literature review

Below a summary of the results is given. These are the concepts found in other countries and are to be used in the next section for the hypotheses.

Concepts	Influence on IT Performance	Benefit to SMEs
<b>Strategy</b>	Better strategy leads to better performance [18]	Operational efficiency, Improving management, Gain competitive edge [19] Better technology, Faster management decisions [18]
<b>Sophistication</b>	More sophistication means higher efficiency [18]	
<b>IT Alignment</b>	Higher individual performance [17]	Overall gains [17]
<b>Information Requirement Analysis (IRA)</b>	Higher efficiency [14]	Faster gathering of requirements, Faster start of projects [14]
<b>Knowledgeable and educated employees</b>	Higher efficiency [14]	Faster return on investments given higher efficiency [14]
<b>IT Planning</b>	Better overall performance [6]	Well-defined task leading to higher efficiency [6]
<b>Globalisation</b>	None	Wider area of influence, New connections [1]

Table 3: Positive influences on insourcing and benefits for SMEs

<b>Benefits:</b>	
1.	Cost Control [15,3]
2.	No need to invest big into a department [15]
3.	Improved Management IS control [15]
4.	Access to better technology [15,3]
5.	More resources to focus on strategy [15]
<b>Pitfalls:</b>	
1.	Coordination is difficult and costly [15]
2.	Lack of flexibility [15]
3.	Personnel upheaval [15,10]
<b>Sets of activities in outsourcing: [4]</b>	
1.	Data entry and processing
2.	Facilities management
3.	Support operations
4.	Contract programming
5.	System integration

Table 4: Summary of outsourcing characteristics and activities

## 3.2 Hypotheses definition

In this section, the definition of the hypotheses for testing is done. The hypotheses are based on the survey data. Having established this, the first three hypotheses are defined as follows:

H1: Warehouse management is outsourced

H2: Fleet management is outsourced

H3: Transport management is outsourced

These are important aspects for Dutch Logistic SMEs as they are the main logistical facilities. It is useful for future enterprises to see what others are doing with these facilities. The questions related to the three hypotheses have the same structure of “Who is the supplier for *X*?” where *X* is one of the three activities. From the answers to the question, one can derive the categorisation of *Own* and *Outsourced*. The former includes the answer “Own system” to the aforementioned question and the latter is any other answer as then the enterprises are not developing their own system meaning it is outsourced.

The next two hypothesis are related to software that does data processing. This software is *Accounting Software* and *Reporting Software*. The former is a software that is used to process their finances and payments. The latter is a software used to enter and report issues related to processes of the enterprise. Furthermore, the answers are again categorised into *Own* and *Outsourced* by following the previous definition. Thus, the hypotheses are defined in the following way:

H4: Accounting software is outsourced

H5: Reporting Software is outsourced

The next three hypotheses are related to each in the sense that they are processes involved with managing the enterprise or to have more connected departments. The following hypotheses are then given:

H6: Business model is influenced by IT

H7: Automatic billing is influenced by IT

H8: Internal Processes are influenced by IT

The final hypothesis has already been defined but is restated for clarity. It is the correlation hypothesis that is given by

H9: Size and outsourcing of IT amount are correlated

## 3.3 Survey data processing

In this section, the processing of the survey “Nationaal Onderzoek data en digitalisering in de logistiek” is discussed and the hypotheses defined above are tested.

### 3.3.1 Descriptive statistics

Firstly, a quick description of the survey results is given. The total number of participants is 654. The participants are representatives of organisations and their position in the enterprises range from supervisors to executives. The represented organisations are of types carrier, expeditor, shipper and logistic service provider. Furthermore from the total number of organisations, there are 356 that are classified small as per the definition in *Introduction*, 199 are medium and 99 - large. One final interesting statistic is that of the turnover of the organisations. More than half of the organisation are with turnover between 0 and 25 million euros. 86 of the participants were unable to give an answer to the turnover question so only 568 answered.

### 3.3.2 Hypotheses testing

For this section, a level of significance of 0.05 or 5% is used for the  $\chi^2$  test. For each test conducted, the expected proportion for insourcing (or probability) is 0.60 or 60%. The 60% is a significant majority for any population based on supermajorities. Another reason for the choice of this percent is that it is the proportion used in voting systems to test whether something is accepted by majority, primarily

Characteristics						
SIZE	Type	Representatives		Turnover (in millions of euro)		
Small 356	Carrier	192	Executives 88	0-25	376	
Medium 199	Expediter	59	Directors 257	25-50	63	
Large 99	Logistics provider	204	Cooperating Manager	50-100	51	
TOTAL: 655	Shipper	108	Supervisors 209	100-150	16	
	Transporters	92		>150	63	

Table 5: The descriptive statistics

in political votes. The tests' null hypothesis is *The system is mostly insourced*. The critical value given the level and degrees of freedom is 5.991. If the observed  $\chi^2$  test statistics is found to be larger than this value then the null hypothesis is rejected. The first test is to see whether in the Dutch Logistic SMEs, warehouse (WMS), fleet (FMS) and transport (TMS) management systems are outsourced or insourced. This also gives an answer to the H1 - H3 hypotheses defined earlier. Each system is tested independently with a  $\chi^2$  goodness-of-fit test. Figure 1. shows the statistics of this category.

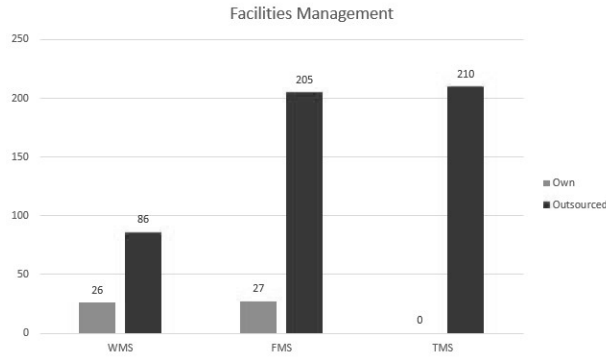


Figure 1: The observed values for the systems

Firstly, it must be noted that not all 555 SMEs have answered to the questions related to the systems, so only the valid answers are used. Beginning with WMS, we can see the observed values are 26 and 86 for own system and outsourced, respectively. Under the null hypothesis, the expected values are 67.2 and 44.8. Subsequently using the formula  $\chi^2 = \sum \frac{(O-E)^2}{E}$ , where  $O$  is the observed values and  $E$  are the expected values, the test statistics is calculated at 63.149. This is significantly larger than the critical value, so the null hypothesis on insourcing is rejected and this system is mostly outsourced. Following the same procedure, this is found about the TMS system: observed values are 27 and 205, expected values are 139.2 and 92.8 and finally the  $\chi^2$  statistic is 226.09. Once again the statistic is significantly larger than the critical value and the null hypothesis is rejected. Although, it is already evident from the data that FMS is outsourced by majority, a test is still needed to confirm. The test follows the same procedure and has the following results: observed values are 0 and 210, expected values are 126 and 84 and the test statistic is equal to 315. As expected, the null hypothesis is rejected here as well. This means that all the systems are outsourced which then confirms hypotheses H1 - H3.

The next two systems that are represented together are Accounting and Reporting software. The same chi-square test is used to see if these two systems are insourced or not. Also, this next test provides an answer to hypotheses four and five. Below is a bar chart with the observed values:

The null hypothesis for these two tests is also *The system is mostly insourced*. The first system in this case is

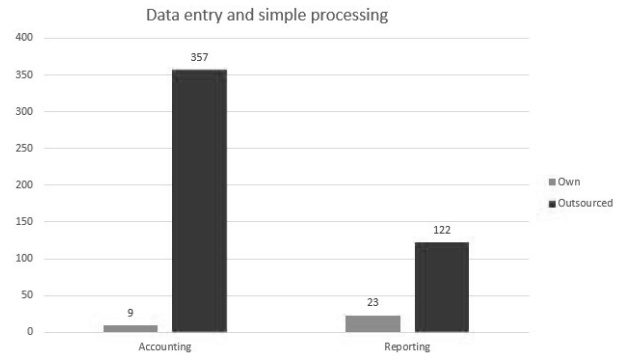


Figure 2: Accounting and reporting software observed values

accounting. In this category it is observed that 9 organisations develop their own system while 357 outsource it. The respective expected values are 219.6 and 146.4. This results into the  $\chi^2$  statistic of 504.92. For the other system, the following can be seen: observed values - 23 and 122, expected - 87 and 58 and the  $\chi^2$  is equal to 117.70. In both the systems, the test statistic is larger than the critical value, thus, the null hypothesis is rejected.

Finally, the hypotheses on processes influenced by IT can be tested. The survey provides questions and answers for the following three processes - *Business model*, *Automatic Billing* and *Internal Processes*. The test conducted remains the same, however, the null hypothesis now is *The process is mostly influenced by IT*. These tests give the answers to hypotheses six to eight. As before, a bar chart is constructed with observed values in each system:

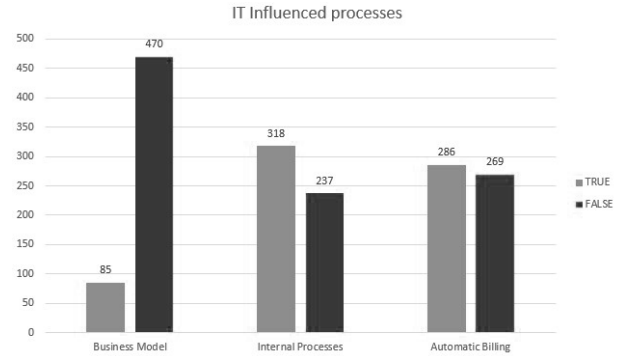


Figure 3: IT Influenced processes

In this case, the expected values for each of the systems are 333 and 222 respectively for True and False. This is the case due to the fact that for each system there are 555 answers which is all of the SMEs in the survey. In the case of Business model, the observed values are 85 and 470, which give a  $\chi^2$  result of 461.74. Similarly, the resulting  $\chi^2$  statistic is 1.69 and 16.58 for Internal Processes and Automatic Billing, respectively. From this follows that the null hypothesis is rejected for two processes, namely *Business model* and *Automatic Billing*. However, the test on *Internal Processes* fails to reject the null hypothesis, meaning that these activities are influenced by IT in SMEs. The first two tests being rejected means that hypotheses H6 and H7 are also rejected while H8 is confirmed by the test on *Internal Processes*.

### 3.3.3 Correlation test

Firstly, an assumption has to be made before conducting



the correlation test. This is the assumption of normal distribution of the data. It is safe to assume this as by the Central Limit Theorem any sample with more than thirty observations can be assumed to be normally distributed. In the case of this survey there are 654 observations. Secondly, the correlation test required numeric values, so and encoding must be done on the categorical answers. Below shows a table with statistics and encoding of the two variables “Organisation size” and “IT management outsourcing”.

Organisation Size			IT management outsourcing		
1-10	1	126	Everything is outsourced	1	132
11-25	2	120	Most things are outsourced	2	217
26-50	3	110	Most things are insourced	3	201
51-100	4	90	Everything is insourced	4	105
101-250	5	109			
>250	6	99			

Table 6: Variables for the correlation test

Now the data is ready for the correlation test. Firstly, the null hypothesis has to be defined. In this case it is *There is no association between the variables*. The test conducted is Pearson’s correlation test which gives a coefficient  $r$  and using it a t-value is calculated. The coefficient  $r$  gives a description on the strength and direction of the correlation. The  $r$  coefficient is calculated using software that follows the formula

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

and the result for  $r$  is 0.1512576 which then is used to calculate a t-value of 3.9102. Subsequently, the p-value is found to be 0.0001019 which is less than the significance level of 0.05. This means that the null hypothesis is rejected and there is an association between the two variables. This association is characterised by  $r = 0.1512576$  and has a positive direction meaning that when one variable increases - the other one increases as well. Given the encoding of the data (i.e Outsourcing everything is 1 and Insourcing is 4), the positive correlation is that of size and insourcing. Given that outsourcing is the opposite of insourcing, it is negatively correlated to size with an  $r$  value of  $-0.1512576$ . Finally, this gives an answer to the ninth and final hypothesis. The hypothesis is confirmed because there is an association as shown above.

## 4. DISCUSSION

It must be noted that one of the articles used in this research is relatively old being published in 1995. That is the article *A dialectic view of information systems outsourcing: Pros and cons* by Palvia. However, it can be shown that this article is still relevant today for two reasons. The first reason is that it is highly cited by more than two hundred other articles. And the second reason is that there are 18 citations that are from 2017 and newer. The newest being the article on decision making methodology for selecting of IS outsourcing suppliers by Demircan *et al.* (2020) [7]. Another article is that of Gonzales *et al.* (2019) [11] in which they use Palvia’s article as basis for establishing IS outsourcing satisfaction. Palvia’s article was also used in a similar manner by Rajaeian *et al.* (2017) [16] for their literature review of model-driven IT Outsourcing.

This paper aimed to compare findings from SMEs in other countries to Dutch Logistic SMEs. To do so, one has to find a survey that measures the variables in a similar or in the same manner as the survey studied in this paper.

However, no such survey was found throughout the research as most papers used an interview format rather than surveys. One such paper on outsourcing is that of Apte *et al.* (1994) in which they categorise activities for outsourcing. The categories do have a similarity with activities found in the survey. One such similarity is *Facilities management* with the activities of Fleet, Transport and Warehouse management. The three activities are facilities in the sense that they are a piece of equipment or building for the Dutch Logistic SMEs. However, it cannot be concluded whether *Facilities management* is outsourced by Dutch Logistic SMEs as the original paper has a different approach towards measuring the variables. Papers on insourcing were identified as well with similarities. It, also, cannot be concluded due to the different ways in which the data is gathered. One of the similarities is *Strategy* as given by Raymond *et al.* (2011) in terms of being used together with IT. There is a data available in the form of *Business model* due to it being the definition of the strategy for SMEs.

Another element of this paper that requires elaboration is the correlation test. The first elaboration being that the test is trying to establish whether a correlation exists between organisation size and amount of IT outsourcing. However, it must be noted that correlation does not mean causation and causation cannot be concluded due to the limited data available from the survey. The second elaboration comes again from limited data availability. This is the fact that there is no *quantitative* measure of amount of outsourcing within this survey. This means that the test cannot correctly measure the correlation between the two variables.

## 5. CONCLUSION

This research set out to investigate whether Dutch Logistic SMEs use similar or the same practices of other countries. However, this cannot be fully concluded as no similar survey could be found during the literature review. As stated in discussion section, this is due to interviews being the primary study approach. Nevertheless, the sub-research questions of this research can be answered and partially conclude this research.

### 5.1 Answering Research questions

Below each of the research questions is addressed and answered while also restating answers to the hypotheses that are related to the question.

#### 5.1.1 Which activities are outsourced by Dutch Logistic SMEs currently?

This can be answered by looking at hypotheses One to Five. All these hypotheses have been confirmed as seen in *Hypotheses testing* section previously. Given this, it can be concluded that the activities outsourced currently by Dutch Logistic SMEs are the following:

- Warehouse Management Systems
- Fleet Management Systems
- Transport Management Systems
- Accounting Software
- Reporting Software

#### 5.1.2 Which insourcing practices do SMEs from different countries use in IT?

The literature review has shown several concepts from SMEs in countries like New Zealand, Canada and the

USA. Surveys in the USA have shown that SMEs use practices like Information Requirement Analysis (IRA), hiring knowledgeable people, Sophistication and IT alignment to achieve higher efficiency. Furthermore, IT is incorporated into their Strategy not only for efficiency but also better marketing. On the other side of the globe, New Zealand SMEs use clear IT Planning to have a better performing IT department.

### 5.1.3 Is there a correlation between size of the organisation and amount of outsourcing?

The significance of this correlation is to give an indication to future SMEs whether or not to develop their insourcing facilities with the expansion of the organisation. Through the analysis in *Correlation test*, it is found that size of the organisation and outsourcing are negatively correlated. This means that organisations lower how much they rely on outsourcing with the growth of the enterprise. This is, also, backed by the confirmation of hypothesis H9

### 5.1.4 Main Research Question

Finally, the main research question *Do concepts found in other countries apply to Dutch Logistic SMEs?* can be addressed. Unfortunately, due to the limitations of this research, the main research question cannot be answered definitively. However, it can be noted that Dutch Logistic SMEs may be following similar concepts as seen in the explanation in the *Discussion* section. The similarities are found to be with countries like the USA and New Zealand. Future research could expand the survey to include SMEs from these countries.

## 5.2 Future Research

As seen throughout the research, a limitation was the survey data availability or detail for aspects like amount of outsourcing. For future research, there should be a more detailed survey in regards to amount of outsourcing of IT. This allows for better understanding of the correlation between organisation size and outsourcing. One suggestion for more detail is to have a numerical answer on size instead of a categorical question. Another suggestion is, also, to have more detailed categories on how much is outsourced by having categories split by 20%. More possible future research could be done in finding what are the causes for such a correlation. This could be done through a survey entirely on the outsourcing of IT.

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