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The true cost of email invoicing and a comparison with alternative invoicing methods

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Declaration of Authenticity

I the undersigned declare that I have prepared the present paper independently and without the use of sources other than those indicated in the reference list.

All statements and information contained herein are listed and indicated as quotations and / or paraphrases.

This Bachelor Thesis has not been published to date. It has thus not been made available to other interested parties or examination boards.

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Management Summary

It is often thought that email invoicing is free of charge. Nowadays, many invoice issuers are changing from paper invoicing to email invoicing under the assumption that sending an email, and thus this invoicing method, incurs no charge for the enterprises. Invoicing between suppliers and buyers is a key process in commercial transactions and, therefore, has to be as cost-effective as possible.

The goal of this study is to examine the extent to which email invoicing generates costs for companies and to compare these results with those for paper invoicing and eBill. The authors also want to investigate the current level of awareness among Swiss companies about invoicing methods and their related cost structures. As a result of this research, companies should have a better understanding of the benefits and disadvantages of various invoicing methods and a specific recommendation for their company's size and needs. In order to answer the research questions, the authors conducted an online survey with companies in the German-speaking part of Switzerland who operate in the telecommunications, insurance and services sectors. Interviews with experts from these sectors were also conducted. Using the results obtained, the authors conducted a quantitative and qualitative analysis of micro-enterprises, small and medium-sized enterprises and large enterprises. Additionally, the level of awareness among the companies was analysed and summarized. The outcome of the quantitative analysis indicates that an email invoice incurs an average direct cost of CHF 0.20 and indirect costs of CHF 3.90, amounting to a total average cost of CHF 4.10. Moreover, the total average costs for all company sizes are found to be CHF 4.53 for a paper invoice and CHF 1.90 for eBill. In addition, the qualitative analysis shows that eBill is the most favourable invoicing method, followed by paper invoicing and email invoicing. The awareness investigation shows that 50% of the firms questioned were aware of their paper invoicing costs, whereas only 12% were aware of their email invoicing costs and 37.5% knew their eBill costs.

The authors recommend to the invoice recipients to reconsider their habits regarding the use of paper invoices as this method has the lowest sustainability rating of the three invoicing methods. The invoice issuers should aim to switch most of their invoicing to eBill as it is the most cost-effective method. This is particularly the case for micro-enterprises, whose costs would be reduced by CHF 3.43. It is not recommended for companies to switch from paper invoicing to email invoicing as the average cost reduction is only CHF 0.44, whereas the cost reduction of switching to eBill is CHF 2.63. The authors recommend that their client should publish the main findings of this study to spread awareness about the topic. They could also provide the calculation model for companies to insert their individual cost structures to calculate the specific cost reduction of switching to eBill.

Table of content

1 Introduction

1.1 Background

Invoicing is a key process in commercial relations between the suppliers of goods and service and their respective buyers. It is an essential part of every business transaction for both seller and buyer (Radeski & Davcev, 2011). Electronic invoicing, better known as 'email invoicing', is defined in Europe as the sending of digital image-based invoices, most of which are PDFs. The term 'e-invoicing' exclusively refers to the exchange of invoices between buyers and suppliers. It excludes the exchange of data for control and reporting purposes between tax authorities and buyers or suppliers (Koch, 2017). Compared to paper invoicing, this form of invoicing allows firms to profit from the advantages of no printing and postage costs, faster payments, fewer errors, less manual work and an ability to issue larger volumes of invoices. In addition, it helps to improve firms' relationships with their business partners and enhances security (Nazish, 2016).

1.2 Problem statement

Nowadays, many billing companies are changing from paper invoicing to email invoicing. The main argument for doing so is that email invoices are free of charge. Although sending email invoices seems not to generate direct costs for the biller, it has not yet been evaluated whether there are indirect costs related to factors such as late payment or, imprecise manual data entry in the e-banking or software of the invoice recipient for the firm. In addition, the company may need to send more reminders to the invoice recipient as emails may be blocked by spam filters. The true costs of email invoicing should be compared with the true costs of both paper invoicing and eBill.

1.3 Research questions and objectives

As indicated in the problem statement, this thesis aims to evaluate the true cost of email invoicing. Therefore, the authors have established the following research questions (RQ):

- RQ 1.0: What are the true costs of paper invoicing?
- RQ 1.1: What are the true costs of email invoicing?
- RQ 1.2: What are the true costs of eBill?
- RQ 2:0: What are the advantages for invoice issuers of switching from paper invoicing to eBill?
- RQ 2.1: Is it more economical to combine paper invoicing with eBill than to use email invoicing?

In addition, the authors empirically test the following hypotheses (H):

- H1: The cost of email invoicing is less than that of paper invoicing.
- H2: The cost of email invoicing is higher than that of eBill.

To answer the research questions, the following research objectives (RO) are defined:

- RO1: A description of the current situation regarding paper and email invoicing
- RO2: A description of the eBill system
- RO3: The development of a model for calculating the direct and indirect financial costs of paper invoicing, email invoicing and eBill
- RO4: An evaluation of the qualitative factors related to paper invoices, email invoicing or eBill
- RO5: An evaluation of the companies using paper invoicing, email invoicing or eBill
- RO6: An investigation of the costs incurred by the companies evaluated

1.4 Scope and limitations of the thesis

E-invoicing is a topic on the agenda of the G20. European Union, Latin American countries and the United States are especially concerned with this topic for cost-saving reasons (Borges & Rouco, 2017). This shows that e-invoicing is a topic of global importance that currently affects companies all over the world. However, the scope of the present study is limited to email invoicing in Switzerland. The term 'e-invoice' has different interpretations. According to the European Commission (2019), e-invoicing is the exchange of structured electronic data between buyers and suppliers, whereas Koch (2015) specifies that e-invoicing consists of image-based digital invoices (mainly PDFs). In this thesis, the authors concentrate on image-based digital invoices and describe these as 'email invoices'. Moreover, the authors focus on companies in the German-speaking part of Switzerland operating in the telecommunications, insurance and services sectors. Due to the fact that the scope and understanding of 'true cost' may be subjective and may thus differ, the authors define clear parameters for the direct and indirect costs, which are measured in order to answer the research questions.

1.5 Research map

The below research map in figure 1 visualize the content of this Bachelor Thesis:

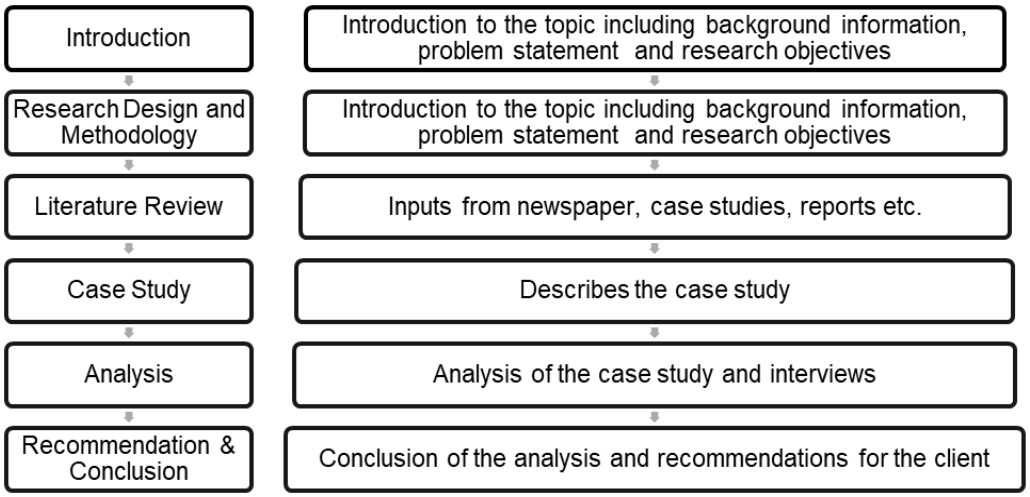

Figure 1: Research Map

2 Research design and methodology

2.1 Strategy

The research questions and objectives, the time available for data collection and the existing sources influenced the research strategy. It is not recommended to rely exclusively on one method but rather to consider combining various types of research in a pragmatic manner (Saunders, Lewis, & Thornhill, 2009). Therefore, for this thesis, the authors combine primary and secondary research. The primary research is based on feedback from surveys and interviews with people operating in the business sectors, whereas the secondary consists of a review and analysis of the literature.

2.2 Approach

To answer the research questions, the authors conducted both desk research and field research. For the desk research, literature on invoicing methods and reports from reliable sources provided in-depth knowledge about the topic. Additionally, this learning enabled the authors to compare scientific information with the outcomes of the primary research.
The primary research consisted of a survey and interviews conducted by the authors. The outcome is used to conduct the quantitative and qualitative analysis.

2.3 Methods

An online survey was conducted to obtain the necessary data for our calculation model. The authors decided to use an online survey as this allowed them to contact several companies and obtain as much data as possible. The authors first contacted the companies by telephone to ensure that the right person would receive the survey and then sent the link to the survey by email. We arranged the 24 questions in our questionnaire into the following categories:

- Introduction
- Questions on awareness about invoicing
- Direct costs
- Indirect costs
- Data privacy

The authors decided to conduct the survey in German to avoid linguistic barriers since the companies are located in the German-speaking part of Switzerland. The questionnaire was distributed by email and through the online business network LinkedIn.

The realized response rate (RRR) is used as a reliable indicator of the response rate:

$$\boldsymbol{approximate\ RRR} = \frac{n - i + x}{N} = \frac{11 - 1 + 0}{86} = 11.62\%$$

n: Net-participation
i: Invalid survey files
x: People who did not finish the survey
N: People who clicked on the link

Our survey had 10 valid participants. The participants spent an average of 8 minutes and 20 seconds completing the survey. The sample was limited to participants working in the insurance, services, telecommunications and administrative sectors. Moreover, 56% of the participants held a position in the finance department of a company and 44% were members of the company's management. This is mainly due to the fact that we distributed our survey only to people who were qualified to answer the questionnaire. We decided to analyse only the results of participants working in these fields because only these participants are qualified to provide detailed answers to our specific questions on different invoicing methods. This decision reduced the number of valid participants from 10 to 8. Furthermore, all participants requested that their answers be anonymous.

2.4 Qualitative interviews

In order to obtain data from different channels, the authors conducted interviews with experts from various business sectors. This enabled us to obtain in-depth practical knowledge about different invoicing methods and their advantages and disadvantages. These interviews were conducted with the following people:

- Alain Hiltgen – Head of Business Security Advice, UBS AG
- Stefan Siegenthaler – Head of Information Technology, Migrol AG
- Stefania Biasella – Head of Accounts Receivable Management and Invoicing, Migrol AG
- Christian Kaufmann – Head of Accounts Receivable Management, Helsana AG

The comments from the experts were used to enhance the calculation model with the necessary values and the rating grid of the various qualitative factors. The interviews were conducted in German and translated into English by the authors. The transcripts of the interviews can be found in the appendix.

2.5 Time schedule and milestones

At the initial meeting with the client and the thesis supervisor, the authors committed to the milestones shown in Figure 2.

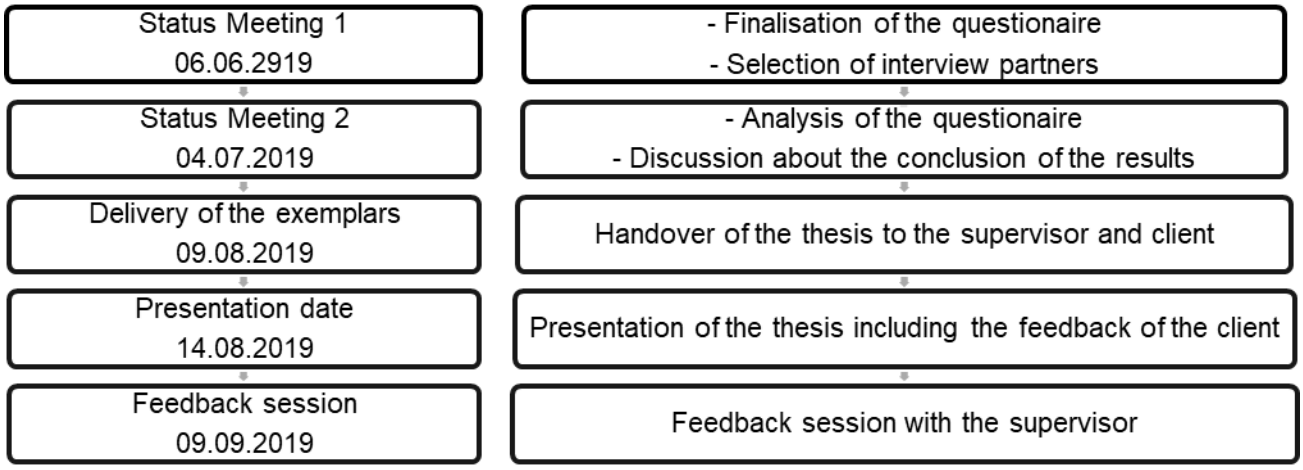

Figure 2: Time schedule and milestones

3 Literature review

This analysis considers three billing methods used in daily business, each of which has different costs. The most important aspects of these methods are described below.

3.1 Paper invoicing

A paper bill is an invoice that is printed, packed in an envelope and sent to the mailbox of the buyer. According to Palmer (2017), 90% of the bills that are issued worldwide are sent manually. Murphy (2019) attributes this to habit. However, printing out paper bills and sending them by post incurs high expenses.

Direct costs: The company must use a lot of tools and material to issue paper bills. The tools and the bills themselves need to be stored for auditing and reporting reasons. In addition, shipping costs are charged for every invoice, and blank paper must be paid for. Furthermore, after a company receives a delivery, the company usually prints their invoice information on paper (Murphy, 2019).

Indirect costs: Staff must be hired to fulfil tasks such as entering the data into the system and sending the bills to customers. These people are responsible for tracking, which can require many hours (Murphy, 2019).

Hidden costs: These are costs that are incurred during the whole procedure. In some cases, invoices need to be resent or workers need to wait for a confirmation. This leads to late fees and penalties, which, in turn, increases the overall hours of the workers (Murphy, 2019).

According to Carter (2015), different factors must be considered when calculating the cost of paper per invoices. The formula presented in Figure 3 is used for cost estimation:

$$\frac{Personal\ cost + late\ fees + lost\ discounts + postage\ cost + storage\ costs}{\#\ of\ invoices\ processed} = cost\ per\ invoice$$

Figure 3: Formula for calculation of the cost per paper invoice (Carter, 2015)

In general, the true cost of a paper bill is between $12 and $30 per bill in the United States. At worst, when all influencing factors are considered, the cost might be $40 per bill (Palmer, 2017). By contrast, in the European market, the cost of an invoice is estimated to be around €11.50 (Frank, 2016). According to Tanner and Rüttimann (2012, p. 55), the total cost of issuing a paper invoice in the Swiss market is CHF 5.99. This figure is divided into CHF 3.92 for processing costs, CHF 1.14 for the cost of materials and CHF 0.93 for postage. According to E. Bamert of UBS (personal communication, June 6, 2019), the significant differences between the different markets are largely due to unstructured working processes in the US-market. For example, invoices may be sent without a payment slip and only with an accompanying letter, which makes invoice processing entirely manual and leads to higher manpower expenses than those incurred in the Swiss market where paper invoices are sent with a payment slip containing a reference number.

3.1.1 Different cost structure in the United States regarding paper invoice

People often have personal reasons for preferring paper invoices to email invoicing, including security precautions and privacy, a preference for human interaction, customer preferences and legal protection (Pitney Bowes, 2015).

The United States government would be able to save up to $450 million if people changed to electronic invoices. However, only 40% of all invoices are processed electronically. Given that the total sum of invoices is 19 million per year, 60% represents a high number of non-electronic invoices are (Caicedo, 2019). Considering the fact that these cost savings could benefit the taxpayer, the adoption of new systems is essential (U.S. Department of the Treasury, 2011).

Companies in the United States have different infrastructures and processes which means that there is no standardized paper invoicing process. This means that they generate more costs than Swiss companies. Postage and physical time spent on the entire process also incur costs. If the distance between the company and the invoice recipient is long, several days may pass until the invoice reaches the recipient (Federal Reserve Bank of Minneapolis, 2016). The Federal Reserve Bank of Minneapolis (2016) reports that some recipients fill out a paper check and send this back to the supplier. This leads to more expenses for the supplier, which has to use more resources to match

information manually and transfer the payment to the bank. Finally, all the data must be archived, which requires space.

3.2 Email invoicing

According to the European Commission (2019), 'electronic invoicing is the exchange of an electronic invoice document between a supplier and a buyer. An electronic invoice (e-invoice) is an invoice that has been issued, transmitted and received in a structured data format which allows for its automatic and electronic processing'. Companies with a large volume of transactions depend on their invoicing procedure and prefer to work with an e-invoicing system (PricewaterhouseCoopers, 2018). In his definition, Koch (2015) includes the fact that e-invoices are image-based digital invoices that are mainly PDFs. According to a study by PricewaterhouseCoopers (2018), e-invoicing has a saving potential of around 70% compared to paper bills.

In addition, email invoicing may be essential for optimizing cash flow. According to Koch (2017), a change in a company's thinking occurs as soon as it considers process automation. Even in a stable economic environment, automation of financial procedures must be improved. The initial implementtation may be difficult, but the benefits will be seen after a period of 0.5–1.5 years. There are three main goals of optimizing corporate finance through email invoicing. These goals are to reduce costs, to increase the elasticity of costs and to increase working capital (Koch, 2017).

Email invoicing is gaining popularity as it has clear cost-reducing advantages. The cost of an email invoice is less than half that of a paper bill. The Deutsche Bank has calculated a potential saving of €260 billion each year in Europe alone (OpenText Corp., 2019). Frank (2016) estimates the cost per invoice at €11.50 in the European market. According to Tanner and Rüttimann (2012, p. 55), the cost of an email invoice in the Swiss market is CHF 1.95. In addition, between CHF 30,000 and CHF 40,000 should be budgeted for initial costs. However, the initial costs are highly dependent on the existing system in the respective company. For example, a change from paper invoicing to email invoicing may cost only CHF 5,000, if the company already has existing processes in place for the invoicing their clients by email and, thus, only has to set up the interface and the connection with their Enterprise-Resource-Planning (ERP) system. Despite its many advantages, including cost savings, email invoicing is also connected with numerous expenses. Errors can occur if the payer makes mistakes during the transaction procedure and, in some cases, the disadvantages can outweigh the benefits (Fernandes & Longbottom, 2019).

3.3 eBill

As the name suggests, eBill is paperless. The issuer sends a paperless invoice to the recipient on the eBill system where the transaction is processed. As eBill is a service provider, the issuer can sign in into the system and send the invoice to the recipient. The recipient can then choose his eBill provider and pay the bill directly (Moneywatch, 2016). According to eBill (2019), SIX provides the service for the platform. The infrastructure for processing is provided by SIX on behalf of the Swiss banks and is offered by numerous companies, including corporations, SMEs and public bodies. One advantage of eBill is that the recipient has full control over the invoice, including the time of payment and whether the invoice should be paid or not and an automatic approval for eBill invoices. Unlike an email invoice, the customer logs into the eBill portal and pays the invoice with a single click, and unlike paper invoicing, eBill is all online. Everything is paperless. The costs of an eBill are lower than a postage stamp and it only takes a few clicks to complete the process. There is no possibility of human error, which is not the case with the other methods (Moneywatch, 2016).

Regarding the costs of eBill for the company, E. Bamert of UBS (personal communication, April 15, 2019) estimates these at between CHF 0.40 and CHF 0.60, depending on the volume of transaction per year and the price negotiated between the company and SIX.

Number of invoices per month	Price per invoice
Up to 999	CHF 0.60
From 1,000	CHF 0.50
From 5,000	CHF 0.40
From 10,000	CHF 0.30
From 50,000	CHF 0.20

Table 1: Prices and conditions (PostFinance, 2018)

PostFinance (2018) does also state that their eBill costs between CHF 0.20 – 0.60 and thus is approximately the same as for the eBill of SIX. As you can see in table 1 it is published that from 50’000 invoices per month the costs are CHF 0.20, 10’000 invoices are CHF 0.30 and for up to 999 invoices the cost are CHF 0.60. In table 2 we can see that in case the bill is unsigned for B2C business and payed by the client’s bank account instead of a PostFinance account, the companies will be issued only with CHF 0.25. There will be no additional transaction fee, as stated in table 1 ‘2. Supplying data to SIX Paynet Ltd’.

Furthermore, PostFinance offers their clients additional services as archiving the eBill invoices digitally or on CD, as you can see in table 2 enumeration 5 and 6.

More	Price
1. Additional charge for forwarding data to third-party systems (roaming)	CHF 0.15 per invoice
2. Supplying data to SIX Paynet Ltd[3]	CHF 0.25 per invoice
3. Obtaining data from SIX Paynet Ltd	CHF 0.60 per invoice
4.Recording invoice recipients	CHF 0.50 per invoice
5. Archiving e-bills in e-bill light	CHF 25 per calendar year
6. Delivery of archive data on archive CD (on request)	CHF 25 per delivery

[3] Applicable to unsigned e-bills for private customers (B2C) paying with their bank accounts. Requires an additional contract with SIX Paynet Ltd. In this case no transaction fee is charged by PostFinance.

Table 2: Prices and conditions (PostFinance, 2018)

4 The true cost calculation model

In line with the research objectives, the authors developed a model for calculating the true costs of paper invoicing, email invoicing and eBill. As the overall goal of the thesis was to find out whether H1 and H2 are true or false, various factors had to be considered when developing the model.

4.1 Paper invoicing costs

It was essential to understand the different costs involved in paper invoicing. According to Warner (2011), these can be divided into direct, indirect and hidden costs.

4.1.1 Direct costs

The direct costs of paper invoices are as follows:

- Material costs, such as paper, ink and cartridges
- Printing costs
- Envelope
- Postal charges
- Reject fees
- Fees for cash payments at the post office counter

4.1.2 Indirect costs

Regarding the indirect costs of paper invoices, the following elements must be considered:

- Customer centre manpower to handle calls and queries regarding invoices
- Accounting and reconciliation manpower
- Undelivered or lost bills (and the personnel and resources required to deal with this)
- The cost of storing the physical invoices (variable or fixed costs)

- Bill query handling time
- The cost of issuing reminders

4.1.3 Hidden costs

The hidden costs of paper invoices need to be considered alongside the losses incurred by failing to implement email invoicing. Warner (2011) identifies the hidden costs as follows:

- Hidden payment transaction fees (which may be fixed or higher than necessary)
- Invoice run or payment processing mistakes

The costs of not implementing email invoicing are as follows:

- The need for a higher than necessary float or bank overdraft
- Possible loss of business due to offering less payment options
- Slower settlement of invoices and potential cash flow problems
- More time-consuming and complex training of staff
- More expensive compliance and audit costs
- Loss of marketing opportunities
- Overall incremental 'Green' benefits/credits

4.2 Email invoicing costs

The literature review shows that email invoicing reduces costs significantly. Nevertheless, there are still costs for companies, which can also be divided into direct, indirect and hidden costs.

4.2.1 Direct costs

- Service provider costs to send emails
- Reject costs
- Fees for cash payments at the post office counter

4.2.2 Indirect costs

- Customer service manpower to handle calls and queries
    - Mainly due to lost invoices, which are delivered to spam folders and thus generate unnecessary reminders for clients
- Accounting and reconciliation manpower
- Bill query handling time
- The cost of storing the electronic invoice (interface and licensing costs for electronic archive systems)
- Cost for issuing reminders

4.2.3 Hidden costs

- The need for a higher than necessary float or bank overdraft
- Depreciation of small debit amounts (up to CHF 10) for which the dunning process is not feasible

The lists above show that some costs occur with both paper invoicing and email invoicing. The authors considered this fact when developing the model for calculating the true costs of email invoicing.

4.3 eBill costs

Our literature review shows that due to eBill's automated process, there are no human errors. This means that the costs incurred by human errors are eliminated. However, there are still costs, which can be divided into direct, indirect and hidden costs:

4.3.1 Direct costs

- Service provider cost per eBill (SIX or PostFinance)

4.3.2 Indirect costs

- The cost of the storing the electronic invoices (interface and licensing costs for electronic archive systems)
- Customer service manpower costs for handling calls and queries
- Cost of issuing reminders

4.3.3 Hidden costs

- The personnel costs for setting up a client in the eBill system

4.4 Development of the true calculation model for the different invoicing methods

Having listed the costs for paper invoicing, email invoicing and the eBill method, the authors then decide which elements had to be investigated with the invoicing parties in order to determine the true costs of the different invoicing methods. First, the authors decided to measure only the direct and indirect costs as it was not possible to quantify the hidden costs given the research conditions. Second, the authors decided to also exclude certain indirect costs identified in Sections 4.1 to 4.3, such as the cost of storing the paper or electronic invoices. A comparison of the different types of costs associated with the different invoicing methods shows that some costs occur with paper invoicing and email invoicing but not with eBill. This fact was considered when developing the calculation model and these absent costs for eBill are expressed as 'No costs'. Finally, the authors concluded that the elements shown in Figure 4 should be examined with the invoicing parties. However, the authors were aware that the calculation model would not include all costs and that there were hidden costs associated with all three methods that could not be investigated.

Direct costs	Indirect costs
• Costs of sending • Cost of materials • Fees for cash payments at the post office counter • Reject fees issued by PostFinance	• Cost of personnel for handling inquiries about invoices • Cost of personnel for processing incoming payments that cannot be reconciled automatically • Cost of issuing reminders

Figure 4: Model for calculating the true cost of email invoicing

In addition, the authors took the below qualitative factors into account and rated them as low, medium or high:

- Sustainability
- Customer connectivity due to process integration
- Customer friendliness
- Probability of invoicing fraud
- Influence on company image

In the authors' view, it is important to include quantitative factors in the model as well as considering the advantages of the different invoicing methods from a qualitative perspective.

5 Calculation of the quantitative factors

In order to rate the different invoicing methods, the authors created a calculation model for the quantitative- and a rating grid for the qualitative factors, which is shown in Figure 8. The calculation model and the rating grid includes the elements identified in Section 4.4. In the following sub-chapters, the cost elements of the true cost calculation model will be described by the authors.

5.1 Estimates

The calculation model contains elements that measure the cost of personnel and the man-hours spent on the various work activities. To quantify these elements, the below parameters had to be included in the model.

5.1.1 Average internal hourly rates

The model had to include the average internal hourly rates to establish the full cost of the employees who perform the various activities. Because salary information is a very sensitive topic, the authors decided to obtain this data through secondary research and not question the companies about their individual salary policy.

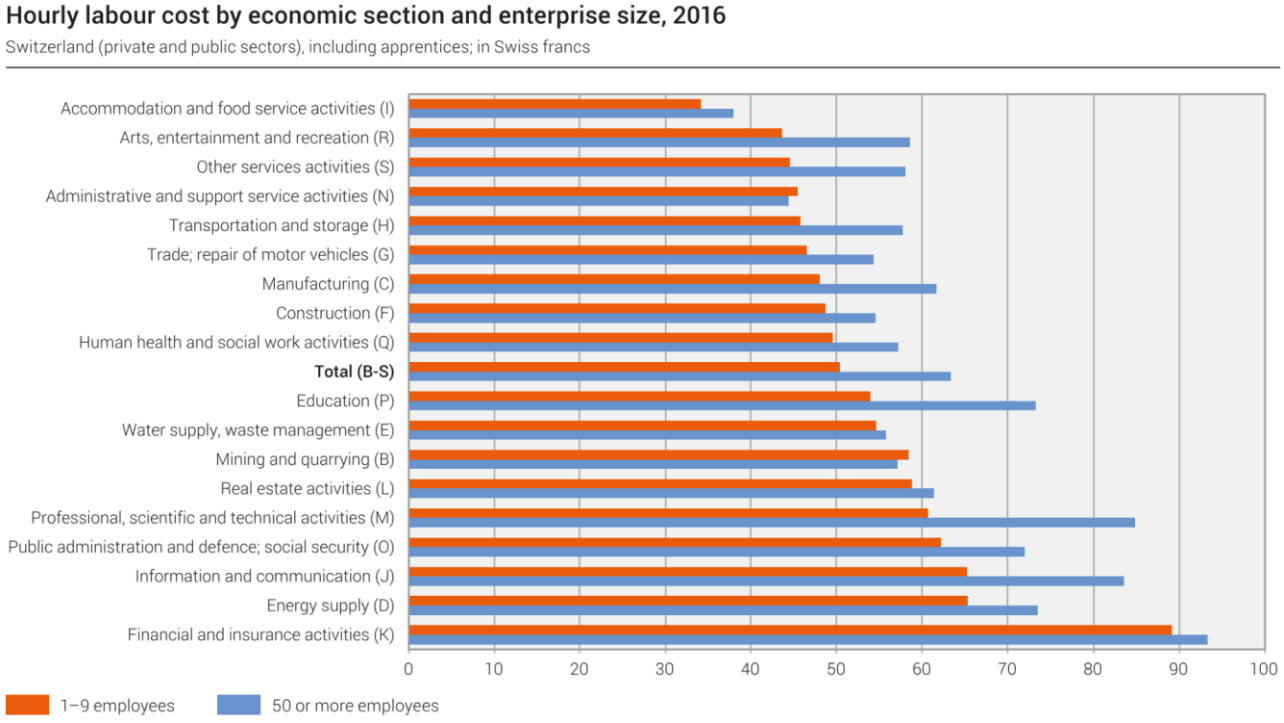

Figure 5: Labour costs statistics (Federal Statistical Office, 2018)

As Figure 5 shows, the Federal Statistical Office (2018) found that average hourly labour costs differ according to economic sector and enterprise size. As the model focusses on financial and insurance activities (K) and the information and communications sectors (J), the authors took

the values for these sectors from Figure 5. Furthermore, the authors determined that a micro-enterprises (MEs) has an average of 1–9 employees and that small and medium-sized enterprises (SMEs) and large enterprises (LEs) have a workforce of more than 50 employees. In addition, the Federal Statistical Office (2018) divides labour costs into two different types. The first is compensation of employees, which includes wages, salaries and the employers' social contribution, as shown in Figure 5. The second type includes vocational training costs and other expenditures paid by the employer. The average total cost for these two sectors was taken, and the following internal cost for employees was calculated:

Micro-enterprises: $\frac{92.09\ CHF\ (K) + 77.95\ CHF\ (J)}{2} = 85.02\ CHF$

Small and medium-sized enterprises: $\frac{92.26\ \ CHF\ (K) + 79.49\ CHF\ (J)}{2} = 85.88\ CHF$

Large enterprises: $\frac{92.09\ CHF\ (K) + 77.95\ CHF\ (J)}{2} = 85.88 CHF$

5.1.2 Number of working hours per week

The Federal Statistics Office (2018) calculates wages data based on a 40-hour week. Therefore, this value was used for the calculation.

5.1.3 Number of working weeks per year

The authors calculated personnel costs over 51 weeks per year. Although employers typically have 4 to 6 weeks holiday per year, this absence has to be paid for by the company. Thus, the whole working year must be considered for the model.

5.2 General information

To quantify the cost per invoice, it is necessary to investigate the number of invoices sent by each company. This is caused by the fact that some of the cost elements which were asked about in the survey were given in Swiss francs. The authors decided to construct a model with three different company sizes:

- Micro-enterprises (MEs)
- Small and medium-sized enterprises (SMEs)
- Large enterprises (LEs)

5.2.1 Number of invoices

The qualitative interviews with the experts and the survey feedback show that it is often not possible to quantify how many invoices are sent by post per year. For instance, insurance firms combine their invoices with their service accounting. In case of Migrol, their external service provider charges a fee

for sending invoices and order confirmations which is billed as an undivided total. Nevertheless, some companies were able to give us estimates of the number of invoices they posted, so we were able to establish realistic numbers of invoices for MEs, SMEs and LEs. We identified the following values for the various company sizes:

- Micro-enterprises: 1,000 invoices per year
- Small and medium-sized enterprises: 200,000 invoices per year
- Large enterprises: 5,000,000 invoices per year

We chose these values in accordance with the qualitative interview with Stefania Biasella, who reported that Migrol, which is a good example of an SME, sends over 200,000 invoices per year. In addition, our survey revealed that one firm in the services sector sends 400 invoices per year, and four large insurance companies send an average of 5 million invoices per year.

5.3 Direct cost information

5.3.1 Fees for cash payments at the post office counter

The fees that PostFinance (2019) charges for cash payments at the post office counter are shown in Table 3. The payment quota at the post office is 13% for paper invoices, 10% for email invoices and 0% for eBill (E. Bamert, UBS, personal communication, July 4, 2019).

Payments up to CHF 50.00.-	CHF –.90
Payments up to CHF 100.-	CHF 1.20
Payments up to CHF 1000.-	CHF 1.75
Payments up to CHF 10 000.-	CHF 2.95

Table 3: Fees for cash payments at the post office counter (PostFinance, 2019)

The authors decided to take CHF 1.375 as an average value for the calculation model as it reflects an invoice amount of CHF 386.00.

5.3.2 Reject fees issued by PostFinance

The reject fee charged by PostFinance (2019, p. 6) for each document that cannot be read by machine is CHF 1.20. The authors estimate that 1% of paper invoices and 5% of email invoices cannot be read by the machine at the post office. Thus, these values are included in the model.

5.4 Indirect costs information

5.4.1 Reminder factor and quota

According to Christian Kaufmann of Helsana (personal communication, July 22, 2019), their reminder quota for paper invoices without client portal is at 14.4%. Helsana does not issue any email invoices but does offer their clients an online portal from where the client can download PDF invoices. As the notification for a new invoice is sent by email, this invoicing method can be compared to the authors investigated email invoicing. As Figure 6 shows, the reminder quota for invoices issued via the portal is 16%, which is higher than that for paper invoices sent by post. For invoices issued via eBill, the average quota is 7.1%.

Total			
	mit Portal	ohne Portal	Total
ESR	16.0%	14.4%	14.2%
LSV	1.0%	1.2%	1.2%
DD	1.3%	1.4%	1.4%
eBill	5.4%	7.5%	7.1%
Total	7.8%	11.6%	11.2%

Figure 6: Reminder quota of Helsana for the different invoicing methods

Stefania Biasella of Migrol stated in her interview that the reminder quota at Migrol was 7.5% in 2017. Nevertheless, the authors decided to use the reminder quota from Helsana as this company invoices their clients each month, whereas Migrol usually only invoices clients once or twice yearly. However, the reminder quota for paper invoicing was lowered slightly to 14% to account for the lower reminder figures of Migrol.

Additionally, the authors took the reminder factor for paper invoices as a benchmark, and, thus, the factor for email invoices was set at 1.11 and for eBill at 0.49.

5.4.2 Costs of sending reminders for companies

Nowadays, it is common practice for companies to pass on reminder costs to their customers. Nevertheless, our written enquiries to insurance companies show that these are only charged on the second reminder. As Table 4 shows, insurance companies charge different fees for second reminders. The authors determined that the reminder costs do reflect the internal cost incurred by companies when they have to issue a reminder.

Given the fact that the first reminder is free of charge for the client, the companies themselves bear the full costs for the first reminder.

Hence, the authors concluded that companies bear an average cost of CHF 20.00 per reminder.

Insurance company A	CHF 30.00
Insurance company B	CHF 20.00
Insurance company C	CHF 15.00
Insurance company D	CHF 20.00 – 40.00, depending on the amount

Table 4: List of the reminder costs for the insurance companies investigated

5.4.3 Inquiries about invoices/handling duration in minutes per inquiry

Only one company could answer this survey question and that company reported a volume of 250 inquiries per week. As that company issues 2.1 million invoices annually, the authors calculated a query rate of 0.006%. Christian Kaufmann of Helsana (personal communication, July 9, 2019) reported that it was difficult to estimate how many inquiries regarding invoices are handled by the company per day. Stefania Biasella of Migrol (personal communication, July 14, 2019) stated that such difficulties are caused by the fact that some companies have not centralized this process within one department and thus cannot estimate how many inquiries are received about invoices from various departments. This means that customers' questions can be addressed without contacting the finance department.

For this reason, the authors decided to make an assumption regarding the amount of inquires based on the personal experience of the author Taulant Gashnjani, who worked as a customer agent at a telecommunications company as well as the examined average of 250 inquiries per week given within the survey. Therefore, we calculated the following figures:

- Micro-enterprises: 3 inquiries per week
- Small and medium-sized enterprises: 30 inquiries per week
- Large enterprises: 500 inquiries per week

The authors are aware that the values vary greatly by company and business model. Thus, this assumption introduces a certain vagueness into the calculation model. Moreover, the inquiries per weeks were divided by the reminder factor on the assumption that fewer reminders result in fewer inquiries from customers.

In addition, the companies were asked how much time they had to invest in handling customer inquiries. Five out of eight companies were able to answer this question. As Figure 7 shows, the handling time varies according to the company size. The value was estimated at 7.5 minutes for MEs, 12.50 minutes for SMEs and 5.00 minutes for LEs.

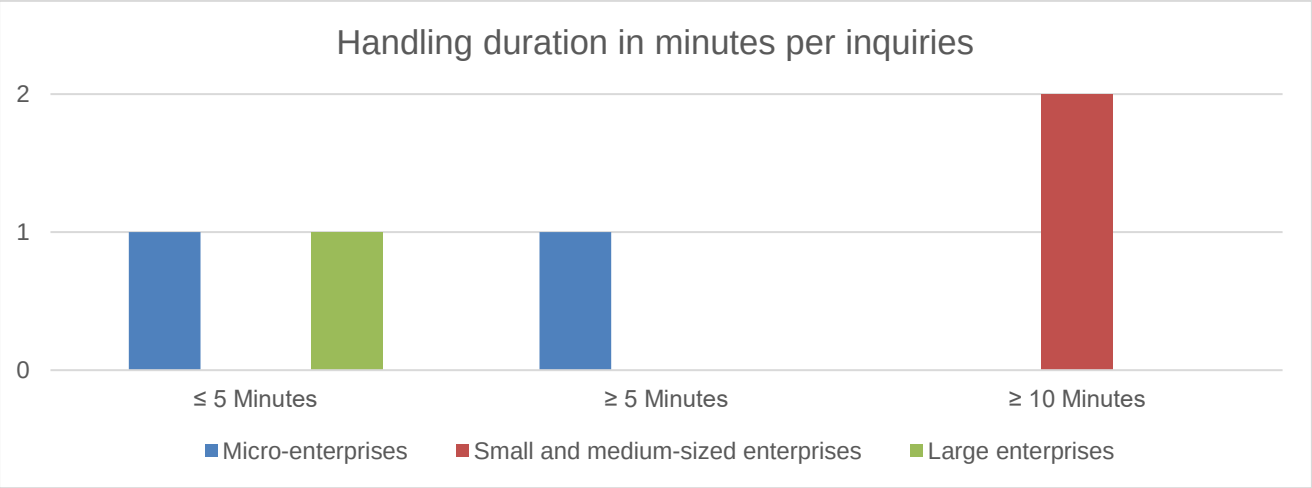

Figure 7: Handling duration in minutes per inquiry

5.4.4 Full-time equivalents for processing incoming payments that cannot be reconciled automatically

Two survey participants answered that they allocated 4.1 and 3.0 full-time equivalents (FTEs), respectively, to handle this activity and thus, 3.5 FTEs are allocated for LEs. The author Thierry Klinkert, who works at Migrol, reported that approximately 0.5 FTEs are allocated to this duty by his firm. However, there are no indications of how many FTEs are allocated to this task by MEs. Thus, the authors estimated that at least 30 minutes per week, which is 0.012 FTEs, is allocated to this task as it is most likely to be executed by a general employee than a specialist, which is the case at MEs. Therefore, it is likely to take longer. Lastly, we divided the number of FTEs assigned to this task equally between paper invoices and email invoices as we estimated the probability of the invoice recipient making a mistake as equally high for each form of invoicing.

5.5 Direct costs calculation

This section describes how the calculations for the different elements in the model were made.

5.5.1 Cost of sending

Paper invoicing: In his qualitative interview, Christian Kaufmann of Helsana stated that the company's invoices are sent by B2 post sending, which costs CHF 0.53. Stefan Siegenthaler of Migrol reported that their sending costs are CHF 0.90. The authors assume that this difference comes from the fact that one company invoices their regular clients monthly, and the other invoices their customers yearly. According to Post CH AG (2019), B2 post sending's require a minimum of 350 items. Thus, this sending method is limited to LEs. For the calculation model, the authors estimated sending costs as CHF 0.53 for LEs, CHF 0.90 for SMEs and CHF 1.00 for MEs.

Email invoicing: In his qualitative interview, Stefan Siegenthaler reported that Migrol could send email invoices via their external provider Avaloq at a cost of CHF 0.45. Nevertheless, the authors are aware that this figure reflects an initial offer by Avaloq and thus downward potential is considered. Finally, the authors decided to set the cost of sending for email invoices for companies of all sizes at zero in accordance with the general assumption that email invoices are free to send.

eBill: Survey participants reported different sending costs for eBill. A company with an invoice volume of 300,000 per year reported a cost of CHF 0.30, whereas a company with an invoice volume of 1,500,000 reported a cost of CHF 0.40. For the calculation model, the authors decided to take the costs from PostFinance presented in Section 3.3, and thus calculated the following sending costs:

- Micro-enterprises: CHF 0.60
- Small and medium-sized enterprises: CHF 0.30
- Large enterprises: CHF 0.20

5.5.2 Cost of materials

The results of the survey show that one company with an invoice volume of 1,800,000 reported a cost for materials of CHF 0.03 per invoice, whereas another firm with a volume of 490,000 invoices per year reported a cost of CHF 0.06. In addition, the interview with Stefan Siegenthaler revealed that at Migrol, the costs are divided between the paper on which the invoice is printed, which costs CHF 0.01, and material costs of the envelope, which is CHF 0.02.

- Micro-enterprises: CHF 0.10
- Small and medium-sized enterprises: CHF 0.06
- Large enterprises: CHF 0.03

5.5.3 Fees for cash payments at the post office counter

The cost for the cash deposit and the respective assumptions are made in Section 5.3.1. Therefore, this cost element is calculated as follows:

$$EI = AC * Q = 1.375 * 0.13 = CHF\ 0.179$$

$$PI = AC * Q = 1.375 * 0.10 = CHF\ 0.138$$

AC: Average costs in CHF

Q: Quota in % of people making cash payments at the post office counter

PI: Cost per paper invoice

EI: Cost per email invoice

5.5.4 Reject fees issued by PostFinance

The costs for the reject fees and the respective assumption are presented in Section 5.3.2. Thus, this cost element is calculated as follows:

$$PI = C * Q = 1.20 * 0.01 = CHF\ 0.01$$
$$EI = C * Q = 1.20 * 0.05 = CHF\ 0.06$$

C: Costs in CHF

Q: Quota in % of invoices that cannot be processed automatically by the post office

PI: Cost per paper invoice

EI: Cost per email invoice

5.6 Indirect costs

This section describes the various indirect costs in the model were calculated.

5.6.1 Cost of personnel for handling inquiries about invoices

Sections 5.1.1, 5,1.2, 5.1.3, 5.2.1 and 5.4.3 describe how the personnel costs for handling inquiries about invoices are estimated. The below formula[1] is used to calculate this cost element for all invoicing methods and all companies, regardless of size.

$$PI = \frac{T * \frac{R}{M} * Q * W}{I} = \frac{5.00 * \frac{85.88}{60} * 192.31 * 51}{5'000'000} = CHF\ 0.01$$

PI: Cost per paper invoice

T: Handling duration in minutes per inquiry

R: Average internal hourly rates (full costs)

M: Minutes

Q: Number of inquiries about invoices per week

W: Number of working weeks per year

I: Number of invoices

[1] This formula reflects the cost per paper invoice for a large enterprise

5.6.2 *Cost of personnel for processing incoming payments that cannot be reconciled automatically*

Sections 5.1.1, 5,1.2, 5.1.3, 5.2.1 and 5.4.3 describe how the cost of personal for handling inquiries about invoices is calculated.
The below formula[2] is used to calculate this cost element for all invoicing methods and for companies of all sizes:

$$PI = \frac{FTE * R * H * W}{I} = \frac{1.75 * 85.88 * 40 * 51}{5'000'000} = CHF\ 0.06$$

PI: Cost per paper invoice
FTEs: Full-time equivalents
R: Average internal hourly rates (full costs)
H: Number of working hours per week
W: Number of working weeks per year
I: Number of invoices

5.6.3 Costs for issuing reminders

Section 5.4.2 describes how the cost of issuing reminders is calculated. The below formula[3] is used to calculate this cost for all invoicing methods and for companies of all sizes:

$$PI = C * Q = 20 * 0.14 = CHF\ 2.80$$

PI: Cost per paper invoice
C: Reminder costs for the companies
Q: Reminder quota

[2] This formula reflects the cost per paper invoice for a large-enterprise
[3] This formula reflects the cost per paper invoice for a large-enterprise

5.6.4 The true cost calculation model

Sections 5.6 to 5.7.3 present the formulas for calculating the various costs. Accordingly, the below formulas were derived to calculate the total true cost of the different invoicing methods. The calculation model is shown in Figure 8, and the results are presented in Chapter 6.

$$\underline{\boldsymbol{Total\ cost\ per\ paper\ invoice} =}$$

$$\boldsymbol{Direct\ costs}: \frac{Costs\ of\ sending + costs\ of\ materials\ + fees\ for\ cash\ payment\ at\ post\ office + reject\ fees}{\#\ of\ invoices\ per\ year}$$

$$+ \boldsymbol{Indirect\ costs}: \frac{Costs\ of\ personnel\ \ for\ processing\ invoices\ and\ handling\ inquiries + costs\ of\ sending\ reminders}{\#\ invoices\ per\ year}$$

$$\underline{\boldsymbol{Total\ cost\ per\ email\ invoice} =}$$

$$\boldsymbol{Direct\ costs}: \frac{Costs\ of\ sending + \sout{costs\ of\ materials}\ + fees\ for\ cash\ payment\ at\ post\ office + reject\ fees}{\#\ of\ invoices\ per\ year}$$

$$+ \boldsymbol{Indirect\ costs}: \frac{Costs\ of\ personnel\ \ for\ processing\ invoices\ and\ handling\ inquiries + costs\ of\ sending\ reminders}{\#\ invoices\ per\ year}$$

$$\underline{\boldsymbol{Total\ cost\ per\ eBill} =}$$

$$\boldsymbol{Direct\ costs}: \frac{Costs\ of\ sending + \sout{costs\ of\ materials\ + fees\ for\ cash\ payment\ at\ post\ office + reject\ fees}}{\#\ of\ invoices\ per\ year}$$

$$+ \boldsymbol{Indirect\ costs}: \frac{Costs\ of\ personnel\ \ for\ \sout{processing\ invoices\ and}\ handling\ inquiries + costs\ of\ sending\ reminders}{\#\ invoices\ per\ year}$$

Calculation model for the true costs of paper, email and eBill invoicing for micro-enterprise (ME), small and medium-sized enterprise (SME) and large enterprise (LE)									
Chapter	**Estimates**	**Value**	**Scenario**						
5.1.1	Average internal hourly rates (full costs)	CHF / Hours	ME	85.02					
			SME	85.88					
			LE	85.88					
5.1.2	Number of working hours per week	Hours	All	40					
5.1.3	Number of working weeks per year	Weeks	All	51					
5.2	**General information**	**Value**	**Scenario**	**Paper invoicing**		**Email invoicing**		**eBill**	
				Total per year		**Total per year**		**Total per year**	
5.2.1	Number of invoices	Quantity/Year	ME	1'000		1'000		1'000	
			SME	200'000		200'000		200'000	
			LE	5'000'000		5'000'000		5'000'000	
5.3	**Direct costs information**	**Value**	**Scenario**						
5.3.1	Fees for cash payments at the post office counter	Costs in CHF - Quota in %	All	1.375	13%	1.375	10%	No costs	
5.3.2	Reject fees issued by diePost	Costs in CHF - Quota in %	All	1.20	1%	1.20	5%		
5.4	**Indirect costs information**	**Value**	**Scenario**						
5.4.1	Reminder factor and quota	Factor / Quota in %	ME	1.00	14%	1.11	16%	0.49	7.10%
			SME	1.00	14%	1.11	16%	0.49	7.10%
			LE	1.00	14%	1.11	16%	0.49	7.10%
5.4.2	Costs of sending reminders for companies	Costs in CHF per Invoice	ME	20					
			SME	20					
			LE	20					
5.4.3	Inquiries about invoices / handling duration in minutes per inquiry	Quantity/Week - Minutes/Inquiry	ME	1.15	7.50 Min	1.28	7.50 Min	0.57	7.50 Min
			SME	11.54	12.50 Min	12.81	12.50 Min	5.65	12.50 Min
			LE	192.31	5.00 Min	213.46	5.00 Min	94.23	5.00 Min
5.4.4	Full-time equivalents for processing incoming payments that cannot be reconciled automatically	Full-time Equivalent (FTE)	ME	0.006		0.006		No costs	
			SME	0.250		0.250			
			LE	1.750		1.750			
5.5	**Direct costs calculation**	**Value**	**Scenario**	**Total per year**	**per invoice**	**Total per year**	**per invoice**	**Total per year**	**per invoice**
5.5.1	Costs of sending	Costs in CHF	ME	1'000	1.00	0	0.00	600	0.60
			SME	180'000	0.90	0	0.00	60'000	0.30
			LE	800'000	0.52	0	0.00	1'000'000	0.20
5.5.2	Costs of materials	Costs in CHF	ME	100	0.10	No costs			
			SME	12'000	0.06				
			LE	150'000	0.03				
5.5.3	Fees for cash payments at the post office counter	Costs in CHF	ME	179	0.179	138	0.138	No costs	
			SME	35'750	0.179	27'500	0.138		
			LE	893'750	0.179	687'500	0.138		
5.5.4	Reject fees issued by PostFinance	Costs in CHF	ME	12	0.01	60	0.06	No costs	
			SME	2'400	0.01	12'000	0.06		
			LE	60'000	0.01	300'000	0.06		
7.1	The "true" direct costs	Costs in CHF	ME	1'291	1.29	198	0.20	600	0.60
			SME	230'150	1.15	39'500	0.20	60'000	0.30
			LE	1'903'750	0.74	987'500	0.20	1'000'000	0.20
5.6	**Indirect costs calculation**	**Value**	**Scenario**	**Total per year**	**per invoice**	**Total per year**	**per invoice**	**Total per year**	**per invoice**
5.6.1	Costs of personnel for handling inquiries about invoices	Costs in CHF	ME	625	0.63	694	0.69	306	0.31
			SME	10'529	0.05	11'687	0.06	5'159	0.03
			LE	70'190	0.01	77'911	0.02	34'393	0.01
5.6.2	Costs of personnel for processing incoming payments that cannot be reconciled automatically	Costs in CHF	ME	1'041	1.04	1'041	1.04	No costs	
			SME	43'799	0.22	43'799	0.22		
			LE	306'592	0.06	306'592	0.06		
5.6.3	Costs of sending reminders	Costs in CHF	ME	2'800	2.80	3'200	3.20	1'420	1.42
			SME	560'000	2.80	640'000	3.20	284'000	1.42
			LE	14'000'000	2.80	16'000'000	3.20	7'100'000	1.42
7.2	The "true" indirect costs	Costs in CHF	ME	4'466	4.47	4'935	4.93	1'726	1.73
			SME	614'327	3.07	695'485	3.48	289'159	1.45
			LE	14'376'782	2.88	16'384'503	3.28	7'134'393	1.43
7	**Total quantitative factors**	**Value**	**Scenario**	**Total per year**	**per invoice**	**Total per year**	**per invoice**	**Total per year**	**per invoice**
5.6.4 / 7.6	The true costs per invoicing method	Costs in CHF	ME	5'757	5.76	5'132	5.13	2'326	2.33
			SME	844'477	4.22	734'985	3.67	349'159	1.75
			LE	16'280'532	3.62	17'372'003	3.47	8'134'393	1.63
8	**Qualitative factors**		**Scenario**	**Rating**		**Rating**		**Rating**	
8.1	Sustainability		All	Low		Medium		High	
8.2	Customer connectivity due to process integration		All	Low		Medium		High	
8.3	Customer friendliness		All	High		Medium		High	
8.4	Probability of invoice fraud		All	Medium		High		Low	
8.5	Influence on company image		All	Low		Medium		High	

Figure 8: Calculation model for the true costs of paper, email and eBill invoices for micro-enterprises (ME), small and medium-sized enterprises (SME) and large enterprises (LE)

6 Results: Companies' awareness of invoicing

Questions 6 to 13 of the survey asked participants about their awareness of the costs of the different elements of the invoicing process. The results showed different levels of awareness, which are explained in detail for each invoicing method. Figure 9 shows the levels of awareness regarding the different elements of invoicing covered in questions 9 to 13. Two out of eight companies reported PostFinance charges them reject fees. However, in response to a later survey question, only one company could identify the actual costs. Furthermore, five out of eight companies reported being aware of the number of inquiries about invoices handled by them. However, only one company could provide an actual number for this in response to question 18. Moreover, five out of eight of the companies were aware how many full-time equivalents they had allocated to processing incoming payments that cannot be reconciled automatically. However, only two of the eight companies could identify the actual percentage. Lastly, regarding awareness of cases of fraud, 50% of the companies surveyed knew that there were no fraud cases at their company. Additionally, the two heads of accounts receivable that were interviewed, Stefania Biasella of Migrol and Christian Kaufmann of Helsana stated that there were no known fraud cases at their companies.

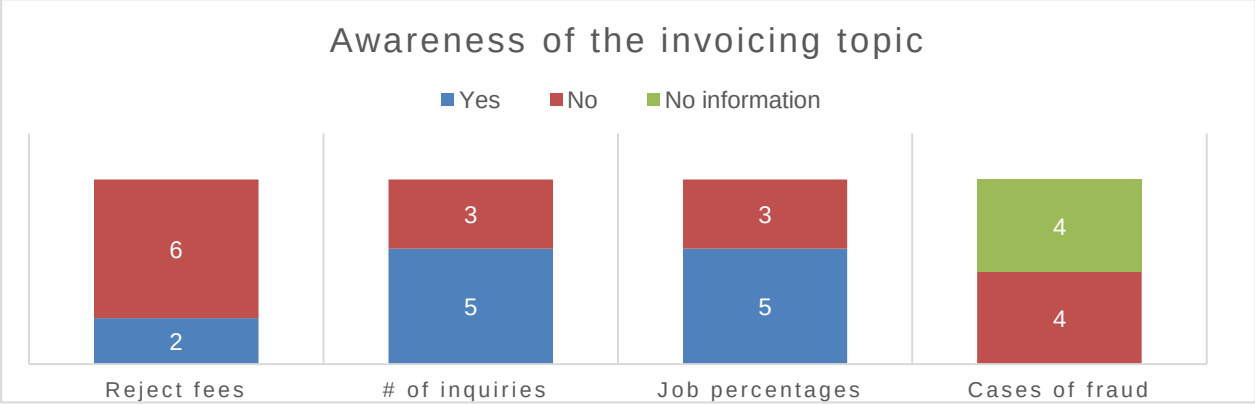

Figure 9: Awareness of the invoicing process

6.1 Paper invoicing

Questions 6 to 8 asked participants whether they were aware of the number of invoices issued by their company and the costs of the different invoicing methods. As Figure 10 shows, the companies were generally aware of the subject of paper invoices; 75% of the companies knew their total number of paper invoices sent to clients and could state the actual number. In addition, 50% of the companies knew their sending costs, but only two of them stated the real costs. Lastly, five out of eight companies reported knowing the cost of materials, and four companies could state these costs.

In his interview, Stefan Siegenthaler of Migrol told the authors that because some firms outsource their invoicing process to external providers, they can quantify their costs relatively well.

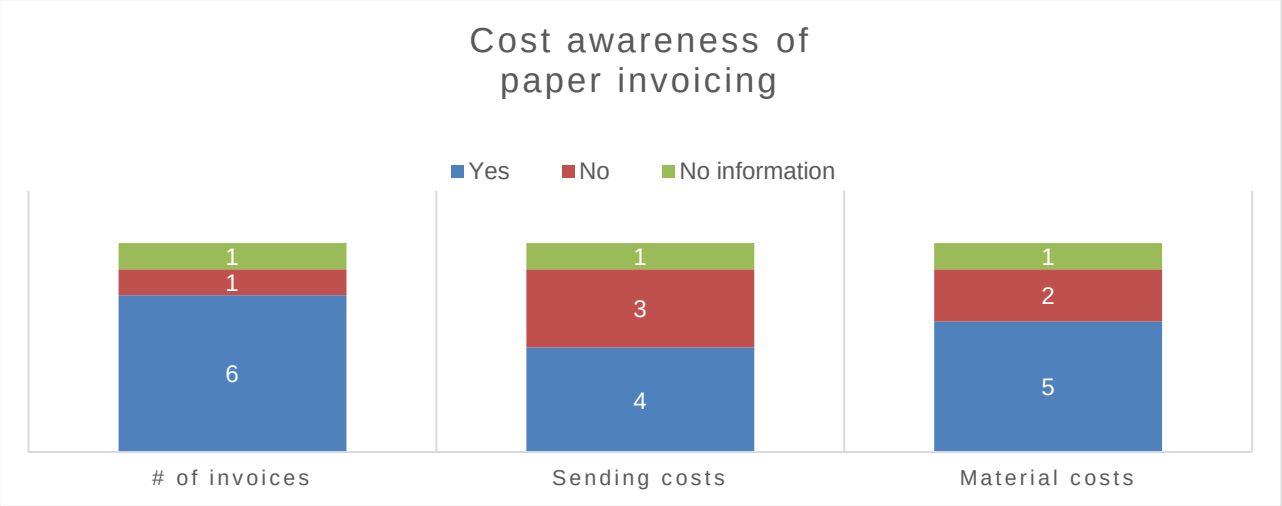

Figure 10: Survey results showing the awareness among participants of the cost of paper invoicing

6.2 Email invoicing

Questions 6 to 7 asked participants whether they were aware of the number of email invoices issued by their company and the cost of sending an email invoice. Figure 11 shows that 50% of the firms reported knowing the number of email invoices sent by their company, but only 12.5% knew the cost of sending email invoices. None of the companies was able to provide exact information about the cost of their email invoicing process.

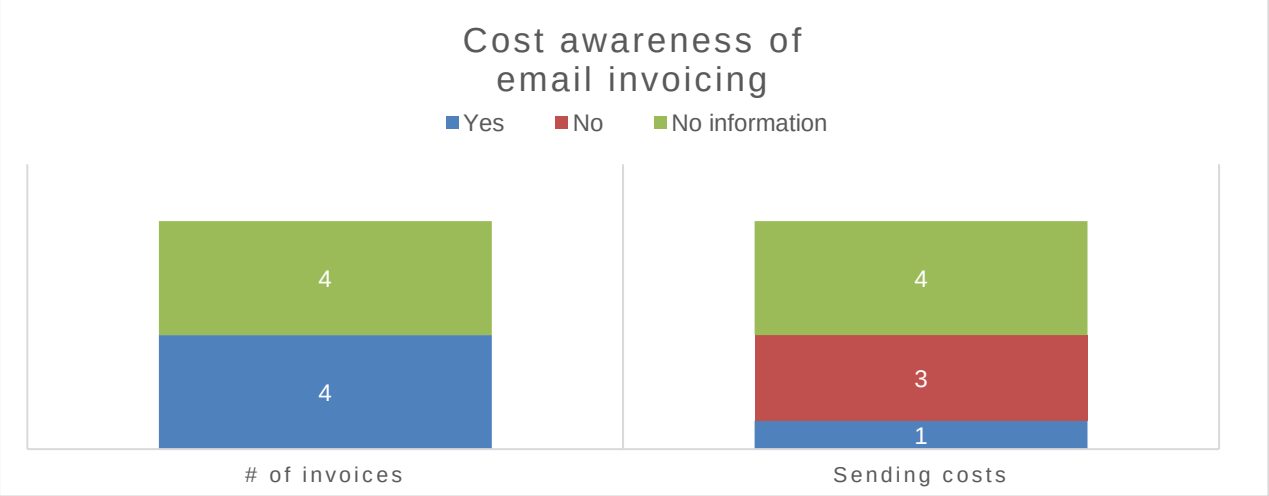

Figure 11: Survey results showing awareness of email invoicing costs

6.3 eBill

Questions 6 to 7 asked participants whether they were aware of the number of eBill invoices issued by their company and the cost of sending an eBill. Figure 12 shows that 50% of firms said that they knew the number of invoices sent via the eBill platform, and all of these could identify the effective numbers. However, only three companies stated that they were aware of the costs and could identify them in the survey. The interviews and the literature review also revealed that the cost of sending an eBill is based partly on the number of invoices sent and is partly negotiated with the company. Thus, the authors concluded that not every company was willing to share this information.

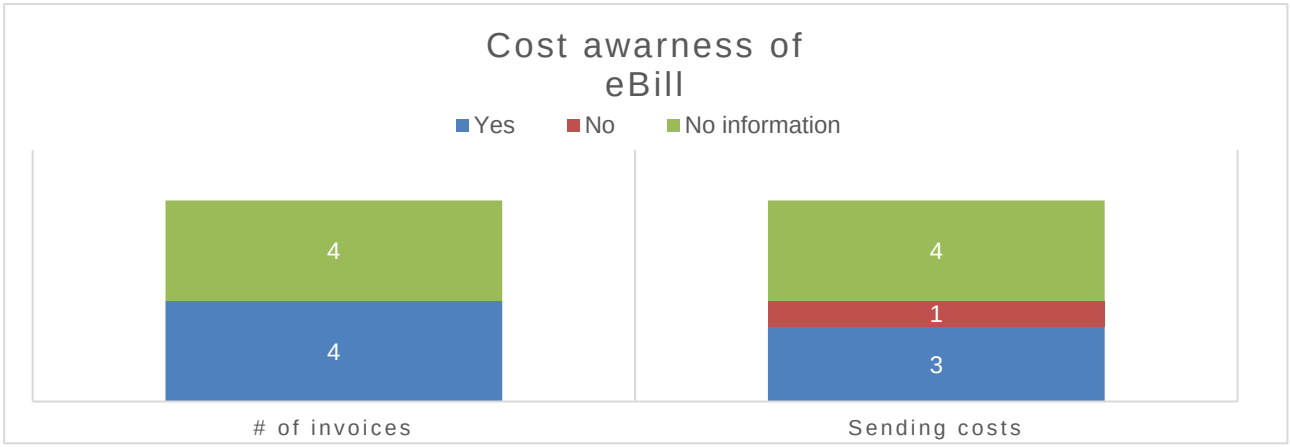

Figure 12: Survey results showing awareness of eBill costs

7 Results: Quantitative factors

7.1 The true direct costs of invoicing

In accordance with the calculations for the various cost elements, the true direct costs of all invoicing methods are presented in Figure 13 for MEs, SMEs and LEs.

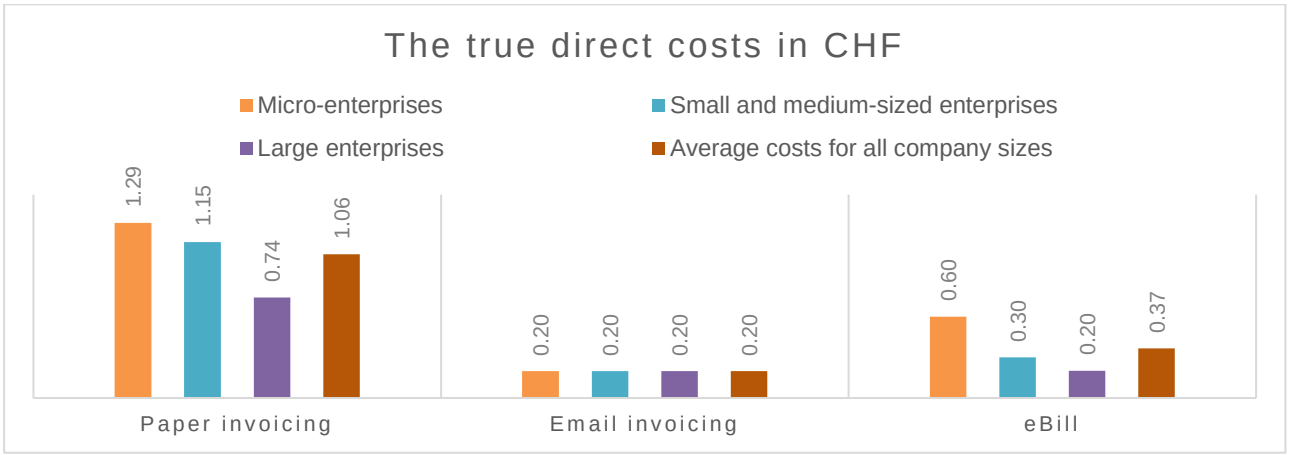

Figure 13: The true direct costs of invoicing

7.2 The true indirect costs of invoicing

In line with the calculations for all cost elements, the true indirect costs of the various invoicing methods for MEs, SMEs and LEs are shown in Figure 14.

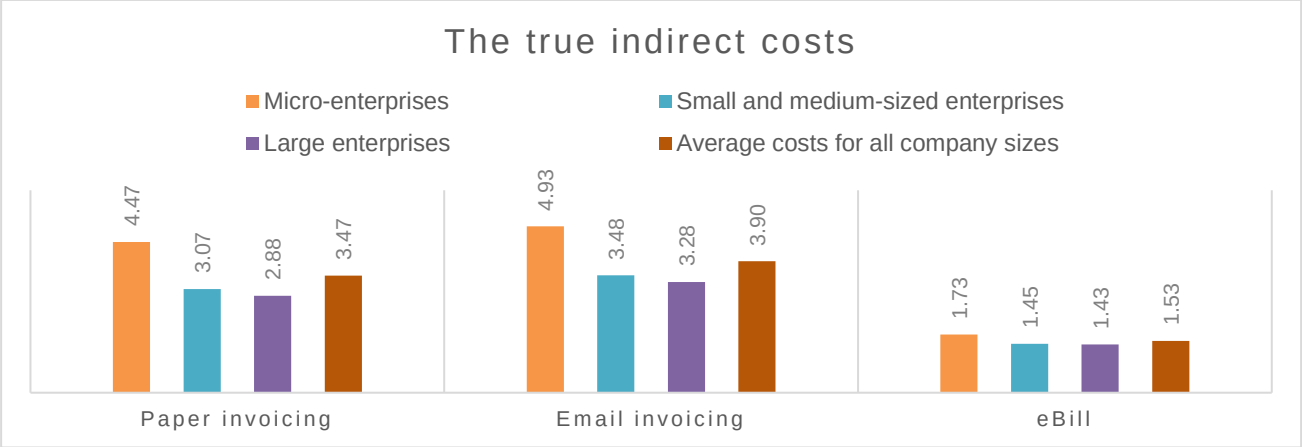

Figure 14: The true indirect costs of invoicing

7.3 RQ 1.0: The true costs of paper invoicing

The results presented in Figure 15 show that the total cost for a paper invoice is between CHF 5.76 and CHF 3.62 depending on the size of the company. The results reflect the principle of the economics of scale, according to which LEs can scale their costs due to the higher number of invoices they issue. This fact is especially apparent when comparing the cost of sending a paper invoice for an LE, which is CHF 0.52, with the cost for an ME, which is CHF 1.00. Additionally, there is a difference of CHF 1.59 between an LE and an ME for indirect costs. This is mostly due to personnel costs as an LE is more likely to employ specialists who are more efficient, whereas, in an ME, tasks are more likely to be performed by a general employee, who is likely to be less inefficient and to need more time to complete the tasks.

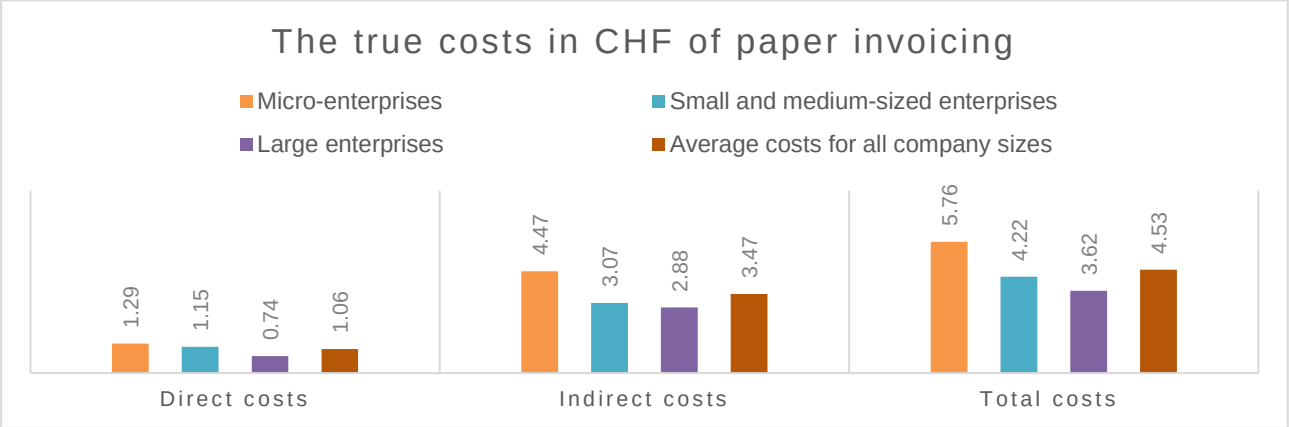

Figure 15: The true costs of paper invoicing

7.4 RQ 1.1: The true costs of email invoicing

The results of the calculation model presented in Figure 16 show that the true cost of an email invoice is between CHF 5.13 and 3.62 depending on the size of the company. However, it is notable that the direct costs are CHF 0.20 for all company categories. This is due to the fact that recipients print their email invoices and pay them at the post office. Moreover, no sending costs or material costs were considered for email as it is electronic. We can conclude that the indirect cost for firms is between CHF 4.93 and CHF 3.28. This is generally higher than the indirect costs for a paper invoice, because firms need to issue more reminders for email invoices. Additionally, we can observe the same effect of the economics of scale as was observed for the paper invoicing method.

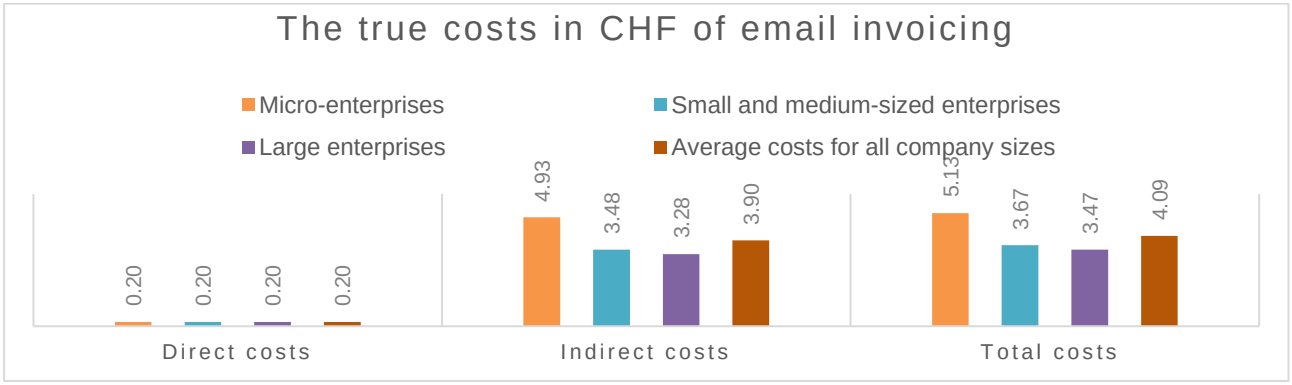

Figure 16: The true costs of email invoicing

7.5 RQ 1.2: The true costs of eBill

Figure 17 shows that eBill costs firms between CHF 2.33 and CHF 1.63 per invoice. It is important to understand that the direct costs are solely sending costs as no other costs are incurred for eBill invoicing. Furthermore, the indirect costs for eBill are between CHF 1.73 and CHF 1.43. It is vital to point out that the indirect costs are significantly lower, because there are no costs generated for the processing of incoming payments that cannot be reconciled automatically and the cost of issuing reminders is 50% lower than for paper invoicing.

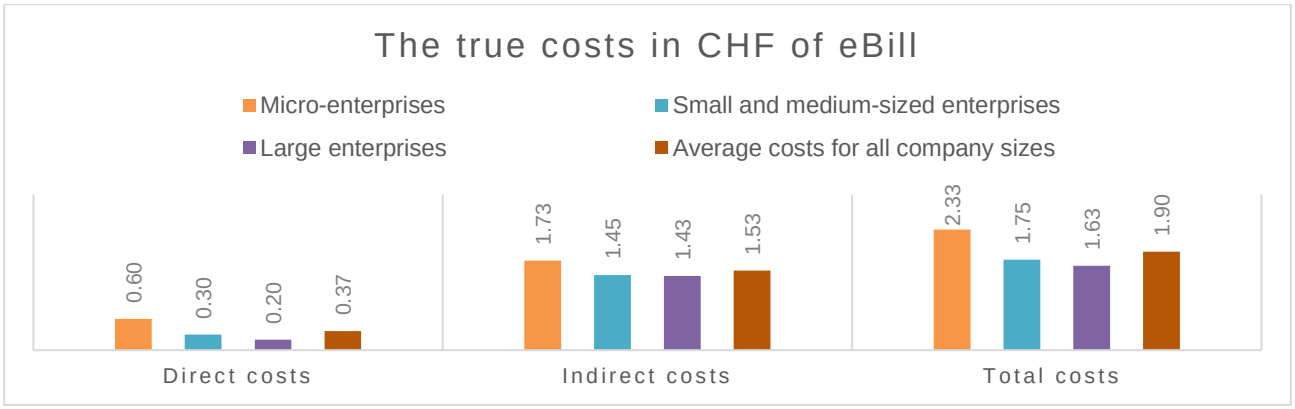

Figure 17: The true costs of eBill

7.6 H1 and H2: The true costs of email invoicing

The results of our calculation model presented in Figure 8 show that paper invoicing is the most expensive method for MEs, SMEs and LEs. Figure 18 shows that, for all firms, the average total cost is CHF 4.53 for a paper invoice, CHF 4.09 for an email invoice and CHF 1.90 for eBill. Therefore, the authors can conclude that hypothesis 1 is true and that an email invoice costs CHF 0.44 less than paper invoicing. In addition, the average cost of an email invoice is CHF 2.19 more than eBill. Thus, hypothesis 2 is also true.

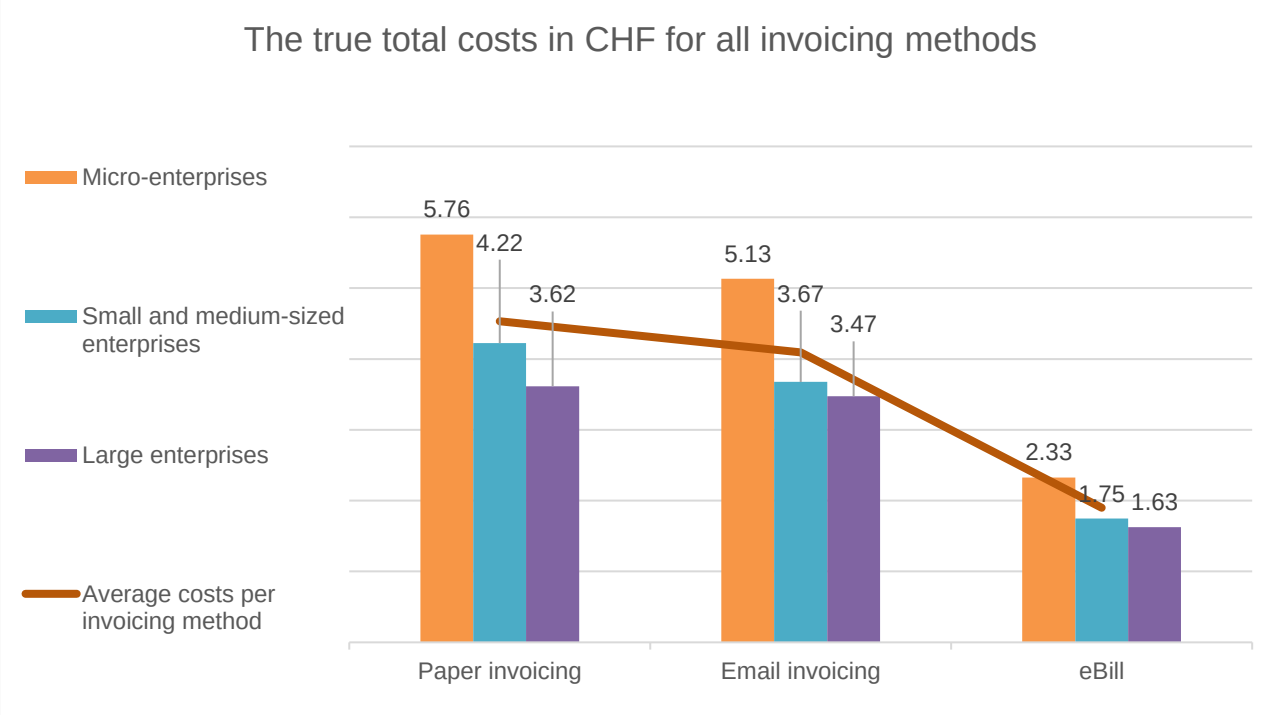

Figure 18: The true total costs for all invoicing methods

Figure 18 shows that the difference in cost between an ME and an LE is CHF 2.14 for a paper invoice and CHF 1.66 for an email invoice. However, this difference decreases significantly to CHF 0.70 for eBill. This is because the difference between an ME and an LE is only CHF 0.40 for sending costs and CHF 0.30 for the cost of personnel to handle inquiries. As the cost of processing incoming payments does not have to be considered for eBill, an ME saves CHF 0.98 by using the eBill method compared to the other methods.

7.7 RQ 2.0: Advantages of switching from paper invoicing to email invoicing or eBill

Figure 19 reveals that the saving per invoice of switching from paper invoicing to email invoicing is on average CHF 0.44 for all company sizes. However, the saving for an LE is only CHF 0.15. It is more economical for all firms to switch from paper invoicing to eBill as the saving is on average CHF 2.63. This switch would especially benefit MEs, as they would save CHF 3.43.

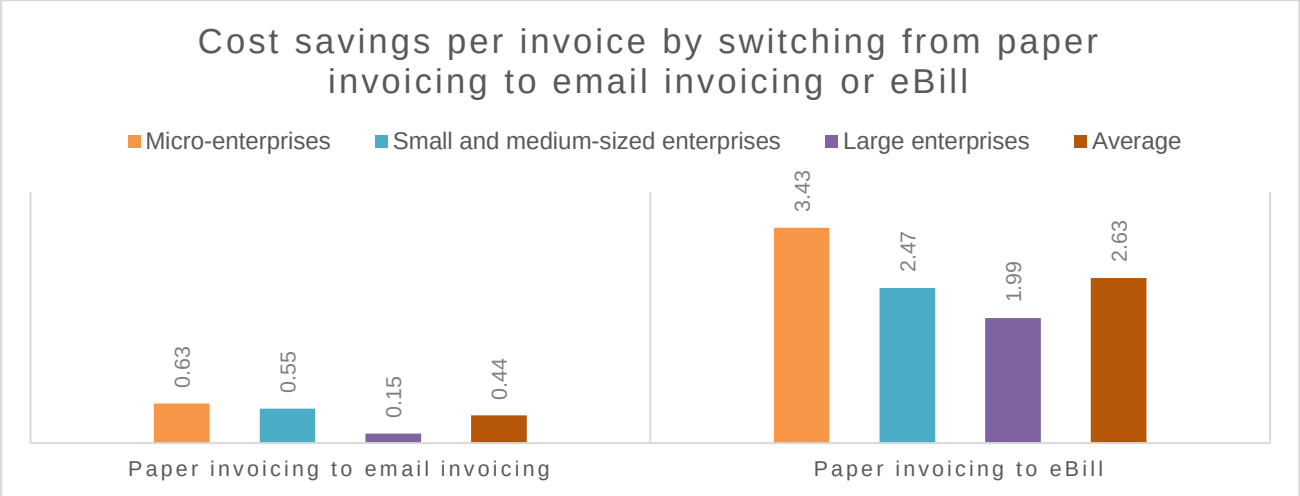

Figure 19: Cost savings per invoice in CHF of switching from paper invoicing to email invoicing or eBill

8 Results: Qualitative factors

8.1 Sustainability

Sustainability is a widely discussed topic nowadays and must be taken seriously. Over the last number of years, the European Union has seen constant socio-economic improvement, which has led to wealth and peace. People in the European Union feel safe and live longer. This positive development also has a downside. More and more people live on the planet and use more resources. If consumption continues at the high level it is at in Europe now, humankind will need at least two planet Earths (European Commission, 2016).

For this reason, countries need to consider the environment, especially natural resources. It is essential not to waste these resources and to use them as efficiently as possible (European Commission, 2017). How raw materials are used is relevant to invoicing methods.

8.1.1 Paper invoicing

According to the Environmental Paper Network (2018, pp. 4-6), worldwide paper consumption is not sustainable as the yearly demand is approximately 400 million tonnes. More than 50% of the paper produced is consumed by the packaging industry. These numbers reveal the urgent need for

efficiency in this industry. In addition, between 2010 and 2015, the yearly loss of forest areas was 3.3 million hectares.

For some uses, such as medical reports and legal documents, paper is generally preferred by most people (Environmental Paper Network, 2018, p. 13). Swisscom (2019) published a climate footprint report showing that that it takes 0.20 kWh of energy to produce one piece of paper. Swisscom uses 83% more energy to produce a paper invoice than an electronic invoice.

The production of paper takes a long time and includes several chemical processes. It takes 130 litres of water and 7.5 kg of wood to produce 500 pieces of copy paper, which weighs around 2.3 kg (Pro Regenwald, 2019). As companies also need envelopes and postage stamps to send paper invoices, the consumption of paper increases (Swiss National Bank, 2016, p. 11). One paper invoice emits 100g of CO2, which is a significant burden on the environment. Another factor that has a negative effect on sustainability is the shipment and consumption of the infrastructure that generates paper invoices (IO market, 2018).

Having analysed the facts collected for this research, the authors rate the sustainability of paper invoicing as follows:

AUTHORS RATING: ***LOW***

8.1.2 Email invoicing

Applications, emails and other digital equipment use energy. It should not be forgotten that the more companies focus on digitalization, the higher the consumption of digital equipment, which requires water and other raw materials to produce (European Commission, 2016). The change from paper invoicing to the digital format makes sense and saves on certain resources. However, the question of how significant the savings are remains to be answered, as the digital format uses different resources (Environmental Paper Network, 2018, p. 15). The laptops, smartphones and computers, on which email invoices are retrieved contain substances that are damaging to the environment and humans. Those devices need power to operate, and electrical waste is not clearly documented by many countries (Baldé, Forti, Gray, Kuehr, & Stegmann, 2017, p. 8).

According to the interview with Christian Kaufman, Helsana's customers receive the notification of their invoices from their portal by email but do not automatically pay online. They print the invoice on paper and pay at the post office counter. According to the Federation of Finnish Financial Services (2010, p. 12), 'an electronic invoice is on average four times more environmentally friendly than a paper invoice. It saves a considerable amount of work time, which reduces emissions and improves overall productivity'.

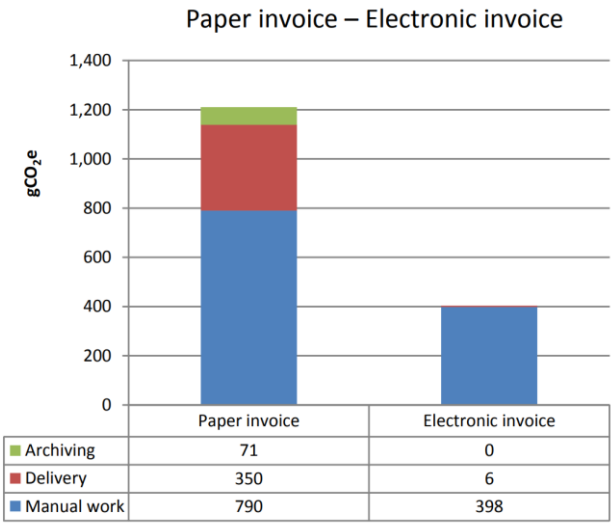

Figure 20: Carbon footprint of different invoicing procedures (Federation of Finnish Financial Services, 2010)

Figure 20 shows the impact of the different invoicing methods on the environment. Electronic invoicing has clear advantages in all three divisions, which are archiving, delivery and manual work.

In light of the facts collected for this research, the authors rate the sustainability of email invoices as follows:

AUTHORS RATING: ***MEDIUM***

8.1.3 eBill

There is little to no information available on the negative impacts of eBill on the environment. The authors assume that eBill consumes a similar or lower amount of resources as email invoices. In addition, eBill is completely paperless (PostFinance, 2019).
Given the facts collected for this research, the authors rate the sustainability of eBill invoices as follows:

AUTHORS RATING: ***HIGH***

8.2 Customer connectivity due to process integration

There are many digital opportunities for attracting and raising the awareness of customers. Customer connectivity refers to the creation of a sustainable relationship between a brand and its customers (Munich Digital Institute, 2017).

8.2.1 Paper invoicing

Paper invoicing does not involve any integrated processes. The invoicing party prepares the invoices and sends them to the recipients. The recipient has the choice of whether to pay the invoice at the post office counter or online. This means no process integration and little customer connectivity. The authors rank the customer connectivity of paper invoicing as follows:

AUTHORS RATING: ***LOW***

8.2.2 Email invoicing

Companies plan to digitalise invoicing systems to increase customer connectivity and enhance efficiency. By offering new user experiences, trust and utility, companies seek new customers (Berger, 2017). Email invoicing does not require paper or physical storage. It does not involve wasting raw materials, except when the recipient prints out the invoice, pays it and archives it physically or completes the payment at the post office counter. Another benefit of changing from paper to digitalised invoicing is that the customer can pay the invoice online within minutes. The process changes involved in switching from paper to digitalized invoicing lead the authors to rank the customer connectivity of email invoices as follows:

AUTHORS RATING: ***MEDIUM***

8.2.3 eBill

Of all payment methods, eBill is the simplest (Berger, 2017). With eBill, there is no longer any need for paper. The process is simple as every invoice is sent directly to an e-banking or mobile banking account, and the payment is completed with a few clicks (UBS, 2019). The customer can register as an official eBill customer and needs to register with each invoicing party. All these characteristics of eBill are essential for the customer journey (Lenz, 2018). Due to its integration of processes, the authors rank the customer connectivity of eBill as follows:

AUTHORS RATING: ***HIGH***

8.3 Customer friendliness

8.3.1 Paper invoicing

According to the Interview with Christian Kaufmann of Helsana, many clients prefer paper invoices as they are accustomed to them. The demand for paper invoicing is high in Switzerland, where 80% of online transactions are handled using paper invoices (Berger, 2017, p. 3). Therefore, offering

paper invoices as a service is important for companies in Switzerland. Although paper invoices cost more, people in Switzerland still prefer them.
The authors rank the customer friendliness of paper invoicing as follows:

AUTHORS RATING: ***HIGH***

8.3.2 Email invoicing

Christian Kaufmann of Helsana noted that email invoicing is also a security issue as a significant amount of data is transferred in the process. Alain Hiltgen, an expert in cyber security at UBS, confirmed that data is stored in an exposed environment that is vulnerable to fraud. Stefania Biasella of Migrol argues that offering email invoices would cause the number of reminders to increase, because clients nowadays receive so many emails from different parties that Migrol's email invoices may not be seen. This research confirms that email invoices can cause difficulties for both the invoicing party and the recipient. Therefore, the authors rate the customer friendliness of email invoices as follows:

AUTHORS RATING: ***LOW***

8.3.3 eBill

Among the three invoicing methods examined in this thesis, eBill is the most secure and easiest invoicing method. The simplicity of eBill is noted by Stefania Biasella of Migrol, and Stefan Siegenthaler of Migrol made the following remark:

> 'In case you are billing invoices on a monthly basis, it makes sense to switch to eBill, because the platform offers the clients a convenient way to pay their invoices. In my view as a CIO, eBill is the invoicing method, which companies should prefer, if in case they fit the frame conditions'.

However, Siegenthaler also noted that for companies who send invoices annually, eBill does not make sense as an invoicing method.

According to Christian Kaufmann of Helsana, many of his company's clients use paper invoices. Therefore, it would not be customer friendly if the company were to force its clients to use eBill. Companies that plan to switch to eBill should consider providing paper invoices in addition to eBill to offer clients greater choice and flexibility. Due to the above, the authors rate the customer friendliness of eBill as follows:

AUTHORS RATING: ***HIGH***

8.4 Probability of invoice fraud

8.4.1 Defining cyber security

The digital revolution affects almost every company. To stay competitive, companies need to adapt to new technologies and keep track of the latest developments (Deloitte, 2015). Given the current constant economic development, companies must pay attention to cyber security (European Union Agency for Cybersecurity, 2018). According to Cisco (2019), cyber security can be described as the process of protecting systems, networks and programs. The main threats are virtual attacks on IT infrastructure. Finding and implementing the right cybersecurity measures can be challenging for enterprises. This challenge arises from the fact that by 2020, there will be around 24 billion devices in circulation that are connected to the internet. If these devices were distributed evenly across the world's population, each person would possess four devices (Business Insider Intelligence, 2016). There are three factors that must be considered when implementing cyber security measures (IT Governance Ltd, 2019):

People: The enterprise should offer specific training and seminars for employees. The employees must understand the relevance of cyber threats and the appropriate actions to take. Cyber security specialists should stay up to date and notify managers when changes occur.

Processes: Companies should ensure that roles and responsibilities within processes are clear and know how to react in a given situation. As cyber security is constantly changing, companies need to adjust their processes to these changes.

Technology: Next to the goals and strategy of the companies, technology also plays an important part in the development of companies. Therefore, companies should use appropriate antivirus software to protect itself from outside cyber-attacks.

Only a small proportion of companies with an internet presence are well protected. The topic of cyber security is known within companies and by senior management; however, a large percentage of managers do not take on the responsibility to take action. Email is an attractive way for fraudsters to obtain valuable data. Eight out of ten cyber fraudsters try to attack companies and private persons through email (Betschon, 2019). One way to obtain personal data is to send forged invoices. Fraudsters use the email address and the email layout of well-known companies to obtain data from private persons (MELANI, 2017). In 2018, there was a well-known case whereby fraudsters manipulated invoices and sent them to recipients with a Swisscom layout and similar email to Swisscom's. Experts call this approach phishing (Wietlisbach, 2018).

8.4.2 Cybercrime

Many companies are in the process of digitalization and this presents optimal opportunities for cyber-attacks. There is almost no company in existence that has not been affected by cyber-attacks. In 2018, ransomware attacks became common in Switzerland. These attacks led companies to unknowingly download encryption software and lock themselves out of their own systems. Then, the scammer contacts the company and promises to unlock the software if the party concerned pays a ransom. The ransom has to be paid in bitcoin, so the perpetrator remains anonymous. Ransomware attacks caused financial damages in 2017 in different international organisations. For instance, companies such as Beiersdorf, Merck and Mondelez were totally crippled from them (Müller, 2019). Mondelez lost over 100 million dollars as a result of a cyber-attack during which all their data was locked. The next crisis was a court case involving Zurich, the official insurance company of Mondelez, which was not willing to cover the costs of the damages. (Panda Security, 2019). The security of virtual networks is crucial for companies as damage from cyber-attacks is forecast to have cost around $2.1 trillion by the end of 2019. For smaller companies in the U.S, such cyber-attacks have led to the collapse of the company (Büttner, 2016).

According to a study by PricewaterhouseCoopers (2019), the total global damage caused by cyber criminality will rise drastically until 2021 as it is the most lucrative type of criminality. Investigators need specific expertise to be able to operate in cyber space. The structure of an attack is difficult to identify, as perpetrators may be individuals, organized criminals or even government-subsidised cyber attackers. In addition, investigation proceedings can be difficult as legal guidelines are not always clear.

8.4.3 MELANI

Switzerland has an official reporting and analysis office for information security, which is called MELANI (Melde- und Analysestelle Informationssicherung [Reporting and Analysis Centre for Information Assurance]). The main tasks of MELANI are to prevent risks, to detect risks early and address them and to provide support to operators of critical infrastructures in times of crisis. SMEs receive current information about risks and the appropriate tools with which to handle them. Another service that MELANI offers is a facility for companies to report incidents. National institutions belong to the so-called ‘closed customer service’. These institutions have sensitive national infrastructures. MELANI tries to reduce net and system interruptions in general (Federal IT Steering Unit, 2017).

The examples above reflect the fact that cyber security plays an essential role in today’s economic world. Companies of all sizes need to be forearmed against cyber threats in order to survive.

8.4.4 Risks with paper invoicing

Although there are electronical alternatives, people still prefer paper invoices. Some do not see any advantages of changing to email invoicing, and others are afraid of fraud occurring during electronic transactions (Susswein, 2019). People's fears regarding fraud are justified, but fraud can also occur with paper invoices: Fraudsters can access invoices and manipulate the bill, so the recipient does not recognize any difference. The invoice still looks the same, but the account numbers are different (Office of the Attorney General, 2016). In Belgium, for example, perpetrators gained access to companies' mailboxes, adjusted the account numbers on invoices and sent them to customers. Once the amount is paid, the company will have difficulties getting it back (Hope, 2016). According to BBC (2019), frauds can be very costly. Scams such as billing frauds can incur costs of up to £93 million. However, paper invoicing is less risky as the fraudster needs direct access to the mailbox of the recipient. The fraudster has to be in the region to manipulate the invoice. Therefore, the fraudster does not have the flexibility that email invoices offer. For these reasons, we rank the probability of invoice fraud for paper invoicing as follows:

AUTHORS RATING: ***MEDIUM***

8.4.5 Risks with email invoicing

Invoicing fraud can occur in different ways, but all methods have one goal: receiving the money of the recipient of the invoice. The banking details are manipulated by the fraudsters, so the recipient does not notice the fraud. Another approach that fraudsters adopt to obtain money is to masquerade as suppliers and inform a company's customers that they are changing their bank details. The fraud victim automatically pays all invoices to the new account without identifying the fraud (ING Belgium, 2018). According to the interview with Alain Hiltgen, the head of business security advice at UBS, email invoicing is insecure, because emails containing personal data are stored in an exposed area. This makes it easier for perpetrators to access data as the invoices are exposed on the internet during delivery and storage. During the payment period of 30 days, the fraudsters can adjust the data for their benefit. Unlike the situation with paper invoices, there is no physical intervention for such fraud. The perpetrator does not need to be at the location where the fraud takes place. For these reasons, we rank the probability of invoice fraud for email invoicing as follows:

AUTHORS RATING: ***HIGH***

8.4.6 Risks with eBill

According to SIX (2018), invoicing methods are connected to culture, which means that different factors influence people's invoicing preferences. When deciding on invoicing methods, care should be taken with regard to payment security and customers' trust must be earned. With eBill, there is no longer any need for paper invoices. All invoices are settled electronically. Another advantage of eBill is that the customer does not need to type in a reference number, an amount or any other information (SIX, 2018). SIX (2018) claims that

> 'eBill is the safest way to receive digital invoices. All of the billers participating in the system have been vetted. Furthermore, eBill is as secure and reliable as online banking itself, making it more dependable than sending invoices and payment orders by mail'.

Because of these facts, the authors rate the probability of invoice fraud for eBill as follows:

AUTHORS RATING: ***LOW***

8.5 Influence on company image

8.5.1 Paper invoicing

As discussed in the previous section, people in Switzerland still prefer paper invoices. Christian Kaufmann of Helsana stated that people appreciate paper invoicing as a service. For most people in Switzerland, opting for paper invoicing is a habit. There is neither a good or bad influence on the company image.

AUTHORS RATING: ***LOW***

8.5.2 Email invoicing

When a company provides email invoices, the ecological image of the company improves as their carbon footprint decreases (Ernst & Young, 2018, p. 4). For people who care about the environment and natural resources, email invoicing is a better alternative to paper invoicing. Companies who offer email invoices as an alternative profit from an improved company image due to a reduced carbon footprint.

AUTHORS RATING: ***MEDIUM***

8.5.3 eBill

The processing and registration processes of eBill are simple. Christian Kaufmann of Helsana stated in his interview that people can pay an eBill invoice with only a few clicks. In addition, the research on invoice fraud shows that eBill is the most secure invoicing method. Therefore, the company image will improve the most in comparison to the other invoicing methods.

AUTHORS RATING: ***HIGH***

8.6 RQ 2.1: Is it more economical to combine paper invoicing and eBill than to use email invoicing?

An SME that plans to implement a new invoicing method should switch to eBill instead of email invoicing. Table 5 shows that the costs savings per invoice are CHF 2.47, whereas the cost savings of switching to email invoicing are only CHF 0.55. In addition, the qualitative factor analysis shows that eBill is in all respects better than email invoicing. Nonetheless, Christian Kaufman of Helsana noted that paper invoices are still required by certain customer groups. Although offering only eBill would be more economical, this approach would mean ignoring the needs of customers. Therefore, the authors conclude that it is better for companies to provide paper invoicing as well as the eBill method for their customers.

Description	**Paper invoicing**	**Email invoicing**	**eBill**
Quantitative factors			
Direct costs	CHF 1.15	CHF 0.20	CHF 0.30
Indirect costs	CHF 3.07	CHF 3.48	CHF 1.45
Total costs	CHF 4.22	CHF 3.67	CHF 1.75
Qualitative factors			
Sustainability	Low	Medium	High
Customer connectivity due to process integration	Low	Medium	High
Customer friendliness	High	Medium	High
Probability of invoice fraud	Medium	High	Low
Influence on company image	Low	Medium	High

Table 5: Overview of the quantitative and qualitative factors affecting invoicing choices for an SME

9 Conclusions, discussion, limitations and recommendations

9.1 Conclusion

This research aims to identify the true costs of email invoicing, paper invoicing and eBill. The analysis confirms that email invoicing is not free of charge and that it incurs particularly high indirect costs for the invoice issuer.

The results show that eBill is the most cost-effective method, which may be of interest to companies that are planning to implement eBill as a payment method. From the perspective of the invoice recipient, eBill is also beneficial.

All the research hypotheses were confirmed. Furthermore, the average cost difference between paper invoicing and email invoicing was identified as CHF 0.44. Therefore, the authors advised their client to use the calculation model for future implementation decisions. Personal interviews and an online survey supported the research and provided the authors with relevant figures.

9.2 Discussion

According to the literature review, the average cost of a paper invoice is CHF 5.99, of which CHF 3.92 is for the company's process costs, CHF 1.14 of for the cost of materials and CHF 0.93 is for postage. Our research finds different figures: The total average cost of a paper invoice is found to be CHF 4.53, of which CHF 0.81 is the cost of sending the invoice and 0.06 is the cost of materials. Other direct costs as reject fees and cash payment fees costs in average CHF 0.095. Indirect costs are found to be CHF 3.47. The difference between the findings from the literature and the authors research show that the costs of a paper invoice will be always different and relies heavily on the researcher's calculation and assumptions as well as the respective companies which provide them with the needed data. The literature review showed the average cost of an email invoice to be CHF 1.95. Surprisingly, our research revealed an average cost of CHF 4.09 for an email invoice. This significant difference may be a result of the authors considered in the literature review taking different factors into account. In case of eBill, the authors noted in the quantitative interviews that the experts are totally convinced about this invoicing method and do recommend it to invoice issuers as well as invoice recipients. However, the literature review has shown that for this topic, there are not as many articles or reports published as for instance paper invoices. Therefore, we observed this knowledge gap between experts and laypersons.

9.3 Limitations of the research

After conducting our survey and analysing the results, we were faced with several limitations. First, we noticed that some of the participants did not answer all the questions properly, so we were faced

with the problem that we could not fill all the parts of our calculation model with the survey results. Hence, the authors decided to conduct interviews with experts who were able to provide some information about the missing elements. Nonetheless, the authors had to make certain assumptions about some certain cost elements within the model. These were discussed with the client at the status meeting.

Lastly, our results are based on the responses of only eight companies. However, only people who were informed about the topic of invoicing, because they work in a finance department or were a member of a company board completed the survey.

9.4 Recommendations

9.4.1 For the invoice recipient

For many people in Switzerland, receiving invoices on paper is a habit. Eighty per cent of all e-commerce transactions are handled with paper invoices. Customers appreciate the fact that a company offers paper invoices as well as electronic invoicing.

The authors recommend that invoice recipients critically reflect on paper invoicing with the goal of minimizing their use. The process of settling paper invoices is long for the invoice recipient and is old-fashioned. Another factor that needs to be considered is the potential for fraud as this invoicing method is not protected. Fraudsters can access the mailboxes of recipients and manipulate payment details.

The most important argument against paper invoices relates to their impact on the environment. The fact that the demand for paper is around 400 million tonnes and that producing 500 pieces of copy paper uses 130 litres of water and 7.5 kg of wood, is a serious concern. This means that the carbon emissions are extremely high for the production of paper.

These figures should encourage people to think about paper consumption. Improvements can be made by avoiding or minimizing paper invoices. Customers would not have to deal with paperwork and filing. In some cases, customers pay their paper invoices at the post office counter, which takes more time than paying email invoices or eBill.

Email invoicing is an alternative paper invoicing. People want to have access to their invoices from different devices. All the payment details are included in an email invoice, which is then sent in an exposed environment where fraudsters can access the invoice. Research shows that the cost of fraud is high, and the money may not be retrievable, because the fraudsters withdraw the money immediately.

Due to the fact that the invoice is stored in the customer’s inbox, there is always a risk that the customer will forget to pay the invoice and will receive a reminder, which is often sent in paper form.

Ten per cent of email recipients print out invoices and pay them at the post office counter. This brings the email invoice to the same initial position as the paper invoice. The authors recommend making payments via e-banking instead of at the post office counter.

However, the sustainability of email invoicing is questionable as it requires electronic devices, which are connected to power. Companies need to build up an infrastructure and maintain it. There is no solid proof of the e-waste caused by email invoices.

The most efficient and simplest invoicing method is eBill. If the customer has the necessary infrastructure and internet access, eBill is the best solution. Everything is handled online, and there is no need for paper. Alain Hiltgen, a cyber security expert, confirms that eBill is the most secure invoicing method. In Switzerland, progress has been slow for eBill as people still prefer paper invoices or do not trust this new invoicing method.

Companies should invest more time in making people aware of the advantages of eBill through workshops and at specific events.

9.4.2 For the invoice issuer

Paper invoicing is the most expensive invoicing method for companies of all sizes. For LEs with a high volume of invoices, the true cost of a paper invoice is CHF 3.62, whereas the true cost of a paper invoice for an ME with a lower yearly volume of invoices is CHF 5.76. Moreover, research shows that companies who only offer one invoicing method limit their business. It should not be forgotten that invoice reminders are also sent by paper and cost CHF 20. As more people are aware of environmental pollution, offering electronical alternatives to paper invoicing will improve a company's image, because it is environmentally sustainable. Therefore, minimizing paper waste and encouraging customers to switch to paperless methods such as eBill, can help companies reduce costs. If the infrastructure of both the invoice issuer and the invoice recipient is present, companies of all sizes can profit from cost savings of at least 50%.

Email invoicing has obvious advantages over paper invoicing, because it does not incur costs for sending and materials. The difference in the true costs per invoice between email invoicing and paper invoicing is minimal with CHF 0.44. In addition to that, the reminder quota for email invoices is 2% higher than for paper invoices due to the fact that many customers are flooded with emails and overlook their invoices. This results in higher volumes of inquiries about email invoices. Some customers prefer to print out an invoice and pay it a post office counter. The reject fees are higher for email invoices than for paper invoices as the readability of printed email invoices is inadequate. Reject fees can be reduced, if companies switch to eBill. Moreover, email invoicing is the most insecure invoicing method.

Based on the research, eBill is the invoicing method that incurs the lowest costs for a company. The true costs for an LE are CHF 1.63 per invoice, whereas MEs incur costs of CHF 2.33 per invoice. In addition, eBill scores highest for every qualitative factor considered in this study.

In summary, the authors recommend companies of all sizes to implement eBill due to the advantages revealed by this research, including more efficient payment processing.

9.4.3 For the client

The authors cannot claim that eBill is suitable for every company. Therefore, a structured analysis of the costs is essential for a company planning to switch to from paper invoicing to email invoicing or eBill. The calculation model should provide the companies with a better overview of their current costs. The authors recommend that the client uses the calculation model developed here or a similar one. Furthermore, the client should state the advantages and disadvantages of the invoicing methods, so customers do not need to gather this information themselves. The best solution would be for the client to create a section on their website where the subject is clearly discussed and facts and figures are provided.

The results should show the cost benefits for a company planning to implement email invoicing or eBill. Every company has its own needs, so eBill is not necessary the best solution for everyone.

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