



THE CLIMATE IMPACT OF ACCOUNTING AUTOMATION

Study Report

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Study report: The climate impact of accounting automation

1 Objectives

The Federation of Finnish Financial Services made a commitment to sustainable development together with the Association of Finnish Accounting Firms and the accountancy firm Leppävaaran Laskenta. The objective of the commitment is to improve the efficiency of accounting systems. By keeping an eye on several indicators, this study aimed to find out how much labour and carbon footprint could be reduced if financial administration had more structured digital data and electronic systems at its use.

The project is assisted by the sustainability consultancy Natural Interest Ltd. The commitment is a three-year project, and its progress is monitored and measured by several indicators.

The financial sector has spearheaded the promotion and development of electronic services. Not looking to leave the forefront, the sector wants to co-operate in the promotion and implementation of the national information society strategy together with the government and the other sectors and industries. Co-operative effort is the only way to advance the use of electronic services throughout entire service chains. Accounting can be improved by making use of the structured data in e-invoices, account statements and card receipts. Success of this commitment will mean more efficient financial management processes, up-to-date reporting data from companies, and, ultimately, higher Finnish competitiveness.

The Association of Finnish Accounting Firms is an association of authorised accountancy and consultancy firms. Main mission of the association is to promote and develop the sector's operations. The association has done long-term work to improve digital accounting systems and the accounting and financial administration of SMEs. The association wants to make more user-friendly systems available in the sector, so that all participants can utilise structured data and modern technology, thus reaching more extensive use of information.

The authorised accountancy firm Leppävaaran Laskenta participated in the project by enabling the on-site observation of its accounting workflows. Leppävaaran Laskenta is actively involved in the development of best practices in the sector to improve the success of Finnish companies and entrepreneurs. Active financial governance together with the latest and most efficient technological innovations are key factors in creating new success stories.

2 Usage potential of structured data

Businesses have in general switched to e-invoices, which enable the structured presentation of data. At the recipient's end, structured data, in turn, enables the automated processing and approval of invoices. It can also enable the automatic use of VAT information in monthly reporting.

The machine-readable account report that companies use is also in structured format, which means that the entering of bank transactions can be automated. Traditional paper account statements require that transactions are manually posted. Although card payments are processed electronically, the receipt data from card payments is, for now, only available in paper or PDF formats, which means that the information has to be processed manually. There are no statistics on company card purchases, but government agencies alone manually process 600,000 purchase receipts each year. If the receipt data from card

payments can be converted to an electronic and structured format, and their processing automated, the effects on the daily work at companies and on the economy will be massive. Having standardised structure in card information would also allow the development of entirely new applications in both business and consumer sectors.

In 2014, banks processed a total of 83.4 million e-invoices. If accounting firms have software that can utilise structured data, the processing of machine readable account reports and e-invoices can be directly automated. Automated data processing will reduce the amount of working hours considerably as well as lessen the climate impact.

Structured e-invoicing and e-accounting also enable the automation of buyer and seller business processes. In addition, automation makes real-time cash-flow forecasts possible. Supervisory reporting can also be automated with structured data. Furthermore, e-invoice data can be utilised in the prevention of grey economy. The Finnish construction sector, for example, has specified a common identifier for all new contracts. This identifier is included in the e-invoice, and the contractor can thus allocate all contract prices for each site and report them to the tax administration. These reports can also be automated on the basis of e-invoice data.

3 Structured data and the objectives of the commitment

The study sought to demonstrate how much financial administration can save on expenses if, for example, monthly VAT reports are created automatically on the basis of existing accounting information. It also analysed the cost savings that switching to structured data in card payment receipts can bring when the data is used to automatically update VAT information in accounting systems.

One of the objectives of the commitment is to define a set of indicators to measure the climate impact of accounting, so that companies can, in the future, independently assess the carbon footprint of their financial administration.

The Finnish Information Society Development Centre TIEKE and the Association of Finnish Accounting Firms have prepared a transaction file called TALTIO. The TALTIO transaction file (XBRL Global Ledger) specifies the data required in accounting entries, and can thus be utilised to automate accounting. The purpose of accounting automation is to make accounting easier for small companies. In the future, the use of TALTIO and a common Reporting Taxonomy would also enable the e-reporting based filing and payment of advance tax.

When all of the relevant data is in a structured format, all the reports that companies or authorities may need can be single-sourced from a data warehouse (see figure 1).

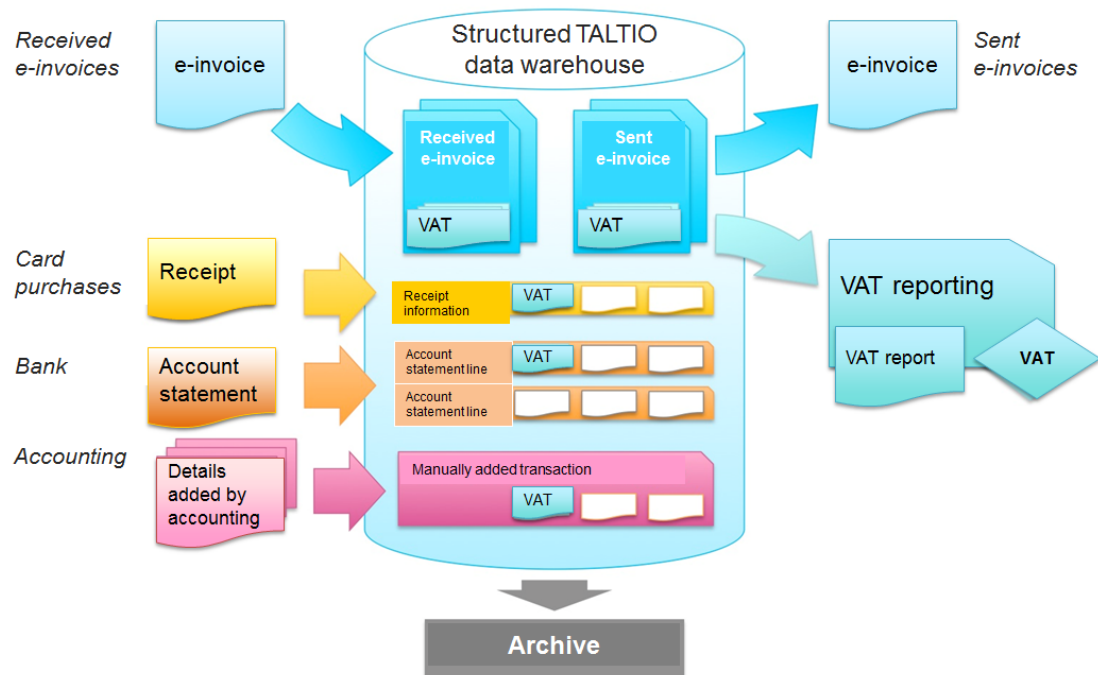


Figure 1. Structured TALTIO data warehouse – representation of reform objective. (Source: Association of Finnish Accounting Firms.)

4 Overview of accounting at an SME

The Association of Finnish Accounting Firms estimates that 90% of small reporting entities have outsourced their accounting to an accounting firm. On average, an accounting firm with 5 to 9 employees handles the accounting of 145 businesses. According to a recent survey, about half of medium-size enterprises (over 50 persons) have outsourced their accounting processes. (Source: Association of Finnish Accounting Firms and BDO)

The challenges are largely caused by the tools and software that are used in accounting and reporting. The lack of real-time structured data results in delays in accounting information and reports, which can be even 1½ months old. Support needed in the daily management of an enterprise cannot be provided on the basis of such data.

Producing accounting data on current systems still requires lots of manual work. Because there is no common standard, the transfer of data from one system to another is very challenging. The manual processing of information siphons the time available to customer consultation and advising.

Moreover, basic accounting processes yield only limited information, because it is based only on the statutory information requirements.

5 How the study was conducted

To calculate the carbon footprint, the study defined two example companies and examined their accounting from the perspective of transaction volumes and working hours. The numbers of transactions used in the calculation were picked from typical accounting firm clients.

Accounting event/task	Number of events	
	One person enterprise	Small enterprise
Incoming invoices	15	50
Outgoing invoices	10	100
Cash and card payment receipts	10	50
Manual posting	2	10
Posting of account statements	1	1
Bank's service fee transactions	1	1
Archived documents	39	212
VAT report producing time	10 minutes	10 minutes

The carbon footprint of companies' accounting is formed of two parts: work done at the company (e.g. handling of invoices and receipts) and work done at the accounting firm.

The study calculated two scenarios for both companies. In the first scenario, all work was carried out manually both at the company and the accounting firm. At the accounting firm, the tasks were based on data from paper invoices, receipts and account statements. At the example company, outgoing invoices were made on paper, and incoming invoices were received by mail. In the second scenario, the processing of structured data in e-invoices and receipts had been automated as extensively as possible.

These calculation scenarios were applied to assess the size difference between the carbon footprints of the present, paper-based accounting and modern, automated accounting. The scenarios were modelled in cooperation with Leppävaaran Laskenta.

6 Calculation of carbon footprint

Carbon footprint is currently the most popular measure of climate impact. It indicates the total amount of greenhouse gas emissions caused by a product or an activity, and is used on all levels from entire governments and organisations to individual persons and products.

The carbon footprint is therefore not used to measure the entire environmental impact in all its aspects – but what makes it so useful is the ease with which it can be interpreted and compared. To rein in climate change, we need indicators and gauges that are equal to everyone. The carbon footprint enables this: its results can be replicated anywhere and anytime using the same initial data.

When the climate impact of activities is in a comparable format, it is easy to identify relevant sources of emissions. The accessibility of the results also makes it easier to target resources more efficiently and thereby cut back on emissions and costs.

6.1 Calculation boundaries

The improvement of accounting efficiency, referred to in the commitment, means both reducing the used working hours and paper documents and increasing the use of electronic systems. All of these have effects on the climate. The purpose of the commitment is to greatly improve the quality and efficiency of accounting processes, while also drastically reducing their environmental load.

The calculations included the processing and archiving of digital and paper documents at both example companies and the accounting firm.

The carbon footprint calculation measured the following areas:

- Example company
 - Processing of incoming and outgoing invoices
 - Processing of card payment receipts
- Accounting firm (including premises and equipment)
 - Entry of various transactions in accounting systems
 - Processing of card payment receipts at the accounting firm
 - Documenting and archiving (paper/electronic)
 - Producing and sending of monthly VAT report

Activities not directly related to financial management or accounting have been ruled outside of the calculations due to difficult data collection or non-significant overall influence. The calculations did not include e.g. the following accounting-related activities:

- Calculation of wages, payment of wages, monthly reporting related to employer obligations
- Card payments processing on the seller's side
- Preparation of financial statements or auditing.

6.2 Emission factors used in the calculations

The calculations mainly applied the emission components specified in the FFI report *Environmentally Friendly Electronic Invoice* (2010) due to issues related to schedules and data availability. For example, "office work" includes all emissions caused by office work, evaluated relatively for each time unit.¹

¹ *Environmentally Friendly Electronic Invoice* was a study on the benefits of e-invoicing at SMEs, conducted by the Federation of Finnish Financial Services in 2010. The study showed that an e-invoice has a significantly smaller carbon footprint than a paper invoice. The carbon footprint of a single paper invoice is 450g, whereas the carbon footprint of a single e-invoice is merely 150g. Somewhat surprisingly, the difference is not the result of saved material or the automation of the delivery process, but the result of saved working time: this made work more efficient and reduced the resulting emissions.

https://www.fkl.fi/en/material/publications/Publications/Environmentally_friendly_electronic_invoice.pdf

The following emission values were used in the calculations:

Emission component	Emissions (g CO ₂ e/x)
Office work	1g per second
Letter paper	9.93g per A4 paper
Envelope	18.16g per letter
Mailing	21.3g per letter
Archiving	35.3g per letter
Digital document (archiving)	1g per document

6.3 Working time used in accounting

User observation was carried out at the accounting firm Leppävaaran Laskenta. Purpose of the observation was to add together the earlier carbon footprint calculations and the amount of work carried out at the accounting firm, in order to find out how much time each task takes, and what equipment or software it uses. The results were also supplemented with expert analyses of the amount of work done in companies.

Task	Task duration (min:sec)	
	Paper	Automated
Invoice, incoming	5:42	0:54
Invoice, outgoing	11:00	4:40
Card payment receipt	8:40	1:00
Manual entry / cash receipt	5:00	5:00
Account statement processing	5:00	1:00
Entry of service fee	5:00	1:00
Monthly VAT report	10:00	2:00

The carbon footprint of e-accounting was calculated using the *Footprinter* online tool developed by Natural Interest and its international partners (www.footprinter.com).

7 Results

Accounting automation can be expected to reduce the climate impact of a company by 80–90 percent in nearly all sizes of companies. In larger organisations, the positive effects of automated structured data are even greater, although the most significant effects in terms of operations can be seen in the more efficient use of time and in the changed duties of the accounting personnel.

Saved working time and carbon footprint after automation, broken down by task:

Task	Duration (min:sec)		Saving	
	Paper	Automated	Working time (min:sec)	Carbon footprint (CO ₂ e)
Invoice, incoming	5:42	0:54	4:48	0.29kg
Invoice, outgoing	11:00	4:40	6:20	0.38kg
Card payment receipt	8:40	1:00	7:40	0.46kg
Manual entry / cash receipt	5:00	5:00	-	-
Account statement processing	5:00	1:00	4:00	0.24kg
Entry of service fee	5:00	1:00	4:00	0.24kg
Monthly VAT report	10:00	2:00	8:00	0.48kg

If the processing of card receipts could also be automated, it would save time on a par with invoice processing.

In a one person enterprise, paper-based accounting takes five working hours per month. Were the process automated, it would take only one and a half hours. In a slightly larger enterprise, the saving would amount to more than 20 hours per month.

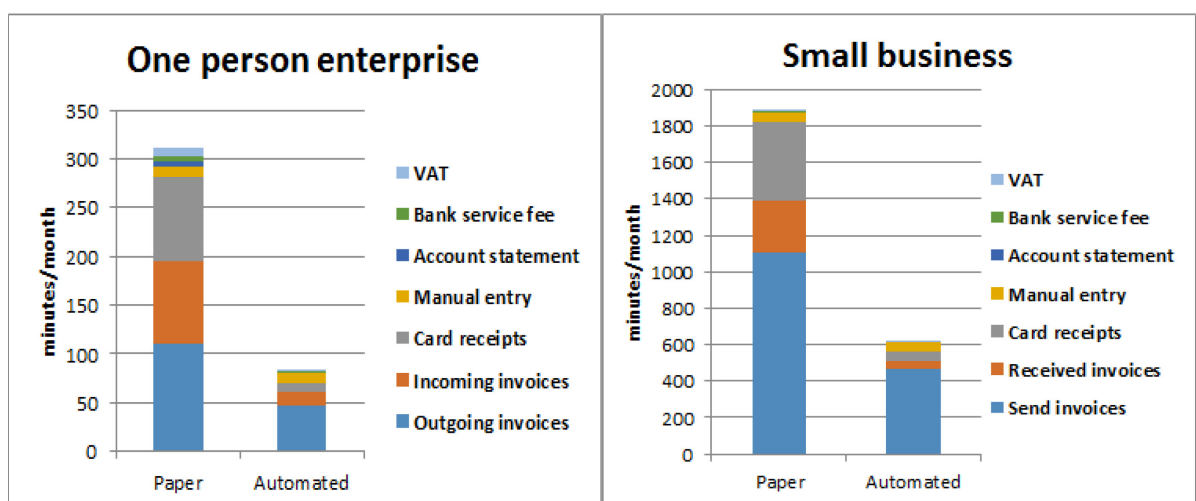


Figure 2. Monthly working time spent on different tasks at the example companies.

Monthly CO₂e emissions of accounting tasks and documents:

Example company	Paper	Automated	Saving %
One person enterprise	39.4kg	5.1kg	87%
Small enterprise	306.0kg	37.3kg	88%

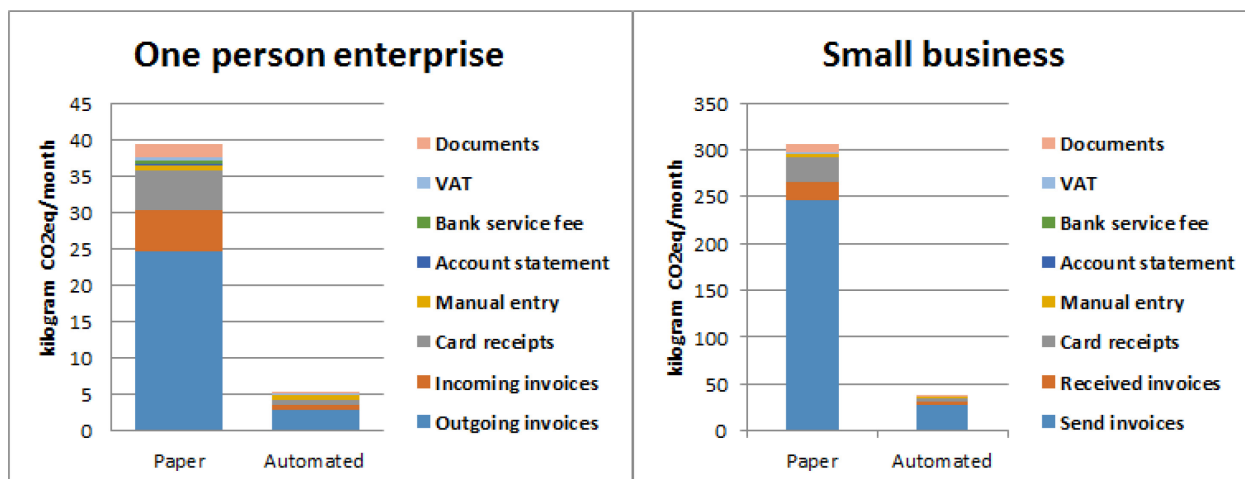


Figure 3. The monthly carbon footprint of accounting at the example companies.

According to the Finnish Tax Administration, majority of companies already use electronic filing channels in their monthly VAT reporting. The 10-minute average time used in the calculations applies specifically to the filing of such report. Most of this work consists of information verification, but it also includes the time spent on logging into various systems, opening forms and UI views, and other similar phases electronic work entails.

A total of 3.7 million VAT reports are filed annually. About 500,000 of these are filed in paper format. When e-reporting finally reaches this remaining pile as well, it will reduce the load on climate significantly.

If the full automation of all VAT reporting succeeds, a staggering 250–300 person-years will be saved in Finland. Furthermore, carbon footprints will be reduced by several thousand tonnes of CO₂e. More accurate estimates cannot be made in the scope of this study's calculations.

Notable savings will also be brought by the automation of card receipt processing. Government agencies, for example, annually process about 600,000 receipts. If their processing can be fully automated (which will require reforms in several systems), the annual savings in the carbon footprint will be around 200 tonnes of CO₂e. The benefits that the implementation of e-accounting in small and micro enterprises brings can be considered significant on a national scale when we take into account the large number of such companies in Finland.



8 Future plans

The calculations of this study indicate that automation will bring significant results and benefits to companies, to the society, and to the climate as well.

The progress of automation must be monitored and guided with select measures in the right direction:

- The Association of Finnish Accounting Firms supports accounting automation at SMEs in all its aspects. The Association also recommends that accounting firms demand software that supports the use of structured data (TALTIO) to facilitate automation and reporting.
- The Association of Finnish Accounting Firms also seeks to speed up the adoption of national standards e.g. pertaining to the e-invoice minimum content requirements and the implementation of the standardised TALTIO transaction file.
- National standards and the use of structured data in all business transactions enable the development of new accounting tools and software for the use of accounting firms and companies. Utilising the structured data warehouse, these new applications are not dependent on each other and will enable the working culture of accounting to move in a more resource efficient direction.
- Standardised data warehouses will in the future make it possible to implement a new national accounting archive, which will reduce administrative burden at companies and improve the legal protection of small entrepreneurs.
- The Federation of Finnish Financial Services will prepare a proposal for the uniform reporting of service fee transactions on account statements, enabling the automated processing of account statement transactions.
- The financial sector is collaborating with other participants to find solutions for transferring receipt data with structured e-invoices. The automation of card receipt processing will bring notable savings to the entire society.

9 Further information

The core project group to work on the commitment and the study was formed by:

- *Pirjo Ilola*, Development Manager, E-services, FFI
- *Kristiina Siikala*, Communications Manager, Public Affairs and Communications, FFI
- *Vuokko Mäkinen*, Chairman of the Association of Finnish Accounting Firms
- *Outi Mäkinen*, Communications Manager, Association of Finnish Accounting Firms
- *Tuomas Tahvanainen*, Leppävaaran Laskenta
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