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The development of electronic document exchange

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Abstract

Document exchange represents a key part of the trade activities of each company. Technological changes provide various opportunities to companies to improve their efficiency. One of the useful and cost-effective technological innovation is electronic data interchange (EDI). Electronic invoicing represents one of the most important and current part of EDI. The aim of this work is to characterize the electronic invoicing and the level of its implementation in the Czech Republic. Using data from questionnaire filled by companies we will evaluate main motives and gains of its implementation. This study gives a general overview of development of electronic invoicing and among other it is one of the first steps in the mapping and in the understanding of this current trend. Results show that through demonstrable savings it is still a marginal issue with large space for further expansion. This phenomenon is mainly associated with retail and automotive industry.

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1. Introduction

For the past twenty years, large corporations have been automating their invoicing process, in order to take advantage of the cost savings, time saving and efficiencies that electronic invoicing can provide. These benefits could in a case of mass adoption bring considerable benefits to the Europe economy as a whole. It is estimated that 238 billion EUR (accumulated over a period of 6 years) can be saved thanks to e-invoicing adoption in Europe.

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Electronic invoicing could reduce the cost per invoice by 75 %. Despite these facts, in 2014, the majority of invoices are still exchanged physically in a paper form only less than 30 percent of invoices were exchanged electronically.

Electronic invoicing has been defined as the sending an invoice or making it and its storage available in a completely electronic way. The e-invoicing process needs to employ fully structured data, which are capable of being processed automatically by senders, receivers and other involved parties. The transmission of an electronic image of an invoice document, which is a common procedure, is not strictly electronic invoicing.

Paper invoicing process is realized in five steps. It is the writing, printing invoices, enveloping, sending emails and archiving. The first and probably the most important motive for switching to e-invoicing is the price. Other difficulties may then be time required for delivery and payment delays, which negatively affect the whole cash flow. Furthermore, there are following issues: error rate of exposure, sending, and of course, the loss of documents. Even relationships between partners might be harmed. There are also difficulties associated with secure archiving, whether technical or methodological, and therefore with a possible non-compliance with legislative requirements.

The whole process can be fully automated and invoice can be created by a supplier's computer and send to a client's computer which can check that the information is correct and approve the payment. All those factors can extremely reduce time and cost of invoicing. That is only a small part of opportunities which company can exploit. There are several other benefits: occasion to access wider market of potential customers and suppliers, to improve and expand business relationships without having to invest to a proportionate number of employees to carry out respective administration tasks.

European Commission seeks to promote the achievement of the Europe 2020 Strategy in the Digital Agenda, it was therefore agreed to the mandatory use of e-invoicing for public sector in the case of public procurement, with the perspective of 2016. Electronic invoicing is increasingly becoming the preferred way to exchange the data. Companies, which want to stay competitive, must be prepared for this natural development of the global market.

2. Literature review

E-invoicing can be defined 'as the electronic transfer of invoicing information, including billing and payment information between business partners' (European Commission, 2009).

Therefore, invoices that are transmitted as attachments (PDFs, etc.) in e-mails are not considered as electronic invoices. This is because e-mail attachments do not permit the invoice data to be automatically processed in the payment system (Innopay, 2009 and Koch, 2009).

Depending upon the location of the buyer or supplier, tax regulations also may require a government- issued identification number, qualified electronic signatures, specific content fields and long-term archiving of the invoice (Keifer, 2011).

The Czech legislation does not define an invoice, whether electronic or paper. A Tax Document can be in either paper or electronic form. A Tax Document is in electronic form if it is issued and received in an electronic way. A receiver of an electronic Tax Document must agree to the usage of the document in electronic form. (Schmandt and Engel-Flechsich, 2013)

For the invoice must ensure the credibility of its origin, the integrity of its content and its readability. The authenticity of the origin of the tax document in electronic form and the integrity of its content can be provided by a recognized electronic signature or electronic information exchange (Chamber of Commerce, 2012).

E-invoicing system usually includes an advanced digital signature which improves the validation of the invoice (Foryszewski, 2006; Rombel, 2007). E-invoicing should satisfy strict security requirements in order to become part of the financial practices of a firm (Kaliontzoglou, 2006).

However, despite most invoices being prepared electronically, the vast majority are processed by manually keying information from a paper invoice into a financial management system to then process and pay. This represents a considerable waste of time and effort, especially given that the reproduction process can lead to the introduction of inaccuracies. Automating this function not only eliminates these risks, but enables the digitized content to be re-used in a more efficient way (Hayward, 2013).

An efficient management of inward cash flows from completed sales is absolutely critical for staying in business (Hanif, 2013).

Switching from a paper to electronic invoicing process can yield savings of 60–80 per cent, with a payback period of 0.5–1.5 years (Billentis, 2009).

There are many important advantages in using e-invoicing, including lower operational costs, fewer administrative errors and the elimination of postal delays (Berez & Sheth, 2007; Hani, 2001; Haq, 2007). E-invoicing reduces the total costs simply by eliminating the millions of paper invoices exchanged every year (Tait, 2009). Further savings can be made by streamline business processes and the adoption of related innovations. One of the benefits that should be highlighted is the improved efficiency of human resources by freeing personnel of administrative tasks, allowing them to dedicate their time to other more productive aspects. Furthermore, the information is obtained in real time, which makes it easier to verify where the e-invoice stands in the billing process. Finally, it is pertinent to emphasize aspects such as agility in deciding, control of errors and the efficient use of financial resources.

Electronic invoices enable faster processing and approval cycles. Suppliers are often willing to exchange a discount of 1–2 per cent of the total charges on invoices for an earlier payment. There a number of different models for early payments, the key enabler to each of them, however, is the electronic exchange of an invoice (Keifer, 2011).

The opportunities (positive risks) created by the adoption of e-invoicing can be divided into market (systematic) and unique (unsystematic) opportunities (Shapiro, 1991). Market opportunities mean the developments outside the company that are beyond the company's control. There may be some favorable effects other than the immediate benefits in the long run, such as the opportunity for business expansion (Peters, 1994), expanded supplier pool using automated processes (Lajili and Mahoney, 2006), and increased power on the material markets (Zhu, 2006), which are the result of developing improved relationships with suppliers.

Finally, the environmental benefits of e-invoicing in terms of reducing paper consumption and energy costs for transportation are also significant, generating carbon savings which could amount to reductions in CO₂ emissions of 1 million tones per annum for the EU. The objective of fostering the uptake of e-invoicing in the EU cannot be achieved without SMEs which represent more than 99 % of European businesses. While many large enterprises already use e-invoices, the adoption level by SMEs remains relatively low. The Small Business Act committed the EU to the 'Think Small First' principle, i.e. to focus on the needs of SMEs. This should also apply to the e-invoicing market, which should offer simple, cheap, reliable and VAT-compliant solutions to SMEs (European Commission, 2010).

All these aspects make up the perception of usefulness of the firm with respect to the ICT and increase intentions to adopt it (non-users) or to continue using it (adopters), (Hernandez-Ortega, 2010). A widespread uptake of e-invoicing could bring considerable benefits to the internal market by streamlining the internal processes of enterprises and reducing administrative burdens.

Reasons for the sometimes slow adoption of e-invoicing are as follows (Salmony and Harald, 2010).

- There is usually resistance to change in financial administration (change which must happen one enterprise at a time — this takes time).
- Old invoicing software needs to be adjusted to send e-invoices (not a difficult task, but time consuming).
- Despite the availability of solutions requiring 'Zero IT skills', some market players still consider e-invoicing not easy and not cost-effective enough.
- A four-corner model for interoperability is lacking — a task for the banks.
- There is not enough pressure from public sector invoice receivers — thus wasting tax-payers' money.
- Digital signatures are mandatory in some countries (but the new value added tax (VAT) directive for equal treatment will eliminate this and harmonize procedure across the EU).
- Only mini e-invoice standards are available locally (ISO will solve this).
- Communication today is difficult (everybody is writing and nobody has time to read). Communication to stakeholders is often neglected. Hence the above message about the massive automation of administrative and tax processes that can be achieved once they migrate to e-invoicing does not get through.

Many businesses are living the same scenario, where a large buyer receives thousands to tens of thousands of paper invoices each month from thousands of vendors. The data entry alone is overwhelming, draining the company of valuable resources. Combine this challenge with the vision of taking margin-enhancing, early-pay discounts (if only the approval process was fast enough), and it's easy to see why interest in electronic invoicing solutions has

continued to grow over the years. Until recently, however, electronic invoicing projects have had mixed results at best. The primary reason is that the value proposition is typically strong for the buyer but weak for the vendor. The business world is littered with electronic invoicing projects in which only a small part of vendors participated (Haq, 2007)

The main business case for e-invoicing in this stage of adoption is organizational readiness: optimization of the administrative processes. The pressure/threat of an economic crisis may increase the urgency to optimize processes and start e-invoicing.

External drivers (customers require e-invoicing, shorter payment cycles) for adoption hardly count at this moment. It is expected that external drivers will become stronger when the number of companies adopting e-invoicing will grow (European Multi-Stakeholder Forum on e-Invoicing, 2012).

Paperless public administration is a key objective for the European Union and e-invoicing promises to help achieve the promised cost savings and efficiencies. E-invoicing is intrinsically linked to supply chain activity across the procure-to-pay and order-to-cash lifecycles and placing invoicing within the context of procurement makes a great deal of sense (Taylor, 2013).

3. Objective and methodology

The aim of this work is to characterize the electronic invoicing and the level of its implementation in the Czech Republic and to find out motives and gains of its implementation. The goal of the study is also to give a general overview of development of electronic invoicing, and among others it is one of the first steps in the mapping and in the understanding of the current trend.

While the benefits of electronic invoicing are broadly recognized, its expanded diffusion, especially in small businesses, is still a distant goal. The economic crisis has slowed the development of electronic invoicing and the increased importance of certain barriers linked with its adoption. So why do Czech firms participate in implementation of electronic invoicing, what are their motives and driving forces?

In order to undertake this research, a telephone interviewing survey was conducted between 2012 and 2013. The questionnaires were addressed to the managers responsible for the use of ICTs in the firm and they were requested to answer on behalf of the firm. The companies were from different sectors of Czech economy and it included companies with an annual turnover above 100 mil CZK. A total of 1 036 telephone calls were made and 245 complete surveys were obtained.

For data processing, descriptive statistics such as absolute and relative frequency was applied. To test the independency between the sending of invoices in electronic form and using digital signature, the hypothesis testing was performed. The Pearson's Chi-Square test of independence between qualitative variables was used.

The next chapter is devoted to the processing of primary and secondary data. The secondary data helped the research to be located in a wider context throughout the European Union. Chapter can be divided into two parts where the first part contains overview of the current state of the problem of electronic exchange of invoices. The data derived from Eurostat and the Czech Statistical Office are used. In the second part there are processed data, which were obtained by the primary investigation and the results will be discussed with regard to the data in the first part. The study is focused on mapping the conditions about electronic invoicing in the Czech Republic and the credibility and integrity of the electronic document that can be provided by adding an electronic signature.

4. Results and discussion

In comparison with paper-based processes, electronic invoice handling processes make it possible to reduce costs by 50–80%. In 2013 around 20 billion bills/invoices globally and 5.5 billion invoices in Europe are likely to be sent and archived paper-free. The high level of debt of the public sector means that this segment must automate its processes and sustainably reduce costs. The optimizing potential of the public sector in Europe alone is likely to amount to at least 40 billion Eur. More and more customers expect invoices from their suppliers in electronic form. Therefore, sustainable rates of growth of 20–30% are expected for the electronic invoice market in the coming years (Koch, 2013).

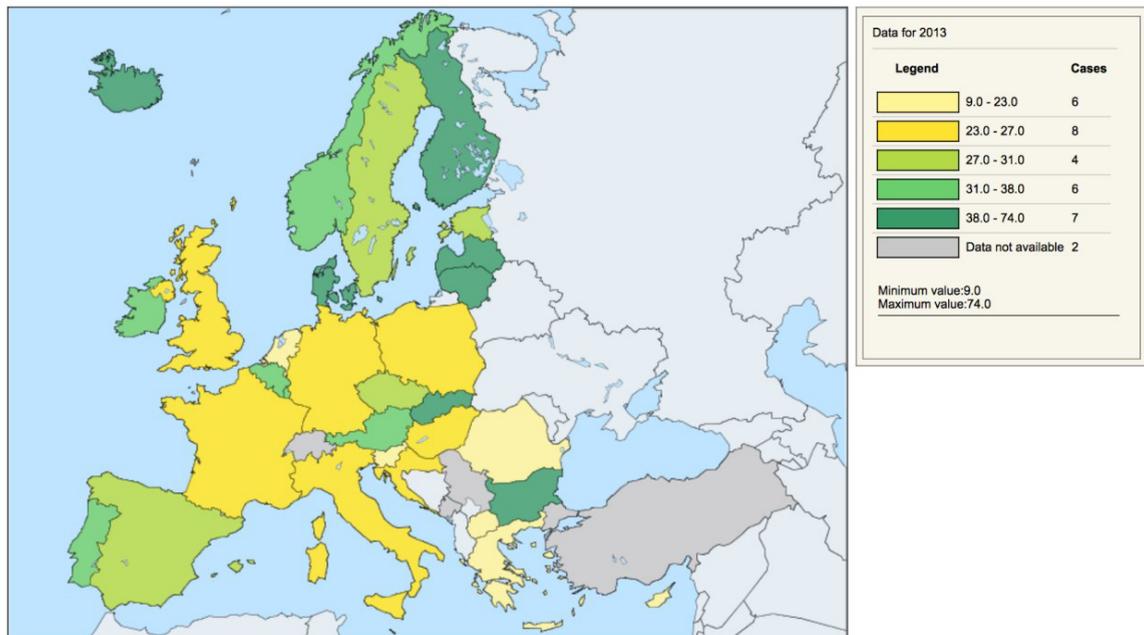


Fig. 1. Enterprises sending and/or receiving e-invoices (Eurostat, 2013)

In 2013, adoption rates of e-invoices are relatively low and vary between Member States. Fig. 1 shows the comparison of work with electronic form for individual states. While 29 % of enterprises state that they receive or send e-invoices (ranging from 9 % to 74 % in EU27), the number of exchanged structured e-invoices still stays low, especially among SMEs. On the supply side, the e-invoicing market is largely fragmented. In some EU States, public sector determines to make e-invoicing mandatory for public procurement. It is very important for further massive expansion of this type of communication. The advanced interoperable e-invoicing solution could be reused also beyond public procurement in the business to business context. Finally, banks, already highly engaged in payments could rethink the way they interact with their customers, offering them e-invoicing solutions to serve their needs (Caluwaerts, 2010). The number of companies, which send and/or receive electronic invoices in the EU has been growing, from 18 % in 2007 to 29 % in 2013. The most enterprises (74 %) sending and/or receiving electronic invoices has Finland, Czech Republic (29 %) occupies fifteenth place of all the European states (Eurostat, 2013).

In January 2013 more than half of enterprises in Czech Republic with 10 or more employees (56 %) sent invoice electronically, and 79 % of the companies receive an invoice in this way. Only 11 % of them sent invoice in standardized format, which is specified for automated data processing. There are more companies (26 %) which adopting invoices in a standardized format. But receiving and sending electronic invoices in different formats, which are not appropriate for automated processing, can be described as quite common. Such is classic e-mail with an attachment in doc or pdf format. In January 2013 were companies sent 53 % and 76 % of invoices in this way. To increase security, it is possible to sent invoices with electronic signature. That in January 2013 used 8 % of companies, whereas in the case of large enterprises it was 21 % of them (CSO, 2013).

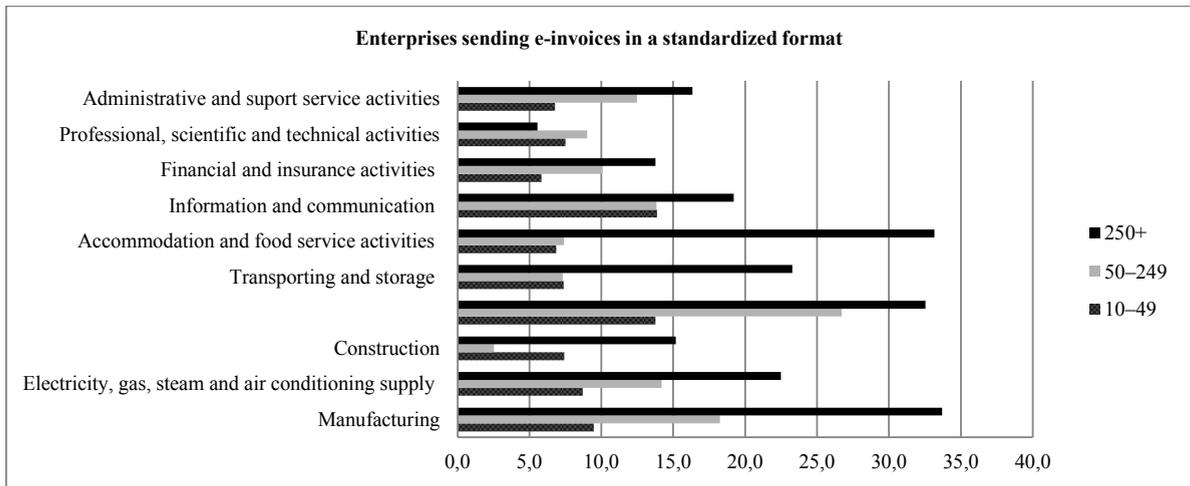


Fig. 2. Enterprises sending e-invoices in a standardized format in Czech Republic

As the latest results from the Czech Statistical Office and their study of the expansion of electronic communication between companies show it is the group of large companies (250+ employees) where we can expect the greatest expansion of electronic invoicing in the most advanced form (see Fig. 2). As well we can observe significant differences within the various sectors. Invoicing in a standardized format is the most widespread in manufacturing, wholesaling and retailing, and accommodation and food service activities.

In the primary research companies with an annual turnover of 100 mil CZK and more were interviewed. Almost half (49 %) of the companies surveyed indicated that do not send invoices electronically for their customers. A total of 31 % of the companies send some of their invoices electronically and only 21 % send all of the invoices to customers electronically. Taking into account that large companies also send a large number of invoices monthly, the form of the transition to electronic invoicing opens up a fairly large scope for savings.

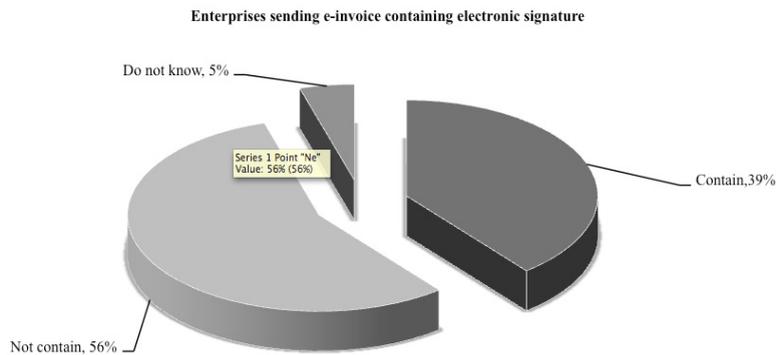


Fig. 3. Enterprises sending e-invoice containing electronic signature

Companies that sent at least part of their invoices to customers electronically responded whether their invoice contains the electronic signature. The use of electronic signature ensures authenticity of document origin, it means identity of the person carrying out the transaction and issuing a tax receipt, and also demonstrates integrity of the

content. Therefore it is evident that the invoice has not been changed later. Thanks to use of electronic signature the value of electronic document is clearly proven and easily documented. The company has not to keep paper form of the document. More than half (56 %) of respondents who are sending electronic invoices are not adding electronic signature. A smaller part of the companies (39 %) sends invoices electronically signed. 5 % of respondents were not able to say whether their invoices include electronic signature (See Fig. 3).

It is also interesting to verify whether the sending of invoices electronically is affecting the need of using electronic signature. To verify the independences between sending invoices in structured format and adding electronic signature to e-invoice the hypothesis testing was performed.

At first the null hypothesis of independence was set up and then the corresponding alternative hypothesis was determined.

- H0: The use of electronic signatures to ensure the authenticity of the invoice is not dependent on sending of invoices in a standardized format specified for automated data processing.
- H1: The use of electronic signatures to ensure the authenticity of the invoice is dependent on sending of invoices in a standardized format specified for automated data processing.

The results of hypothesis testing based on Pearson's Chi-Square test of independence between qualitative variables shows, that the null hypothesis about independence between variables could be rejected. The p-value (0.0001) is less than 0.01, which shows on high statistical significance. Whether the company uses an electronic signature, to ensure the credibility and integrity of the electronic document, is influenced by the sending of electronic invoices (in fully structured data). According to the value of Cramer contingency coefficient (0.3714) this dependence could be assessed as medium strong. The simple way to ensure the credibility and integrity of the electronic document could be requiring electronic signature on invoices, what is also recommended by the VAT Act. Then it is not necessary to work with the paper form and its authenticity can be conclusively proven. The Czech Republic adopted Amendment no. 502/2012 of the Law no. 235/2004 on 19 December 2012, which was promulgated on 31 December 2012 to be effective 1 January 2013, where could be found all of recommendations. Despite the fact that electronic signature is very important part of future communication with public sector, only small part (20.82 %) of all respondents use electronic signature (see Tab. 1).

Table 1. Pivot table – relative frequency

Enterprise	Invoice does not contain e-signature	Invoice contains e-signature	Do not know
Enterprise do not use e-invoicing	47.76 %	0.41 %	0.41 %
Enterprise use e-invoicing	11.43 %	9.39 %	0.00 %
Enterprise partly use e-invoicing	17.55 %	11.02 %	2.04 %

Another topic of this research was processing invoices electronically. What happens to the invoice, if it is sent in electronic form? The vast majority of respondents (78 %) print their received invoices. Only fifth of companies works with an electronic version of the invoice (19 %). About 20 % of companies print invoice even repeatedly. Invoice printing and archiving paper brings additional costs to the company. Another waste of time represents tracing paper invoices in archive in case of need.

Companies, that do not print received invoices, but work with them further in electronic form, have been asked if they require electronic signature from their suppliers. The result shows that only 27 % of respondents require electronic invoice including electronic signature. The rest (73 %) does not require this condition. A large number of companies, that do not require invoices from suppliers with an electronic signature, correspond with a similarly large number of companies, which print their invoices.

5. Conclusion

After a slow start, the mass adoption of e-invoicing is expected within the next 6 years, according to Europe 2020 Strategy and the mandatory use of e-invoicing for public sector. It could bring benefits to enterprises as well as to

the EU and it may help to increase its competitiveness. In December 2013 EU Council approved agreement on a draft directive on electronic invoicing in public procurement, which may be one of the key factor for widespread adoption and it will become stronger when the number of companies adopting e-invoicing will grow. The main benefits of e-invoicing include: cost savings, elimination of errors, the potential enhanced competitiveness, accelerated cash flow, more efficient supply chains.

It was found that even the fact of amount of proven benefits, the potential of electronic invoicing is not still fully exploited in the Czech Republic. The number of companies, which send and/or receive electronic invoices in the Czech Republic has been slowly growing, in 2013 more than half of enterprise sent electronic invoice but only 11 % of invoices were in standard format suitable for automatic processing. The receiving and sending of electronic invoices in different formats, which are not appropriate for automated processing, can be described as quite common. It is the group of large companies (250+ employees) where we can expect the greatest expansion of electronic invoicing. The results show significant differences within the various sectors. Invoicing in a standardized format is the most widespread in manufacturing, wholesaling, retailing, and accommodation and food service activities.

In the primary research, which includes the companies with an annual turnover 100 mil CZK and more, was found that almost half of these companies still do not send invoices electronically. More than half of respondents who are sending electronic invoices are not adding electronic signature and thus they face a significant risk. The company uses an electronic signature, to ensure the credibility and integrity of the electronic document, is medium strong influenced by the sending of electronic invoices (in fully structured data). It can be concluded that the fact of using of electronic invoicing does not signify that the company has too a system to proof of authorization of document. Only fifth of respondents works with invoices in electronic form, the vast majority print they received invoices, it shows on a lack of use of the opportunities that e-invoice could offer.

Electronic invoicing is only the first step that opens many other opportunities for growth of computerization of new sectors, such as e-health, e-commerce, etc. It will finally lead to an increasing trend of internationalization and it could create a global market in real time. It is clear that the issue could not be taken lightly and it is necessary to devote considerable attention to this current trend.

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