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The Adoption of Computer-Aided Translation Tools by Freelance Translators in the UK

by

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*A mis queridos padres, Joaquín y Laly,
a quienes debo todo lo que soy.*

*A mi estimado hermano, Sergio,
por lo importante que es para mí.*

*Y a mi impetisa, mi amada Débora,
porque mi vida no sería la misma sin mi amanecer.*

*To my parents, Joaquín and Laly,
to my brother, Sergio,
and to Débora.*

Abstract

The demand for translation services by the business community has increased significantly over the past decade or so, fuelled by socio-economic changes, such as industry globalisation, and closer collaboration between European countries. Technological developments, such as the advent of the Internet, the rise of electronic business, and the increase in the use of electronic documents have also contributed to the demand for translation. At the same time, translators are required to produce high-quality translations in ever-shorter time periods. Running in parallel with the increasing demand for translation services, various organisational developments have had, and are indeed continuing to have, a considerable impact on the UK translation services sector. For example, many large organisations have been divesting themselves of in-house translation teams to focus on their core business to reduce costs, resulting in an increasing number of translation assignments being outsourced to freelance translation businesses.

Among the range of information and communication technologies (ICT) available to translators today, Computer-aided translation (CAT) tools, have been designed to increase translators' productivity and efficiency, thus helping them to meet the demand for their services. Whilst there has been much discussion among translators about the suitability of CAT tools for freelance translators, there have been few studies investigating their use by freelancers. Research to date has focused instead on the analysis of the technical features of CAT tools, or on their use in large translation departments.

This study investigates the uptake of CAT tools by freelance translators based in the UK and their perceptions of these tools. In order to achieve this, a research model was developed drawing on previous research undertaken about ICT adoption in small and medium-sized enterprises (SMEs). The study was undertaken in two phases. In the first phase, a mail survey was conducted of a sample of freelance translators to determine levels of uptake of CAT tools, to explore the characteristics of the adopters of these tools, and the perceptions of the tools among freelancers. In the second phase, an online survey of adopters and non-

adopters of CAT tools was undertaken in order to facilitate the investigation of what drives the adoption of these tools, as well as the impact of CAT tool adoption.

The findings of the mail survey (to which 391 usable responses were received) revealed a rather low level of uptake of CAT tools (28%), and showed that almost half of the translators in the sample were not familiar with these tools. Further quantitative analysis revealed a positive relationship between the adoption of CAT tools and the adoption of other specialist-purpose software used by translators to support the activities in their workflow. A number of characteristics of CAT tool adopters were identified. These included the fact that adopters tended to be young translators, holding a university degree in translation studies. Most of those using the tools undertook technical translation. In addition, although translators' perceptions of CAT tools were generally positive, attitudes towards ICT in general were more positive and clearer in terms of specifying the benefits and problems arising from their use.

In the second phase of the study, a sample of 19 adopters of CAT tools was employed to explore the determinants of the adoption of these tools. This phase showed that the main motivators for CAT tool adoption were the perceived advantages of the tools, such as increasing productivity, enhancing effectiveness as translators, or making the translation job easier. Also a sample of 34 CAT tool non-adopters was used to identify the factors deterring translators from adopting these tools. It was found that the main inhibitor of CAT tool adoption was the perceived difficulty of learning to use these tools. This phase also captured the translators' perceptions of the impact of CAT tools on their work. It was found that overall, the impacts of adopting CAT tools were largely positive, and included an increase in the quality of the translations undertaken and increased productivity.

This research contributes to the existing body of literature about CAT tools by providing a model and instruments for investigating CAT tool adoption in the context of freelance translation businesses. The findings of this study make a timely and relevant contribution to the translation sector in the UK by providing indicators of CAT tool adoption among freelance translators in the UK, the factors affecting this adoption, and the impacts of the adoption on the work of the freelancers. The study benefits various key stakeholders in the translation sector, notably existing freelancers, newly-qualified translators, translator trainers, professional bodies for translators, and the developers and distributors of CAT tools by providing evidence regarding CAT tool uptake, characteristics of adopters, adoption determinants and impacts of adoption.

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Chapter 1. Introduction

1.1. Background and context

Over the last decade or so, there has been a growing demand in the UK and elsewhere for translation services by the business community, exacerbated by a number of factors, including the increasing emphasis in business on globalisation, the advent of the World Wide Web as an international marketing tool, the rise of the software localisation industry (Sprung, 2000:ix), and increasing opportunities for international trade (Andrés Lange and Bennett, 2000:203). In Europe, the forging of closer trading relationships between countries, and more recently, the enlargement of the European Union, have highlighted awareness of the need for translators, and again fuelled demand for their services (Roxburgh, 2004).

Along with the growth that the translation market is facing (Sprung, 2000), more and more clients are requesting faster, better and cheaper translation services. Schäffner indicated that “translations need to be done ever more quickly, much more efficiently, and at a high quality” (2000:7), something that Pavlovich (1999:37) also acknowledged. Client demand has therefore meant that the language services sector, especially the translation sector, has had to develop innovative production processes and software tools to lower transaction costs, work faster and provide consistently high quality (Shadbolt, 2003).

In addition, the increasing availability of personal computers has also facilitated the development of information and communication technologies (ICT) specifically designed for professional translators. The development of technologies such as Computer-aided translation (CAT) tools, the main component of which is based on

translation memory technology, has allegedly led to significant increases in the quantity (productivity) and quality (efficiency and effectiveness) of translators' work (Heyn, 1998; Somers, 2003b), and these tools have been deemed to be one of the most useful facilities for translators (Hutchins, 2005).

For the purposes of this research, a comprehensive working definition of CAT tools is provided below:

CAT tools are essentially a set of computer applications designed to assist translators in producing fast and consistent translations. To achieve this goal, CAT tools store source and target language pairs of text segments found in previous translations and retrieve this information during the production of new translations. To do so, CAT tools use both translation memory and terminology management functions, which provide translators with exact equivalences of the text in the source language or equivalences containing partly similar text. The equivalences suggested by CAT tools occur at a term level (through terminology management functions) or at a longer segment of text level, such as a sentence or a paragraph (through translation memory functions). Those functions, along with other ones usually included in CAT tools (e.g. document alignment, word count, file format filtering, project management) have been designed to help translators during the core activities in their work, i.e. translation production, and storing and retrieving terminological information.

Running in parallel with the increasing demand for translation services and the availability of CAT tools for translators, various organisational developments have had, and are indeed continuing to have, a considerable impact on the UK translation services sector. For example, many in-house translation departments have closed as large commercial organisations have found it necessary to downsize and focus on core competencies in order to reduce costs (Fraser and Gold, 2000:3; Locke, 2005:19). As a result of this divestment, organisations now tend to outsource more translation assignments to freelance translators. Public sector organisations have adopted a similar approach and now tend to rely on the services of freelancers, in conjunction with a core body of in-house translators. As a result of these developments, a substantial proportion of translators, in the UK and elsewhere, now work on a freelance basis (Holland et al., 2004:254; Locke, 2005:19).

Whilst recent technological developments in the freelance translation sector have provoked much discussion among translators at professional conferences and seminars, as well as via electronic discussion groups, the adoption of CAT tools has not been investigated systematically to date. It has been claimed (see for example Joscelyne, 2003), that translation professionals have had to catch up with the increased demand for translation services; and that, to do so, translation memory and terminology management software should not only be used by large multilingual services suppliers, but also by small translation companies and freelance translators. Joscelyne's statements are based on the findings of the surveys conducted by the LISA (Localization Industry Standards Association) (Lommel, 2002, 2004), which reported a growth in the use of translation memory technology and evidence of translation companies becoming more productive due to such use. However, these surveys did not report specific evidence of use by freelance translators. In addition, other studies have also tended to be focussed on the working environments of in-house translators, and whilst such studies have been more comprehensive in their coverage of translators' working practices and the technology used, their findings are inevitably now somewhat dated as the studies were undertaken prior to, or in the very early days of the widespread commercial availability of CAT tools. Such studies include Smith and Tyldesley (1986), Fulford, Höge and Ahmad (1990), and a European study, carried out as part of the LETRAC Project, undertaken more recently, and reported in Reuther (1999).

Research to date about CAT tools, has generally been concentrated either on evaluations of their technical features or their introduction to the translation departments of large organisations (Weßel, 1995; King, 1998). Evidence regarding the uptake of CAT tools by freelance translators, the benefits of using these tools, and the problems associated with their use, is largely informal and anecdotal. In addition, discussions about CAT tools have, at times, been emotionally charged, primarily because of the threat to job security which some translators fear computer-assisted aids pose to the translation profession (see for example, Shields, 1999; Fenner, 2000). A number of concerns about the use of CAT tools such as low job satisfaction levels

due to the use of CAT tools, the unsuitability of CAT tools for freelancers' needs, the high cost of the tools, or conservative attitudes towards technological investments have been mentioned in existing literature (see for example Langé *et al.*, 1997; Heyn, 1998; Hutchins, 1999; Esselink, 2003).

This study represents an attempt to address the gap in the existing research about the use, perceptions, and impacts of CAT tools in freelance translators' work by conducting a study of CAT tool adoption by freelance translators. This study has been conducted as part of a larger research project funded by the Engineering and Physical Sciences Research Council (EPSRC), one of the aims of which was to investigate the adoption of ICT by freelance translators in the UK.

It is envisaged that the findings of this study will make a timely and relevant contribution to the translation sector in the UK by providing indicators of CAT tool adoption among freelance translators in the UK, the factors affecting this adoption, and the impacts of the adoption on the work of the freelancers. In particular, it is anticipated that this research will be of interest and benefit to various key stakeholders in the translation sector, notably to existing freelancers, to newly-qualified translators, translator trainers, professional bodies for translators, and the developers and distributors of CAT tools. From the perspective of the freelance translator community, there is a major concern about whether CAT tools are suitable for their type of work, whether they should acquire this technology, and whether they would gain benefits from adopting CAT tools. Given the increased number of freelance translators within the translation sector, and thus their importance to the sector and the wider community requiring translation services, it is important to understand the role CAT tools might play in their work. Also, from the perspective of the end users of translation services, more translations are required from freelance translators in shorter time scales, maintaining a high standard of quality. It is necessary to confirm whether freelance translators are taking advantage of the potential productivity and quality benefits provided by CAT tools, that could help freelancers to cope with the increased demand for translated documents from the business and scientific community. Equally, it will provide insights to those members of the wider academic

community concerned with the effects of introducing specialist-purpose ICT, such as CAT tools, into micro businesses, such as freelance translation businesses.

1.2. Aims and objectives

Given that CAT tools have only relatively recently become available to freelance translation businesses, it is not surprising that little or no research has been conducted to date into their use by freelance translators. The underlying purpose of the present study is to fill this gap by conducting an in-depth study of CAT tool adoption by freelance translators in the UK.

The overall aims of this research are to explore and analyse the extent to which CAT tools have been adopted by freelance translators in the UK, as well as to provide insights into the determinants of CAT tool adoption, and into the impact that the adoption of these technologies has on freelance translators and their businesses. In pursuit of these aims, the following research objectives have been identified:

- To examine the level of CAT tool adoption among freelancers
- To compare that adoption with the adoption of other ICT in the various activities in their workflow
- To explore the perceptions translators have of CAT tools and compare these perceptions with their perceptions of other ICT
- To identify the determinants of CAT tool adoption in a freelance working context
- To examine the impacts of introducing CAT tools into a freelance translator's working environment.

1.3. Organisation of the thesis

This thesis is organised in ten chapters, as follows:

In this **Chapter 1**, an overview of the study is provided, introducing its background and context, presenting the aims and objectives of this research, and explaining how this thesis is organised.

In **Chapter 2**, the literature about CAT tool adoption by freelance translators is reviewed. For this purpose, literature about translators, their workflow, and the tools available to support their work is presented and discussed. Also, literature about ICT adoption in small and medium-enterprises (SMEs) from the informant domains of information systems and SME management is presented.

Chapter 3 discusses the conceptual framework devised for this research, presenting the research model of the study and the research questions to be investigated.

In **Chapter 4**, an outline of the research method is presented, focusing on the description of the questionnaire, which is the research instrument used for the first phase of this study, and providing a preliminary discussion of the data analysis to be carried out.

In **Chapter 5**, a summary is provided of the characteristics of the translators in the survey sample and of their usage of, and experience with, ICT in relation to the activities that form the translator's workflow.

Chapter 6 discusses the analysis undertaken to test the relationships between the adoption of CAT tools and the adoption of, and experience with, other ICT that support the various activities of the freelance translator's workflow. For this purpose, Chi-Square tests and Logistic regression analysis were used.

Chapter 7 details the analysis conducted to investigate the characteristics of the freelance translators who have adopted CAT tools and of the characteristics of their

translation businesses. For this purpose, Chi-Square tests and Logistic regression analyses are used, leading to the presentation of a profile of CAT tool adopter.

Chapter 8 presents the factor analysis conducted to explore and examine the perceptions of ICT in general, and CAT tools in particular, among the translators in the survey sample. The perceptions of CAT tool adopters and non-adopters are then compared and their differences assessed through ANOVA tests. In addition, perceptions of the translators with different levels of experience with CAT tools are compared through ANOVA tests.

In **Chapter 9**, the research method followed and the analysis conducted for the second phase of the study is presented. This comprises the examination of the factors that affect CAT tool adoption through a cross-case analysis approach. Findings about the impacts of CAT tool adoption on freelance translation businesses are also discussed.

In **Chapter 10**, the summary and discussion of the findings of the present study are presented in relation to the research questions of the study. In addition, practical and theoretical implications, limitations of the study, further research issues, and concluding remarks are discussed.

Chapter 2. Literature Review

2.1. Introduction

In order to provide context for this study of Computer-aided translation (CAT) tool adoption, literature is reviewed from the domains of translation studies, as well as other informant domains, including information systems and small businesses management.

2.2. Literature related to translation studies

This section traces the activities a translator typically undertakes, and the place of CAT tools within these activities; reviews the historical development of CAT tools, and discusses the findings of existing research on CAT tool usage.

2.2.1. The role of the translator

Schäffner proposes a definition of the role of the translator, based on an article from Schmitt (1998), which offers a clear, comprehensive and current view of what being a translator involves, highlighting in particular the skills required of a modern translator, and his or her orientation toward meeting translation market challenges.

Translators (and interpreters) are experts for interlingual and intercultural communication, and assume full responsibility for their work. They have acquired the necessary professional expertise, above all linguistic, cultural and subject-area competence, and are equipped with suitable technological skills to meet the challenges of the market today and those to be expected over the coming years. On the basis of source material presented in written, spoken or multi-medial form, and using suitable translation strategies and the necessary work tools, they are able to produce a written, spoken or multi-

medial text which fulfils its clearly defined purpose in another language or culture. Translators are engaged in fields ranging from scientific and literary translation over technical writing and pre- and post-editing to translation for stage and screen. (Schäffner, 2000:25)

Since ancient times, even before St. Jerome translated the Bible into Latin, the essence of what a translator does has not changed very much. In studies of translation, the process of the translators' work has traditionally been divided into three main stages, namely, pre-translation, translation, and post-translation (see for example, Holmes, 1988; Hatim and Mason, 1990; Austerlühl, 2001). Translators are usually seen as persons who have a good command of at least two languages, maybe a degree in linguistics, a languages-related degree, or studies in translating and interpreting. It is obvious that linguistic skills are very important for translators, but there are other skills that must also be acquired by a translator, such as expert knowledge of a specialist subject, cultural and communication competence, or technological skills (Schmitt, 1998). Essentially, the core tasks of the translator's role have not changed much over time:

- Translators have always had to promote themselves as language professionals capable of undertaking translations and show their potential clients that they are suitable professionals to perform their translations (i.e. take care about marketing themselves).
- Translators have always had to deal with clients to receive the source material, send it back, and invoice them (i.e. take care about communication and business administration tasks).
- Translators have always had to look for answers to terminological or subject-knowledge problems (i.e. take care about information search tasks).
- Translators have always had to draft the translated text, and proofread it, before they could deliver it (i.e. take care about the production of documents and translations and quality control tasks).

As indicated in the introduction section, the number of translators operating on a freelance basis has substantially increased over the past decade (Fraser and Gold, 2001; Holland *et al.*, 2004:254; Locke, 2005:19), and being a freelance translator also means undertaking additional tasks. Freelance translators do not only have to undertake translation assignments but also have to deal with their clients, manage their translation assignments, sort out payments, acquire new ICT equipment, undertake continuing professional training, and other activities that are necessary to run a translation business. In other words, in their day-to-day life as translators, they have to undertake a number of activities that are part of running their translation business, but that are not part of the core translation task. These requirements of the freelance translators have been reported by authors like Varona (2002:202) who cites budgeting, pricing, customer services, or marketing functions, and Locke (2005:50) who adds hardware and software acquisition to the examples of activities the freelancer must undertake. In this sense, freelance translators are not only language professionals capable of undertaking translations, but also professionals who have to run their own business and take decisions upon which business and ICT strategies they have to follow to remain competitive in an ever demanding market.

In addition to the added tasks originated from freelancing, what has also changed over time are the tools used to support the translator in the tasks performed.

2.2.2. Tools to support translators

Traditionally, a translator just used paper and ink to write, and paper dictionaries and libraries to do research. As technology evolved, the use of dictation machines and typewriters (mechanical and later electronic) assisted translators in their work. However, it was the proliferation of microcomputers – personal computers – that formed a turning point in the way that translators work. The mere use of word processors greatly assisted translators in tasks such as revising and editing translations or formatting documents. The development of computer-based reference works on electronic media, such as CD-ROM, first, and then, the advent of the Internet and

electronic communications, multiplied the resources that translators could use in order to increase their productivity and quality of their work, and to improve the ways they communicate and transfer information.

Many different terms are used when referring to computer-based tools and resources that support the translation process, for example, 'translation software' (Hutchins, 2000a), 'translation tools' (Esselink, 2000; Langewis, 2002), 'language technologies' (Shadbolt, 2003), and 'electronic translation tools' (Austermühl, 2001). The term 'computer-aided' or 'computer-assisted translation' tools is also used to refer to the computer-based applications that support the translation process (Hutchins and Somers, 1992). In view of the existing terminological variations, for the purpose of the present study, the term 'translation tools' is used to refer to the different terms given to all the computer and Internet-based resources supporting the translation process; and, as defined in the introduction chapter, the term 'CAT tools' is used to refer to the set of computer applications designed to assist translators in producing faster and consistent translations, by storing source and target language pairs of text segments, such as sentences or paragraphs, (through translation memory functions) and terminology (through terminology management functions) as they are produced, and by retrieving exact equivalences of text in the source language or equivalences containing partly similar text during the production of new translations. In addition to the translation memory and terminology management functions, CAT tools usually include others such as document alignment, word count, file format filtering, or project management to help translators during the core activities of their work, i.e. translation production, and storing and retrieving terminological information.

Next, a review of the range of tools is introduced by discussing the models of translation tools suggested in previous research, and by presenting a brief overview of the development of translation tools over time, up to the development of present CAT tools.

2.2.2.1. Translation tools and the ‘translator’s workstation’

There is a wide range of computer-based applications – i.e. software – that has been developed to suit the needs of translators. Previous research has categorised translation tools in different ways. Below, some of the models for categorisation of translation tools are presented, along with some of the basic terminology used in the discussion about translation tools in general.

Before the appearance of CAT tools, Melby (1982) presented a three-level classification of computer-based tools, based on a functional approach, (see Figure 2.1) that made up a ‘translator’s workstation’, a term widely used by experts in the field (for example Melby, 1992; Hutchins, 1998a) to refer to the computer software and hardware used by translators.

Level 1	Text Processing Telecommunications Software Terminology Management Systems Others (DTP, Converter)
Level 2	Text Analysis Automatic Dictionary Look-up Bilingual Text Retrieval Other (SGML)
Level 3	Machine Translation

Figure 2.1

Melby’s translator’s workstation
(based on Melby, 1982)

One of the most popular classifications arises from the model presented by Hutchins and Somers (1992) showing the degree of human involvement in the translation process. Figure 2.2 shows the dimensions identified by Hutchins and Somers. They differentiate between purely human translation and fully automatic high quality translation (FAHQT). The categories in between refer to tools that require some interaction between computers and human translators; either by using tools that aid professional translators (e.g. grammar and spelling checkers, online & CD-ROM

electronic dictionaries), labelled as Machine-Aided Human Translation (MAHT), or by using semi-automatic translation tools that require human intervention for pre-editing and post-editing tasks, labelled as Human-Aided Machine Translation - (HAMT). The authors use the term Computer-Assisted Translation (CAT) to refer to these two types of interaction.

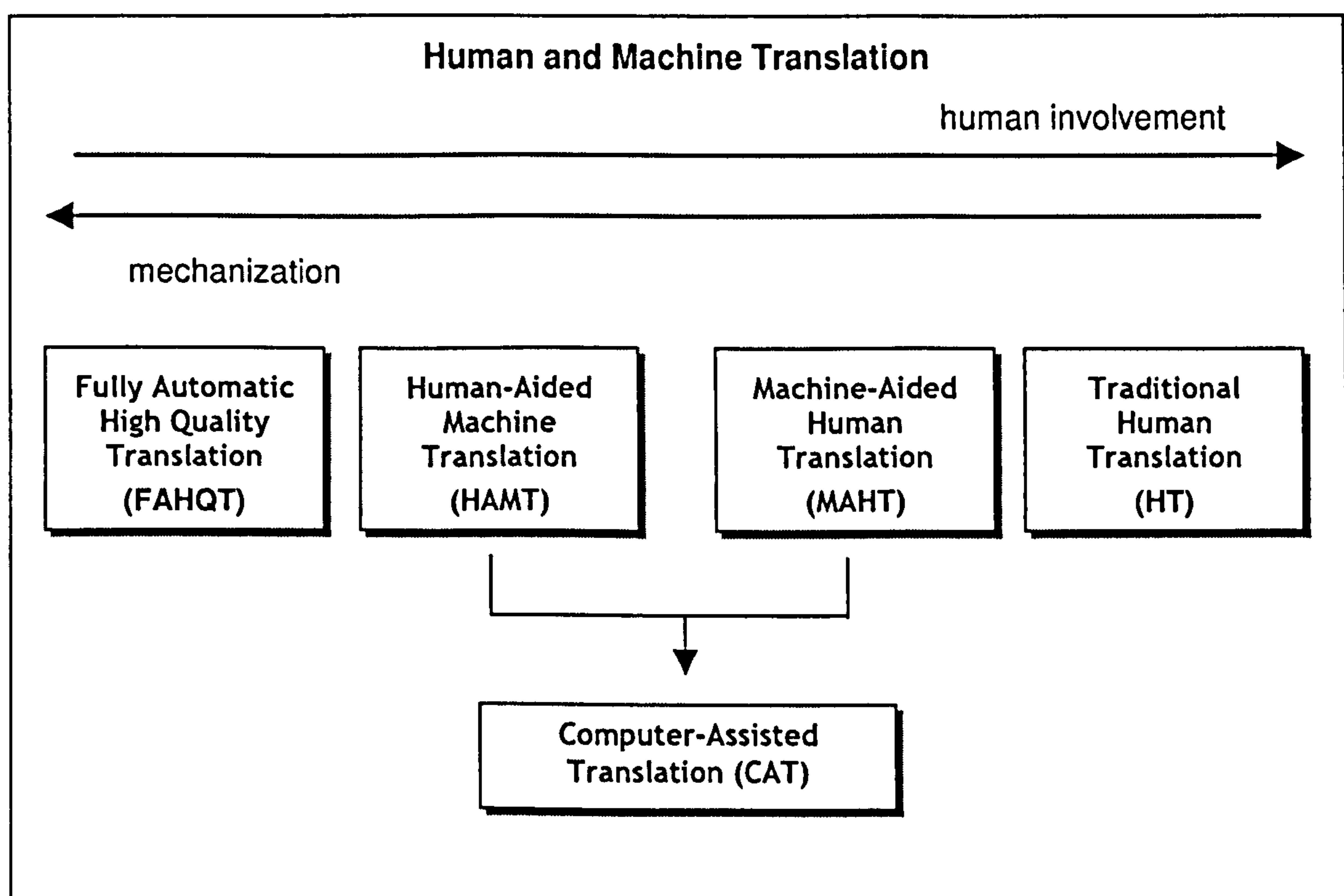


Figure 2.2 Hutchins and Somers' dimensions of translation automation
(Hutchins and Somers, 1992:148)

In a more recent contribution by Melby (1998), he categorised types of translation tools according to the traditional three phases of translation (i.e. pre-translation, translation, and post-translation), and depending on the linguistic level in which the translator receives support, i.e. at individual term level, or at a whole segment level. Figure 2.3 shows the eight categories identified in Melby's model.

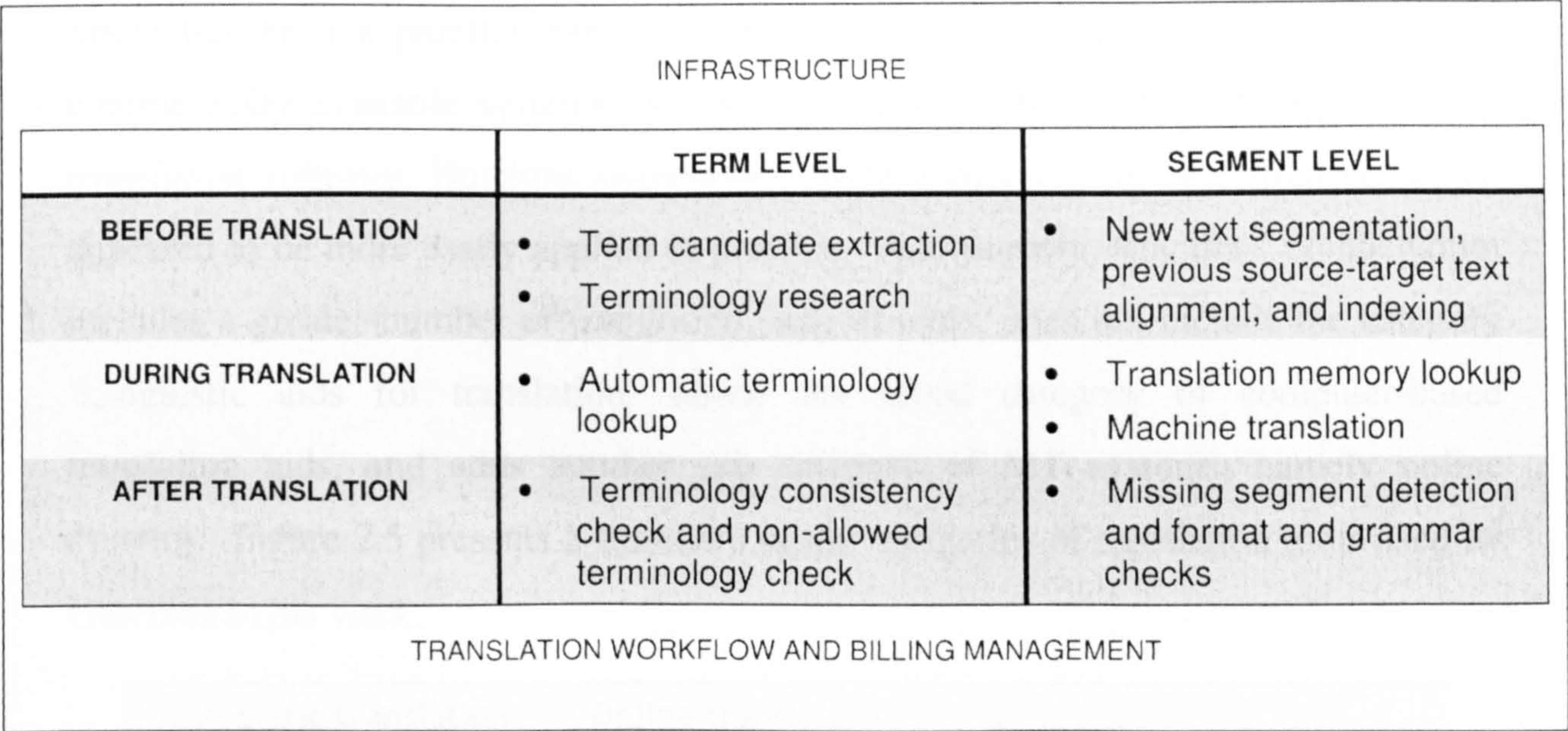


Figure 2.3 Melby’s eight types of translation technology (Melby, 1998)

In an attempt to define categories of translation tools (Hutchins, 2000b), the International Association for Machine Translation (IAMT) categorised them in two main groups: Automatic translation (MT) systems and Computer-based translation aids. In this second wide group, those tools that are familiar to the general public (described as systems that provide linguistic aids for translation by Hutchins) are differentiated from those that have been specifically designed to support translators (Translation support tools). Figure 2.4 below lists all the categories and the tools belonging to each one, according to the IAMT Certification group classification.

Automatic translation systems	Computer-based translation aids	
	Linguistic aids for translation	Translation support tools
Basic level systems ("entry level" or "home use")	Dictionaries (bi/multilingual)	Electronic dictionaries
Standard level systems ("Professional level")	Language aids (grammatical)	Terminology management systems
Advanced level systems ("Company level")	Spelling checkers	Translation memory systems
	Style checkers	Foreign language authoring systems
	Terminology aids	Translator workstations
	Specialised glossaries (areas/clients)	

Figure 2.4 IAMT Certification initiative classification (based on Hutchins, 2000b)

There has been a parallel, but independent, effort to compile a general guide to commercially available systems by John Hutchins (2000a). In his *Compendium of translation software*, Hutchins suggested a slightly different set of definitions which appeared to be more easily applied in practice. Additionally, Hutchins’ compendium includes a greater number of translation support tools, does not include the category ‘Linguistic aids for translation’ inside the broad category of computer-based translation aids, and adds another sub category of MT systems, namely online systems. Figure 2.5 presents a summary of the categories of translation tools used by Hutchins in his work.

Automatic translation systems	Online translation systems	Translation support tools	
Home use MT system	MT services (i.e. translation service via Internet or cellular)	Electronic dictionaries	
Internet/Web MT system		Terminology management systems	
Professional use MT system	MT portals (i.e. access to MT services on Internet and/or to information about MT systems)	Translation memory systems	
Client/server MT system		Translator workstations	
		Alignment tools	Added tools
		Pre-editing tools	
		Localization support tools	

Figure 2.5

Compendium of translation software classification of translation tools (based on Hutchins, 2000a)

Austermühl (2001) has reviewed some of the existing models (Melby, 1982; Hutchins and Somers, 1992) and proposes a process-oriented approach to understand that translation tools are an integral part of the translation process, and instruments that support the translator during the various sub processes of translation. He states that in order to make an effective use of translation tools, the translator needs to determine what types of translation tools are needed at what stages in the translation process. In addition, he outlines that to use translation tools effectively, and design and evaluate them; compatibility between the tools and the steps must be ensured. In the whole

translation process, Austermühl differentiates three levels at which translation tools may help translators, namely translation workflow management level, linguistic and cultural transfer level, and automation level. Figure 2.6 below summarises the tools and resources that, according to Austermühl (2001) support translators during the sub processes at each level of the translation process.

Level	Sub processes		Translation tools / resources
Translation workflow management	Client-translator communication		Internet-based communication tools, e.g: <ul style="list-style-type: none">- e-mail- FTP- WWW
Linguistic and cultural transfer	Reception phase	Retrieval of background knowledge	<ul style="list-style-type: none">- Encyclopedias- Knowledge databases- Information retrieval systems- Contacts to domain experts<ul style="list-style-type: none">- Mailing lists- Newsgroups
		Source text analysis	<ul style="list-style-type: none">- Terminology extraction tools- Terminology databases- Terminology databases
	Transfer phase	Retrieval of linguistic, encyclopaedic and intercultural knowledge	<ul style="list-style-type: none">- Electronic dictionaries (CD-ROM or Internet)- Terminology databases- Hypermedia systems
	Formulation phase	Syntagmatic relations and collocations	<ul style="list-style-type: none">- Electronic dictionaries (CD-ROM/Internet)- Terminology databases- Style guides- Collocational dictionaries- Text corpora (CD-ROM/Internet)
		Document management process	<ul style="list-style-type: none">- Alignment tools- Translation Memory tools- Terminology management tools
Automation	Whole translation process		Translation memories Software localization tools Machine translation systems

Figure 2.6 **Austermühl’s process oriented approach (based on Austermühl, 2001)**

All the classifications presented above are a valuable contribution to the translation studies research, offering classifications of different nature: the human-machine involvement in the translation process (Hutchins and Somers, 1992), the translation tools used at each phase of the translation process (Melby, 1998), the types of application at each sub classification of translation tools (Hutchins, 2000b, 2000a), or the types of application at each process and sub process of the translation process (Austermühl, 2001). However, all these classifications focus either on linguistic processes involved in the translation process, or on types of application that fit into a number of sub categories of translation tools. These perspectives have a number of limitations. These models do not include ICT that supports translators within the context of a freelance translation business. Types of application which might support freelance translators' activities in other processes around the core translation function supported by CAT tools, such as the ones discussed earlier in the chapter (e.g. financial management of their translation business and promoting their services) would not fit into these models of ICT adoption. From the translation industry point of view, existing models do not fully consider ICT in the context of freelance translators, and thus these classifications are restricted to the linguistic-related activities of the translators. From the freelance translation business point of view, existing models do not consider any managerial or organisational issues (e.g. ICT and business strategy) regarding the adoption of CAT tools or other current ICT that is also part of the translators' workflow.

The framework devised for the research of this study will draw on the reviewed models, but it will also intend to provide an updated model of CAT tool adoption that overcomes the highlighted limitations of previous research, mainly addressing the freelance translation context (this framework is presented in detail in Chapter 3).

2.2.2.2. Translation tools: Origins and evolution

The historical development of computers for the translation of human languages has been well researched and documented by researchers (see for example Slocum, 1988;

Hutchins and Somers, 1992; Melby, 1992; Hutchins, 1996; Kay, 1997; Abaitua, 1999; Hutchins, 2001a, 2001b, 2002).

The origin of research on using computer aids for translating natural languages can be attributed to Warren Weaver of the Rockefeller Foundation, who was one of the pioneer researchers who put forward the use of cryptographic techniques, the application of the Claude Shannon information theory and statistics, and speculations about universal principles underlying natural languages.

Early developments aimed to achieve automatic ways of translating texts from one language to another: what was called 'Machine Translation (MT)'. A MT system can be defined as "software for automatic translation, where input units are full sentences of one natural language and the output units are corresponding full sentences of another language" (Hutchins, 2000a:4) without the intervention of any human translator (excluding pre-editing or post-editing) (Slocum, 1988).

The first public demonstration of a machine translation (MT) system was held in 1954, in a collaboration of IBM with Georgetown University. These early systems consisted basically of large bilingual dictionaries and a set of rules that allowed to determine the syntactic order of the output. This initial optimism made possible to think of developing a system that offered fully automatic high quality translation (FAHQT). In this context of euphoria, two systems that are still used in the present, *Systran* and *Metal* were developed by Georgetown and Texas universities.

After one decade of optimism and investments supporting predictions of successful MT systems, the outputs produced were still disappointing, and the human translator always had to be present to widely revise (post-edit) the outputs, so they failed to fulfil the expectations created. By 1964, the US government sponsors had become increasingly concerned at the lack of progress, and the US National Research Council set up the Automatic Language Processing Advisory Committee (ALPAC), which concluded in a 1966 famous report that MT was slower, less accurate and twice as expensive as human translation, and that there was no immediate or predictable prospect of useful machine translation (ALPAC, 1966). It saw no need for further

investment in MT research, and instead it recommended the development of machine aids for translators, such as automatic dictionaries, and continued support of basic research in computational linguistics.

Although the ALPAC report had great impact elsewhere in the Soviet Union and Europe, the drastic effect on MT research in the United States did not reproduce in Canada, France, and Germany. In Europe, the Commission of the European Communities adopted the system *Systran* and sponsored an ambitious project called *Eurotra* in 1976. In the same year, another successful MT system for translating weather reports, *Meteo*, was developed in Canada by the research group TAUM (*Traduction Automatique de l'Université de Montréal*). Despite new efforts in research during the 80s, the expectations in machine translation success were less and less supported by governments, companies, and institutions.

In the absence of successful results, there has been a shift from fully automated machine translation (FAMT) systems towards the research and development of computer tools that assist translators, called Computer-Assisted Translation (CAT) tools (Hutchins and Somers, 1992), as in some way had been suggested by the ALPAC report (ALPAC, 1966) and Kay (1997), in an internal working paper written for Rank Xerox in 1980, but not published until 1997. For 30 years, software developers had been trying to replace human translators with machine translation. “This legacy has caused our industry [translation tools] to fall behind in performance improvements made in other [software] industries” (Hunt, 2003). While FAMT systems were based on rules – ‘Rule-based Machine Translation’ (RBMT) –, the main new developments in the early 90s are based on analogies – ‘Analogy-based Machine Translation’ (ABMT)–, also called ‘Example-Based Machine Translation’ (EBMT). Today, translation tools embrace not only MT systems, but also a number of computer technologies that assist in the process of translating from one language to another, such as the translation memory and terminology management functions which are part of CAT tool packages.

A 'translation memory' (TM) can be defined as a "database that stores previously translated sentences that can be retrieved in future translation projects in an attempt to prevent [eliminate] repetitive, time-consuming work. Pre-translated sentences in the text are retrieved via fuzzy [approximate] matching, leaving only parts of the sentence that do not have matches to the translator" (Tunick, 2003:14). This type of application is the main function of the CAT tool packages available today and is one of the most useful facilities for translators (Hutchins, 2005).

A 'terminology management tool' can be defined as "a program that catalogues words and phrases along with pertinent related information [e.g. grammatical, context] in a database in a manner conducive for use in linguistic applications" (Langewis, 2002:6).

Practitioners have claimed that significant benefits can be obtained from their use of CAT tool packages, especially with regard to the reductions in the time invested in the translation process, and in the cost of their translation projects provided by the translation memory functions. Some examples of these claims can be observed in the following quotes:

"The main benefit of tools is leveraging translated text from TM and reducing project management time and engineering support. [...] If we can reuse 40% of the weekly average output in leveraging TM, it saves us (and our clients) a lot of money. The larger savings, however, is in the form of project time scales. Tools and workflow can save at least as much in reductions of real-time use of project managers and engineers. The client benefits from the reduction in time-to-market – which is probably more relevant." (quoted by Hedley Rees-Evans in Shadbolt, 2003:6);

"TM software can reduce the length of the translation process by 50%. Additionally, reductions in total translation costs of between 15% and 30% can be realized" (Tunick, 2003:14).

In these quotes, a number of benefits of using CAT tools are highlighted, especially with regard to reutilising a significant portion of the translation output, and reducing the length of the translation process, which results in a reduction of costs for translators and their clients. However, these statements were made in the context of large translation services providers, and it remains unclear whether the same benefits are obtained by freelance translation businesses.

2.2.2.3. *CAT tools and freelance translators*

CAT tools represent a major advance in the ICT available to support the translator's work, and their availability to freelance translators has increased the prospects of a widespread use of these tools (see for example Heyn, 1998; Joscelyne, 2003; Somers, 2003b). The focus in this section is placed on CAT tools, their role within the freelance translator workflow, and their use by freelance translators.

Existing literature about tools for translators contains a number of discussions about a 'translator's workstation' (see for example Melby, 1982; Hutchins and Somers, 1992; Hutchins, 1998a; Somers, 2003a). As highlighted in the models presented earlier, the emphasis of these discussions tends to be restricted to ICT to support what might be understood as 'core' translation activities, such as document production, managing terminology, storing and retrieving segments of previously-translated text, and automated translation. The software to support these core activities is typically categorised according to levels of automation, ranging from basic word processing facilities to support human translation, through to machine translation to support fully automated translation. CAT tools, mainly through its terminology management and translation memory functions, are present in these 'translator workstations', providing support to these 'core translation' activities.

However, as pointed out by Locke (2005) and Varona (2002), the freelance translator's workflow involves a broader range of activities than the conventional core translation activities. Locke cites budgeting, pricing, and hardware and software acquisition as examples of activities the freelancer must undertake (p. 20). Varona adds other activities that translation micro businesses must undertake like file or document management, customer services, or marketing functions (p. 202).

Rather like the discussions in the literature about translators' workstations, existing empirical investigations of the adoption of CAT tools by translators have not tended to cover the range of activities undertaken by freelancers surrounding the core translation process. Some, for example, have concentrated on the translation activities and on a narrow subset of translation tools, such as investigations into the uptake of machine

translation systems (see for example Brace, Vasconcellos and Miller, 1995). Others have been devoted to the use being made of ICT within an individual organisational setting. Examples include the reviews of translation tools usage at the European Commission reported in Blatt (1998) and Brace (2000); as well as a study of terminology management tools at Ericsson (Jaekel, 2000), and a study of machine translation usage at Caterpillar (Lockwood, 2000). More recently, in a related sector – the localisation industry– the uptake of translation memory tools has been studied (Lommel, 2002, 2004); and another survey about the resources, such as the hardware and software, utilised by translators has been conducted by Fulford (2001).

In addition, research to date has generally been concentrated either on evaluations of technical features of tools for translators (see for example EAGLES project, 1996) or their introduction to the translation departments of large organisations (Weßel, 1995; King, 1998). King presents an article showing the results of three studies about the different workflow patterns and consequences originated from the use of translation tools in translation departments of large organisations. She examines these scenarios through real experiences, describing each work environment, suggesting which translation tools might be introduced, and analysing the consequences of the introduction of new tools and new ways of working. King concludes that translation tools are likely to be of benefit to almost everybody, either by providing a more familiar and easy to use computer-based environment, or by suiting to specific situations and to different contexts of work. Furthermore, she outlines as a critical factor the need for a preliminary analysis before adopting translation tools and states that “maximum benefit from introducing translation technology can be gained by careful preliminary analysis of what is really needed and of the consequences of introducing it.”

Langé and Bennett (2000) have also carried out research on the use of translation tools by companies. Specifically, they analyse, through a one-firm case study approach, whether the integration of a machine translation system with a CAT tool system would improve the productivity of their translators. The implementation process consisted in several pilot phases, comprising the use of an MT system first, the use of

a CAT system, and readjusting the translation process workflow. Results showed that the throughput times could be reduced by 50 percent if all ran smoothly (i.e. if there were no technical problems and everyone involved fully cooperated). In fact, translator's willingness to adapt to a new and more automated workflow was found to be critical to success. Regarding the impact on the translators, the study showed that after an initial negative attitude towards automation processes (specifically MT), the degree of motivation and cooperation increased dramatically after individual training (including freelance translators).

There are also a number of descriptive studies showing what translation tools are being used in different size organisations (see for example Blatt, 1998; Chanod, 1998; Rinsche, 2000). These are examples of how organisations have had to develop their own systems in order to adapt translation tools to match their own workflow and be more efficient as stated by Joscelyne (2003).

Whilst some studies have been more comprehensive in their coverage of translators' working practices and the technology used, their findings are inevitably now somewhat dated as the studies were undertaken prior to, or in the very early days of, both the 'Internet boom' in the business world and the widespread commercial availability of CAT tools. Moreover, these studies tended to be focussed on the working environments of in-house translators. Such studies include Smith and Tyldesley (1986) and Fulford, Höge and Ahmad (1990). A European study, carried out as part of the LETRAC Project, investigating the 'language engineering' and 'language technology' requirements of both in-house and freelance translators, was undertaken more recently, and reported in Reuther (1999). However, its findings do not really provide any detailed insights into the technology actually being used in the freelance translator community.

As highlighted in the previous sections of this chapter, CAT tools have only started to be efficient for translators recently, mostly with the development of translation memory technology and its integration with other tools, such as terminology management systems. Freelance translators have only started adopting these new

translation tools in the past few years; therefore, it is not surprising that little or no research has been conducted to date into CAT tool use in the freelance context.

In summary, existing studies and research conducted in the translation sector present a range of tools that are available today to support translators in their translation activity and meet an increased demand for translation services. Among the range of translation tools available, CAT tools seem to represent a major advantage for making translators more productive and increase the quality of their translations. Although there is some evidence of these benefits in larger organisational contexts, research has not addressed the particular context of freelance translators. There is little evidence of the extent of the current adoption of CAT tools among the translation community, and in particular among freelance translation businesses. In addition, the context of this type of translation business has not been discussed by existing models and categorisations of the ICT available to translators.

The present research seeks to fill this gap in current knowledge by exploring the extent to which freelance translators are adopting CAT tools in the UK, in comparison with their adoption of other translation tools and other ICT in their workflow. In addition, in this study, CAT tool adoption is understood within the context of freelance translators, which is defined by the characteristics of the translators, the characteristics of the freelance business they run, the ICT used by them to support other activities in their workflow, and their attitudes towards ICT in general, and adoption of CAT tools in particular.

2.3. ICT adoption in small businesses

Although CAT tool adoption has not been much researched in the translation sector, there are other areas in which research about the adoption of technologies in small businesses has been studied more extensively. This section of the literature review presents a discussion of existing research conducted in other domains that helped to

inform this study, as well as to develop a conceptual framework that generated relevant research questions. Pertinent literature was identified in the domains of Information Systems (IS) and Small business management.

Within each of these domains, a number of more specific areas were deemed to be of importance to the present research, namely:

- **Small business management:**
 - IS/ICT adoption strategies in small businesses;
 - IS/ICT adoption factors in small businesses, including motivators and inhibitors;
 - The influence and role of the CEO in IS/ICT adoption decisions.
- **Information systems:**
 - Measures for determining the success of IS/ICT adoption and implementation in organisations;
 - Stage models of IS/ICT adoption in organisations.

2.3.1. ICT and SMEs

The dawn of the 21st century was marked by an information-based economy that makes organisations more reliant upon Information and Communication Technology (ICT) and Information Systems (IS) to support their business processes (Irani and Love, 2001a). However, research undertaken by Kempis and Ringbeck (1999) claims that a higher availability of ICT does not always translate into higher efficiency and effectiveness, and suggests that a significant proportion of organisations may be under-performing with regard to efficiency and effectiveness of ICT utilisation. Researchers and practitioners are seeking for an explanation to this fact. For example, McKay and Marshall (2001) state that the notion of an information-based economy and the arrival of an e-business domain have led to considerable faith being placed in IT to deliver performance improvements, and that there is a concern that ICT/IS is not delivering what it promises. Irani and Love (2001b) attribute this lack of delivery “to

the difficulty in determining business value from ICT/IS investments”, and the “considerable indirect costs associated with enterprise-wide systems”. The measurement of business value of ICT/IS investments has been widely debated in the IS and business management literature (see for example Weill and Olson, 1989; Serafeimidis and Smithson, 1996; Irani *et al.*, 2001), yet there has been a lack of consensus in defining and measuring ICT/IS investments (Irani and Love, 2002), and the important concept of ICT/IS evaluation has not been subjected to extensive empirical research (Davenport, 1993). This area of research has looked at these issues in the broad organisational context, but it represents a more critical problem in the case of the SMEs, where management functions and ICT budgets are more limited.

In SMEs, managers play a decisive role when deciding about investing in new technologies (see for example Cragg and King, 1993), therefore, they have to carefully consider the potential impacts of acquiring them, and then take an informed decision of the investment. In order to better utilise resources, managers need to have an understanding of the impact of ICT/IS on the organisational infrastructure and overall performance, as shown in the discussion of ICT/IS evaluation above. This literature shows that an analysis of potential impacts of ICT/IS for SMEs is needed, and once an ICT/IS has been adopted, ICT/IS evaluation would provide with feedback that allows to better establish benchmarks of what is to be achieved by ICT/IS investments.

Studies on the evolution of IS in SMEs (see for example Saarinen, 1989; Cragg and Zinatelli, 1995) have identified several approaches to investigate the evolution of IS in organisations, although not necessarily small firms. First, a number of models have looked at the growth stages undergone by organisations adopting ICT/IS. Second, a number of factors that influence the decision of adopting ICT/IS in SMEs have also been studied to understand what are the determinants of the adoption. Other studies have looked at the factors that determine the IS success. Finally, IS evolution has also been studied through the concept of its sophistication in organisations. These four

aspects of the IS literature on ICT adoption in SMEs are analysed in the following sections and related to the specific case of freelance translation businesses.

2.3.1.1. *Models of ICT adoption in SMEs*

According to Cragg and Zinatelli, one of the related areas identified by researchers as relevant to understand the adoption of new ICT is the analysis of 'stage models' of IS adoption and evolution in organisations, which are based on the assumption that computing moves through a series of growth stages.

Saarinen (1989) reviewed the existing literature about the evolution of and organisation's information systems through the discussion of models developed in IS science and the broader theoretical features to which they apply. This review goes from – according to King and Kraemer (1984) – the important initial step in research into the evolution of IS in organisations (Churchill *et al.*, 1969; Nolan, 1973, 1979), to more specific-area models (IBM, 1981; McFarlan *et al.*, 1983; Rockart, 1983; Zmud *et al.*, 1987). The early stages of growth in these models seem to be close to each other in the models, but as the growth process proceeds more differences in the assumed development patterns can be detected. According to Saarinen, these models explicitly or implicitly incorporate underlying theoretical principles from economics, diffusion theory, organisational learning, and growth and stages theory.

Economic theories offer a whole body of literature which could be applied in analysing the development of computing in organisations, and Saarinen cites Schumpeter (1934) as an example. These theories assume that the balance between supply and demand for ICT is reached in the same way as in the market (i.e. the price of using ICT determines the demand). However, researchers of ICT/IS evolution have considered that economic theories did not provide an answer to ICT/IS evolution, which changes over time, and that other, more descriptive, models and theories were needed to explain the mechanisms beyond the adjustment process of demand and supply (Saarinen, 1989:393).

Diffusion theories define ‘diffusion’ as “the process by which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 1995:5). Saarinen (1989:393) states that “diffusion theories could offer a wide and well-formulated set of models [...] meant for use in studying a phenomenon which represents one possible view of the development of computing in organisations”, and that “authors in the IS field seem to have been aware of this literature, but the existing diffusion models have not been used significantly until now”.

Organisational learning theory describes the changes associated with the ICT/IS evolution process through the concept of ‘learning curves’, which illustrate, for example, unit costs as a function of the number of times performed (Saarinen, 1989:394). According to Saarinen’s work, “most of the IS evolution models have recognized learning to be one of the most important mechanisms. However, connections with existing learning theories seem to be weak and their potential to be only partially utilized.”

Finally, growth and stages theory describes the growth of an organisation in terms of sequences of distinguishable stages. According to this theory, organisations go from one stage to the following after reaching a crisis and undergoing a revolution that leads them to a new growth process.

Churchill’s model (Churchill *et al.*, 1969), in which the idea of the stages theory was introduced to computing, proposed a number of levels of automation, from the simplest tasks to the automation of more complex tasks (like making decisions based on strategic purposes). The early approaches of ICT evolution in translation firms suggested in the translation tools literature seem to have followed a similar path to the stages described by Churchill. These approaches (see for example Hutchins and Somers, 1992; Hutchins, 1996, discussed in more detail earlier in the chapter) understood the automation of the translation process as the ‘logical’ aim of the translation tool development and use.

Nolan's model (Nolan, 1973; 1979), presented a more detailed account of the stages of IS growth in organisations, using budget growth as the primary indicator of the evolution, and implicitly based on the dynamic diffusion theory and organisational growth models (according to Saarinen, 1989). This model has been considered to be the most inclusive description of the evolution of IS in organisations (Saarinen, 1989), and although its validity has been criticised (Benbasat *et al.*, 1984; King and Kraemer, 1984), researchers suggested its testing in small firms (Cooley *et al.*, 1987; Stair *et al.*, 1989), and studies on ICT adoption have drawn on it (Cragg and King, 1993).

Churchill's and Nolan's models of stages of adoption, have explained IS evolution in the broad context of organisations; however, many of the processes and management issues of large organisations are much simpler in the case of translation freelance businesses (see for example Joscelyne, 2003).

Research showed that the models developed in the IS field do not take full advantage of the possibilities offered by the theories and models developed in the more mature fields of scientific inquiry, and that computer use is generally used to indicate the state and growth of computing, in spite of showing evidence that the extent of use (often measured by cost) has any direct effect on the level of benefits gained. Saarinen criticises that these models are descriptive and that they give no suggestions for evaluating the effectiveness of different ways of using computers, to conclude that "as long as technologies continue to develop, there will be a need for detailed models addressing the specific problems of each technology."

In the translation sector, there have not been any models that have tried to explain ICT adoption up to now. For this reason, one of the aims of the present research is to look at how ICT adoption has been investigated in other disciplines, such as information systems, and use the suggestions and theoretical foundations offered by them to develop a suitable framework to investigate CAT tool adoption in the specific context of freelance translation businesses.

As presented earlier in this chapter, theoretical discussions about the existing ICT available to translators have tended to focus on proposing an evolution from fully manual (human) translation to fully automatic (machine) translation, through several degrees of computer-aided tasks (Hutchins and Somers, 1992). There have also been further discussions on the applicability of software tools supporting translators' main tasks (i.e. those within the translation process) to the context of the individual translator (see discussions about the 'translator's workstation' in Kay, 1980; Melby, 1982, 1992; Hutchins, 1996, 1998b, 1999; Somers, 2003a). However, the scope of these studies was limited to the tools aiding translators in the purely linguistic tasks of their job, and there was not much evidence of the current usage of the ICT available to freelance translators. At the same time, existing research reports some degree of uncertainty about the use of CAT tools, along with claims reflecting scepticism about the reasons for not observing a widespread use of these tools among translators (see for example Langé *et al.*, 1997; Heyn, 1998; Hutchins, 1999; Esselink, 2003, who mention concerns about the high cost of the tools, conservative attitudes towards technological investments, low job satisfaction levels, or the unsuitability of CAT tools for the freelancers' needs).

Some empirical studies have highlighted translators' needs for software support (Smith and Tyldesley, 1986; Fulford *et al.*, 1990), and other studies have been conducted to determine the resources, such as the hardware and software, utilised by translators (for example Fulford, 2001). There have also been studies evaluating the technical features of translation software tools, and their introduction to the translation departments of large organisations (Weßel, 1995; King, 1998). However, no research has as yet tried to use formal models to analyse the adoption of CAT tools in the context of freelancer translators.

2.3.1.2. *ICT Adoption factors in SMEs: Motivators and Inhibitors*

Another of the IS-related areas identified by researchers as key to understanding the adoption of new ICT is the analysis of factors that may affect the decision and the process of adoption (Cragg and Zinatelli, 1995).

In order to get an understanding of whether ICT are successfully adopted and used in firms or not, researchers have tried to identify the factors that affected positively and negatively the processes of adoption. Prior to the main stage of ICT adoption, there are a number of factors that can encourage or discourage the decision of adopting ICT, therefore leading SMEs to adoption or deterring them from adopting ICTs.

There is a body of literature that relates to ICT adoption and to the factors that encourage and discourage ICT adoption. Researchers in this area which have analysed ICT adoption success factors, covered in the next section of this chapter, have drawn on the literature that explores the motivators and the inhibitors for ICT growth in SMEs (for example, Cragg and King, 1993); and the literature on reasons for computerisation in SMEs (Easton *et al.*, 1982; Farhoomand and Hrycyk, 1985; Malone, 1985; Baker, 1987; Lefebvre and Lefebvre, 1988; King and McAulay, 1989).

2.3.1.2.1. Motivators

Studies on ICT growth in SMEs, like Cragg and King (1993), are based on previous research on factors that encourage or discourage computerisation in SMEs, and have distinguished a number of motivators that reflected internal, external, and individual factors, such as relative advantage in information processing, relative advantage in planning and control, and relative advantage in work improvement. This group of motivators focuses on factors that give some kind of advantage (e.g. time, effort, or economic savings), and the authors identify three more general factors related to external support (consultant support), competitors (competitive pressure), and CEO involvement (managerial enthusiasm). CEO enthusiasm toward computing was found to be the strongest motivating factor for ICT adoption and growth by Cragg and King. However, the nature of this involvement can vary from one CEO to another, as shown by Martin (1989) who revealed five types of involvement, ranging from remote to close involvement (discussed later in this section).

Among the findings of the studies on motivators for computerisation of SMEs (referred to above), there are some factors that have been identified as highly significant drivers to ICT adoption: the search for an increase in the office tasks

productivity (Easton *et al.*, 1982; Baker, 1987), the improvement of information management and processing (Easton *et al.*, 1982; Farhoomand and Hrycyk, 1985; Malone, 1985; Baker, 1987; Lefebvre and Lefebvre, 1988), or the effect of external information sources (Lefebvre and Lefebvre, 1988; King and McAulay, 1989).

More specifically, a desire for an increase in the productivity, identified as a key persuasion factor by Baker (1987), is a perceived benefit that allows SMEs to be more efficient and save time and effort (Cragg and King, 1993) through the automation of office tasks.

A higher capability of data processing (Easton *et al.*, 1982; Baker, 1987), a quicker processing of the information (Lefebvre and Lefebvre, 1988) and therefore, an improvement in information management is another factor that brings more savings in terms of time and effort (Cragg and King, 1993), helps the firm to cope with information overload (Farhoomand and Hrycyk, 1985), and increases the performance of the firm through a higher control for effective management (Malone, 1985).

External factors may also influence the decision of adopting ICT in a variety of forms. For example, through the influence of consultants that increase the willingness of CEOs to use ICT, either by recommending the firm to develop an ICT solution or by the consultant's own use of technology (King and McAulay, 1989). Lefebvre and Lefebvre (1988) found some more external sources of information affecting ICT adoption, apart from consultants' support, like general environment, clients, competitors' pressure (also identified by Cragg and King, 1993), employees and suppliers; although they do not find that there are a number of these factors that are clearly more important than others for the adoption.

Lefebvre and Lefebvre (1988) discuss that the decision of the small-firm manager is mainly influenced by information sources that are external to the firm, being the manager the person more likely to take the final decision, especially in SMEs, where the manager is much more prone to outside influence than managers of large firms (Malone, 1985).

A summary of the factors positively affecting IS adoption in SMEs found in the literature reviewed is presented in Table 2.1 below. This categorisation classifies motivators into external and internal.

Table 2.1 **Motivators affecting IS adoption in SMEs**

Type	Motivator	Studies
Internal	a. Advantage in information processing	Baker, 1987 Cragg and King, 1993 Easton, 1982 Farhoomand and Hrycyk, 1985 Lefebvre and Lefebvre, 1988 Malone, 1985
	b. Advantage in planning and control	Cragg and King, 1993 Malone, 1985
	c. Increase of productivity	Baker, 1987 Cragg and King, 1993 Easton, 1982
	d. CEO involvement	Cragg and King, 1993
	e. Advantage in managing information	Cragg and King, 1993 Farhoomand and Hrycyk, 1985
External	a. Consultant support	Cragg and King, 1993 King and McAulay, 1989
	b. Competitive pressure	Cragg and King, 1993 Lefebvre and Lefebvre, 1988
	c. External information sources	King and McAulay, 1989 Lefebvre and Lefebvre, 1988
	d. Clients, employees or suppliers influence	Lefebvre and Lefebvre, 1988

In the freelance context, the role of the CEO is particularly important, since the manager of the freelance translation business is also the end-user of CAT tools. In the IS literature reviewed, CEO involvement and eagerness towards technology – denoted by Cragg and King (1993) as ‘managerial enthusiasm’ – has been confirmed to be one of the most important factors during the stage when the adoption decision is taken and once ICT have been adopted, for the success in the use of the systems (DeLone, 1988). Freelance translators have to both make the decision to adopt CAT tools and

use them. Therefore, it is relevant to examine studies that have analysed CEO involvement in more depth, such as Martin (1989), who identified a range of different involvement patterns among CEOs in SMEs, and categorised them into five groups of behaviour patterns. Table 2.2 shows the five types of CEO involvement identified by Martin.

Table 2.2 **Types of CEO involvement in computerisation in SMEs**
(Martin, 1989:192)

Type	Behaviour pattern
1	Top manager is remote from the computer resource, and is uninvolved even in key decisions in relation to its development or operation
2	Top manager is involved in a managerial, supervisory capacity, and identifies goals and sets targets
3	Top manager is closely involved in implementation, and takes part in detailed choice and/or design decisions
4	Top manager is directly involved technically, and takes part in programming or spreadsheet development
5	Top manager routinely interacts directly, hands-on, with the IS

Although Martin's classification of CEO involvement looks at the role of managers in larger organisational contexts, it is important to observe that all the behaviour patterns described in levels 2 to 5 are present in the figure of the freelance translator adopting CAT tools. Level 1 cannot apply to the freelance translation context because it describes a remote involvement, which in the case of freelance translators does not exist.

The role of the CEO in freelance translation businesses, among other motivators identified (e.g. advantages of adopting ICT, influence of external sources), is something that will need to be investigated in this study to gain a better understanding of the characteristics of the freelance translators underpinning the adoption of CAT tools.

2.3.1.2.2. Inhibitors

In the same research conducted by Cragg and King (1993) about motivators, inhibitors of ICT growth are also explored, again based on previous studies on computerisation

in SMEs (Bourner *et al.*, 1983; Baker, 1987; King and McAulay, 1989). According to Cragg and King's (1993) study, the most significant factors that deter SMEs from adopting ICT identified by the authors can fall into broader categories like: ICT education factors (such as lack of CEO or personnel with broad ICT knowledge, lack of personnel with specific ICT skills, and negative influence of higher levels), lack of managerial time, economic factors (such as an inappropriate economic climate, an excessive cost, and firms being too small), and technical factors (such as having an unstructured system, and having poor software support).

As corroborated by other studies (Baker, 1987; Lefebvre and Lefebvre, 1988; King and McAulay, 1989), the lack of general ICT knowledge has been found to be the most important inhibitor for ICT adoption and growth, together with a lack of economic resources. These two factors become accentuated in the case of the SMEs, where economic resources available for ICT investments are more limited than in large companies. The fact that many SMEs do not even have a department devoted to ICT support, together with the tendency to employ more generalists than specialists, makes it more difficult for them to have a high internal ICT knowledge. For this reason, another major inhibitor of ICT adoption is the influence of the person that has to make decisions regarding ICT – generally the CEO. Since this person may not have a high ICT knowledge either, their decision tends to depend on the their enthusiasm towards technology they may have and the confidence they may have in external support – such as consultants or vendors (see for example, Kole, 1983; Baker, 1987; King and McAulay, 1989; Gable, 1991).

A summary of the factors that deter the adoption of ICT in SMEs found in the literature is presented in Table 2.3 below. This categorisation classifies inhibitors into external or internal factors to the organisation.

Table 2.3 **Inhibitors affecting IS adoption in SMEs**

Type	Inhibitor	Studies
Internal	a. Lack of general IS/ICT knowledge	Baker, 1987 Cragg and King, 1993 Farhoomand and Hrycyk, 1985 King and McAulay, 1989 Lefebvre and Lefebvre, 1988
	b. Lack of managerial time	Baker, 1987 Cragg and King, 1993 King and McAulay, 1989 Lefebvre and Lefebvre, 1988
	c. Lack of economic resources	Cragg and King, 1993
	d. Inappropriate economic climate	Cragg and King, 1993
	e. Too small firm	Cragg and King, 1993
	f. Unstructured system	Cragg and King, 1993 Lefebvre and Lefebvre, 1988
External	a. Lack of good technical support	Cragg and King, 1993 Farhoomand and Hrycyk, 1985
	b. Lack of confidence in vendors	Baker, 1987 King and McAulay, 1989
	c. Technology changing quickly	Baker, 1987

The inhibitors identified in the literature about ICT and SMEs represent a valuable set of factors that will need to be investigated in the present research to gain a better understanding of the characteristics of the freelance translators hindering the adoption of CAT tools. For example, factors such as the ‘lack of managerial time’, the ‘lack of expertise’ or the ‘lack of economic resources’ which affect SMEs in their adoption of ICT, are particularly likely to affect micro businesses, like freelance translation businesses, where the translator is also the owner-manager of the business. Similarly, some external inhibitors that might affect freelance translators are the existence and reliability on external support in the shape of consultants and mostly vendors, who can provide freelance translators with the right training and technical support that allow

them to cope with the fast changes that the technology used by freelance translators experiences (Rico Pérez, 2002; Joscelyne, 2003).

2.3.1.3. *Success factors for ICT implementation in SMEs*

Success factors have also been studied in the area of information systems that looks at ICT adoption in SMEs. The concept 'Information systems success', denoted also by some authors 'IS effectiveness' (Hamilton and Chervany, 1981; Raymond, 1990; Thong *et al.*, 1996), is recognised by many researchers as difficult to define (as shown, for example, by Weill and Baroudi, 1990).

A number of studies have investigated the factors contributing to IS success in the context of small firms. For example, Raymond (1985) investigated the relationships between organisational characteristics and IS success based on the studies of Ein-Dor and Segev (1982), DeLone (1981), and Turner (1982). Raymond used user information satisfaction and level of system satisfaction as measures of IS success, and the findings revealed that systems success was higher where a greater proportion of applications were developed and used internally, a greater number of administrative applications were used, interactive applications had been implemented, and the IS function was situated at a high organisational level.

Similarly, other studies examining the factors that affect the successful use of IS by SMEs found not only a positive association of IS success with the CEO knowledge of computers, but that CEO involvement was a key factor for IS success (see for example DeLone, 1988; Montazemi, 1988; Palvia *et al.*, 1994; Caldeira and Ward, 2002).

The factors affecting IS success in small businesses that were found to be significant in previous studies were categorised into four major classes (organisational characteristics, organisational action, system characteristics, and internal expertise), plus a fifth category regarding external expertise by Yap *et al.* (1992), leading to the development of a descriptive model of key factors to IS success in a small business context.

External factors affecting IS success were further investigated by Soh *et al.* (1992), Palvia (1996), Thong *et al.* (1996), and Igarria *et al.* (1998), and the computerisation success of SMEs was associated with the capability, experience, and effectiveness of the consultant.

There are some inconsistencies in the findings of all these studies, however, the positive association of IS success and a higher involvement of the CEO in SME computerisation was supported by most of the studies (DeLone, 1988; Yap *et al.*, 1992; Palvia *et al.*, 1994). Cragg and Zinatelli (1995) attribute this inconsistency in the findings to the evolution of IS and changes in the factors affecting its success over time.

This review of the studies carried out in the IS domain regarding IS success factors is particularly important for the present research. There is a lack of research focussing on CAT tool adoption and factors that contribute to its success in the translation studies area. However, the analysis of IS success factors in previous research on IS presents a number of factors (such as CEO involvement in CAT tool adoption, or the influence of software consultants / vendors) that will need to be investigated with regard to CAT tool adoption by freelance translation businesses.

A summary of the factors affecting IS success in SMEs found in the literature reviewed is presented in Table 2.4. This categorisation is based on Yap *et al.* (1992) classification, and includes a fifth category regarding external expertise identified in the same study, as well as adds factors found in subsequent studies.

Table 2.4 Classes of factors affecting IS success in SMEs

Class	Factors	Studies
1. Organisational characteristics	a. CBIS experience	Raymond, 1985 Igbaria <i>et al.</i> , 1998
	b. Proportion of applications developed internally	Raymond, 1985
	c. Presence of in-house processing	Raymond, 1985
	d. User attitudes	Caldeira and Ward, 2002
	e. Rank of computer function	Raymond, 1985
	f. Financial resources	Caldeira and Ward, 2002
	g. Degree of decentralisation	Montazemi, 1988
	h. Company size	Palvia <i>et al.</i> , 1994
	i. Age of company	Palvia <i>et al.</i> , 1994
2. Organisational action	a. CEO support and attitude towards IS/ICT adoption and use	DeLone, 1988 Caldeira and Ward, 2002 Thong <i>et al.</i> , 1996
	b. Computer planning	DeLone, 1988
	c. Sophistication of control	DeLone, 1988
	d. User participation	Montazemi, 1988
	e. Intensity of requirements analysis	Montazemi, 1988
3. System characteristics	a. Type of computer used	DeLone, 1988
	b. Number of administrative applications	Raymond, 1985
	c. Interactive/Online applications	Montazemi, 1988 Raymond, 1985
4. Internal expertise	a. CEO knowledge of computer	DeLone, 1988 Palvia <i>et al.</i> , 1994
	b. Internal IS/ICT competencies	Caldeira and Ward, 2002
	c. User computer literacy	Montazemi, 1988 Igbaria <i>et al.</i> , 1998
	d. Presence of systems analysts	Montazemi, 1988
5. External expertise	a. Vendor's support	Yap <i>et al.</i> , 1992 Caldeira and Ward, 2002 Thong <i>et al.</i> , 1996 Igbaria <i>et al.</i> , 1998
	b. Consultant effectiveness	Yap <i>et al.</i> , 1992 Soh <i>et al.</i> , 1992 Thong <i>et al.</i> , 1996 Gable, 1989, 1991 Kole, 1983 Igbaria <i>et al.</i> , 1998

2.3.1.4. SMEs and ICT Sophistication

It has been noted in a number of studies that one of the fundamental problems that IS researchers face is to characterise organisational information systems, and particularly identify different criteria of systems “maturity” or “sophistication” (Benbasat *et al.*, 1980; Cheney and Dickson, 1982; Ein-Dor and Segev, 1982; Saunders and Keller, 1983; Gremillion, 1984; Lehman, 1985; Mahmood and Becker, 1985; Raymond, 1988; Raymond and Paré, 1992).

“ICT sophistication” is defined by Raymond and Paré (1992) as a multi-dimensional construct which refers to the nature, complexity and interdependence of ICT usage and management in an organisation. Therefore, the concept of ICT sophistication integrates both aspects related to IS usage and IS management, also present in Nolan’s model of stages of growth (Nolan, 1973, 1979). Raymond and Paré (1992), based on variables from previous research to characterise each dimension, identified four dimensions within the construct related to technological support (technological sophistication), information content (informational sophistication), functional support (functional sophistication), and management practices (managerial sophistication).

- Technological sophistication refers to the number and diversity of information technologies used by SMEs as well as to the nature of the hardware and the development tools used by the firm.
- Informational sophistication refers to the nature of the application portfolio of the SME, including both transactional and administrative applications. Another aspect of informational sophistication identified by Ein-Dor and Segev (1982) relates to the degree of integration of the applications, in an SME basically characterised by the presence of software (e.g. database) or hardware (e.g. local area network) that allow information interchange and resource sharing.
- Functional sophistication relates both to the structural aspects of the IS function in the SME (e.g. the location and autonomy of the IS function and the number of internal IS specialists) and to the ICT implementation process (e.g. method, source and uniqueness of applications).

- Managerial sophistication relates to the mechanisms employed to plan, control and evaluate present and future applications (e.g. written documents, formalism of process, position of responsible individual, and level of alignment with organisational objectives).

For the particular interest of this study, the ‘technological sophistication concept’ developed in IS research is likely to help in understanding the conceptual framework of CAT tool adoption by providing the theoretical foundations used in this area to understand ICT adoption in the context of freelance translation businesses. In addition, Raymond and Paré had developed and used an instrument based on the sophistication concept that can contribute to the development of the instrument measuring CAT tool adoption and the adoption of other ICT in the freelance translation business. In the absence of instruments to measure ICT adoption in the translation field, Raymond and Paré’s instrument represents a useful and validated contribution to the measurement of ICT adoption which will be tested in the freelance translation business context.

2.4. Summary of the chapter

This chapter has highlighted the issues arising from literature about the adoption of CAT tools in the translation sector and presents the literature reviewed to inform and shape the present study.

For this purpose, first the literature about translators, their activities, and the ICT available to them has been presented and discussed. This highlighted that there is very little evidence of the use of CAT tools by freelance translators, and that issues surrounding the adoption of CAT tools have not been addressed to date. Despite this lack of studies about CAT tool adoption in the translation sector, the adoption of ICT has been more thoroughly researched within the context of SMEs in the IS domain. Accordingly, a summary of the investigation conducted about ICT adoption in SMEs has been presented, offering theoretical foundations and instruments that will be used

to inform and support the development of a suitable framework to investigate CAT tool adoption in the translation freelance context.

Following the review of the literature which informs the present study, the main aim of this research is to contribute to fill the gap in the knowledge about the adoption of CAT tools in the freelance translation context. In order to achieve this, the conceptual framework that allows the investigation of this issue is presented in the next chapter.

Chapter 3. Research Framework

3.1. Introduction

Advances in the technologies available to translators today aim to improve some aspects of their work, such as increasing their productivity or the quality of the translations they undertake. Existing ICT and newer computer-aided translation (CAT) tools have also become more affordable and available to freelance translators. However, it is not clear the extent to which CAT tools are actually being used among the freelance translator community, and there is some evidence of scepticism towards the use of CAT tools and the suitability of this technology for translators that has been reported in the literature. The literature reviewed in the previous chapter showed that CAT tool adoption has not been studied much. Accordingly, there is no framework available to investigate the adoption of these tools and the reasons for the existing scepticism about the suitability of CAT tools for freelance translators.

Nevertheless, the literature showed that ICT adoption has been studied in other areas, which helped to provide a framework to show which issues would be important to study. The literature about ICT adoption in the context of SMEs in other sectors, such as manufacturing and accounting, was richer and provided an established and valid body of literature and instruments to draw on for conducting the present research. Hence, the literature suggests that the following issues could be worthy of investigation:

- Models of ICT adoption in SMEs, which can help to identify the levels of ICT adoption in small translation businesses (Saarinen, 1989; Cragg and Zinatelli, 1995).

- Factors that have motivated or inhibited the decision of ICT adoption in SMEs, which can help to identify the factors that motivate or inhibit the adoption of ICT by small translation businesses (Easton *et al.*, 1982; Farhoomand and Hrycyk, 1985; Malone, 1985; Baker, 1987; Lefebvre and Lefebvre, 1988; King and McAulay, 1989; Cragg and King, 1993; Cragg and Zinatelli, 1995).
- Success factors for ICT implementation in SMEs, which will help to identify the factors that lead to a successful implementation of ICT in small translation businesses (see for example DeLone, 1988; Montazemi, 1988; Palvia *et al.*, 1994; Caldeira and Ward, 2002).
- Sophistication in the usage of ICT in SMEs, which will help to understand the evolution in the adoption and use of ICT in small translation businesses (Benbasat *et al.*, 1980; Cheney and Dickson, 1982; Ein-Dor and Segev, 1982; Saunders and Keller, 1983; Gremillion, 1984; Lehman, 1985; Mahmood and Becker, 1985; Raymond, 1988; Raymond and Paré, 1992).

3.2. Research objectives

The specific objectives pursued in the present research are:

- To examine the level of CAT tool adoption among freelancers
- To compare that adoption with the adoption of other ICT in the various activities in their workflow
- To explore the perceptions translators have of CAT tools and compare these perceptions with their perceptions of other ICT
- To identify the determinants of CAT tool adoption in a freelance working context
- To examine the impacts of introducing CAT tools into a freelance translator's working environment.

3.3. The research model

In order to analyse CAT tool adoption by freelance translators, determine the relationships of CAT tool adoption with factors that may determine the adoption decision, and examine the impacts that CAT tool adoption may have on the translators’ workflow, a research model was developed, bringing together previous research in the Information Systems domain on ICT adoption and usage, and previous models classifying technologies available to translators identified in the literature of the translation domain. An overall research model is represented in Figure 3.1.

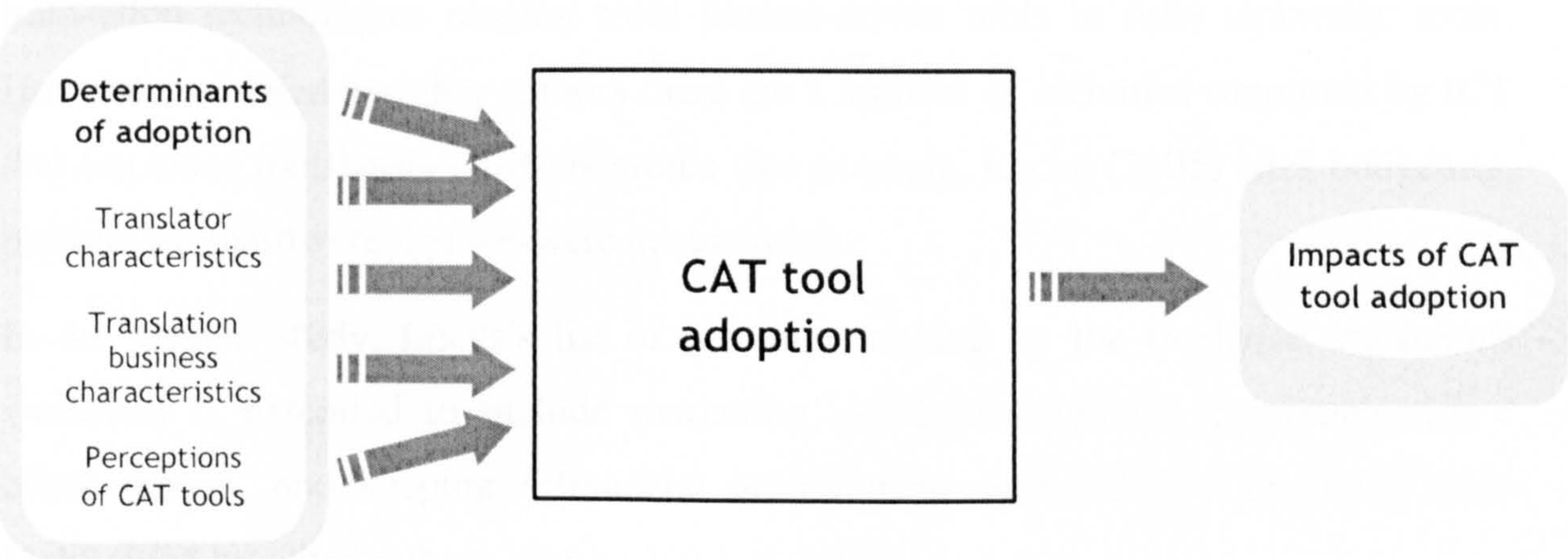


Figure 3.1 Research Model: CAT tool adoption by freelance translators

This figure shows an overview of the research model of this study, displaying the determinants that are likely to affect the adoption of CAT tools, and the impacts that the use of CAT tools may have. In the centre of the model, the core interest of this research (CAT tool use after adoption) is represented, as part of the ICT being used by freelance translators to support the activities of their workflow. On the left part of the model, the determinants that may affect the decision to adopt CAT tools are represented by the “Translator characteristics”, the “Translation business characteristics”, and the translators’ “Perceptions of CAT tools”. Finally, on the right hand side of the model, ICT success is represented by the impacts that the adoption of CAT tools may entail, such as benefits realised or problems that CAT tools may cause to the translators’ workflow.

3.3.1. CAT tool adoption

Section 2.2.2 in the previous chapter showed how literature about ICT and translators has traditionally focused on discussing the tasks and sub processes surrounding the core translation activity, usually categorising technologies according to their level of automation of tasks (e.g. Hutchins and Somers, 1992). Austermühl's process-oriented approach (2001) proposed three levels at which translation tools may help translators (at the translation workflow management level, at the linguistic and cultural transfer level, and at the automation level) which expanded the traditional understanding of translation technologies ranging from human-driven tools to fully automatic tools. However, as noted by other authors there are a number of activities supported by ICT that freelance translators must undertake (for example, Locke (2005) cites budgeting, pricing, and hardware and software acquisition).

In the present study, Locke's list of activities making up the freelance translator's workflow is extended to include marketing, work procurement, communication / client liaison, bookkeeping / financial management, and billing / invoicing (also highlighted by other authors such as Varona, 2002).

This 'activity view' of the freelance translator's workflow provided the basis for researching CAT tool adoption within the ICT and business context of freelance translators. In the present research, the emphasis is on investigating, not so much the degree of automation that translators are willing to permit into their core translation activities, but rather on the range and types of software application they are adopting to support them in each of the individual activities that form a constituent part of their overall workflow. This broader view of activities draws on Austermühl's "process-orientated" view of the translator's workstation. He suggests that in this process-orientated view, the ICT that translators use must encompass both the notion of "translation as a business" as well as translation "as a linguistic and cultural process" (Austermühl, 2001:11). Austermühl's process-orientated approach is, however, not specific to the freelance working environment, and so does not include important components of the freelancer's role, such as marketing and financial management.

The activity view adopted here extends Austermühl's approach to incorporate these components, thereby providing a more comprehensive view of the activities making up a freelancer's workflow.

The freelancer activities forming the basis of the present study are represented in the research model as part of its central box (CAT tool adoption). A more detailed description of these activities is provided in Table 3.1 below, together with some examples of software applications that might be used by freelance translators to support these activities. An explanation of it can also be found in Fulford and Granell-Zafra (2005).

Table 3.1 **Freelance Translators: Activities and ICT Support**

Activity	ICT Support
Document production <i>e.g. creating and formatting target texts; overtyping sources texts with target texts</i>	Word processing software (e.g. MS Word, Wordperfect); Graphical / presentation software (e.g. MS PowerPoint); Web publishing software (e.g. MS FrontPage, Dreamweaver); Desktop publishing software (e.g. QuarkXpress, PageMaker)
Information search & retrieval <i>e.g. locating background and reference materials; locating client company information; identifying terminology; locating definitions of terms; finding examples of terminology usage; managing personal terminology collections</i>	Internet search engine (e.g. Google, Altavista); Electronic encyclopaedia / reference work (e.g. Encyclopaedia Britannica, Encarta); Terminology databank (e.g. EuroDicAutom, CILF); Text corpus / document archive (e.g. British National Corpus, New Scientist Archive); Electronic library (e.g. The British Library, Biblioteca Nacional de España); Electronic dictionary and / or glossary (e.g. yourDictionary.com, Lexicool); Database software (e.g. MS Access, FileMaker); Terminology management software (e.g. MultiTerm, Lingo)
Translation creation <i>e.g. formulating translation</i>	CAT tool (e.g. Trados, Déjà Vu, SDLX, Transit); Machine translation (e.g. Reverso Pro, Systran)

Communication

*e.g. liaising with clients;
networking with colleagues*

Email (e.g. Webmail, MS Outlook, Thunderbird);
Electronic mailing lists (e.g. LANTRA-L, The LINGUIST List);
Online discussion groups (e.g. Proz.com, TranslatorsCafe.com)

Marketing & work procurement

*e.g. promoting translation
services; searching for clients;
bidding for translation contracts*

Having own web site;
Online marketplaces (e.g. Foreignword.biz, Proz.com)

Business management

*e.g. client & contact data
management; contract quotations;
billing / invoicing; financial
management*

Database software (e.g. MS Access, FileMaker)
Spreadsheet software (e.g. MS Excel, Lotus 1-2-3);
Accounting / bookkeeping package (e.g. Sage, QuickBooks)

3.3.2. Determinants of CAT tool adoption

In order to assist freelance translators when adopting CAT tools, a greater understanding of those factors that affect the decision and, therefore, the process of adoption is needed. Hence, one of the focuses of the literature reviewed for this study was the identification of previous research that had examined these factors. A number of studies have researched factors affecting adoption of ICT in the information systems domain (discussed in Chapter 2, section 2.3.1.2). After the initial analysis of the factors, a number of items were collected from the works of various authors, and initially classified into motivators (factors that affect positively the ICT adoption) and inhibitors (factors that affect negatively the ICT adoption). These items and their sources are exhibited in Tables 2.4 and 2.6 respectively.

As other similar SMEs – like accounting or consulting services SMEs – that use ICT, freelance translators are advised by previous research and professional associations to plan and define their requirements for ICT (see for example Proudlock *et al.*, 1999). However, this advice is generally derived from the ICT success in large firms, which have a different hardware, software and support environment from the micro business

context of freelance translators. Such advice needs to be tested in translation micro business context to help determine, for example, whether a written document regarding ICT implementation is helpful; whether a particular level of ICT adoption is intended to be achieved directly, or a lower level of ICT should be adopted and then progressively adopt a higher level of ICT adoption; whether the resources available will be enough to adopt a particular level of ICT successfully; and whether the degree of sophistication needed to adopt a particular level of ICT adoption is going to be achieved.

These strategies draw heavily on the factors that affect ICT adoption and the factors that affect the success of the ICT adopted. The literature reviewed for this study has identified a number of factors affecting success of ICT in SMEs in the information systems domain (discussed in Chapter 2, section 2.3.1.3). After the initial analysis of the studies containing these factors, a number of items were collected from the works of various authors and classified according to the nature of the factors, namely organisational characteristics, organisational action, system characteristics, internal expertise, and external expertise. These categories are based on a classification proposed by Yap *et al.* (1992), but include their own findings and those of a number of subsequent studies. These items and their sources are detailed in Table 2.4.

In the present study, these factors are represented by the box at the left of the central box (CAT tool adoption) of the model, and were grouped into the characteristics of the freelance translator, the characteristics of the freelance translation business, and the translators' perceptions of CAT tools. The determinants of CAT tool adoption are summarised in Table 3.2.

Table 3.2 Determinants of CAT tool adoption

Translator characteristics	Source
1. CEO IT knowledge	DeLone, 1988; Palvia et al., 1994
2. Internal IS/ICT competencies	Caldeira and Ward, 2002
3. User computer literacy	Montazemi, 1988; Igbaria et al., 1998
4. CBIS experience	Raymond, 1985; Igbaria et al., 1998
5. CEO involvement	Cragg and King, 1993
6. Managerial time	Baker, 1987; Cragg and King, 1993; King and McAulay, 1989; Lefebvre and Lefebvre, 1988
Translation business characteristics	Source
7. Computer planning	DeLone, 1988
8. In-house processing	Raymond, 1985
9. Financial resources	Caldeira and Ward, 2002; Cragg and King, 1993
10. Age of company	Palvia et al., 1994
Perceptions of CAT tools	Source
11. CEO support and attitude towards IS/ICT adoption and use	DeLone, 1988; Caldeira and Ward, 2002; Thong et al., 1996
12. User attitudes	Caldeira and Ward, 2002

3.3.3. Impacts of CAT tool adoption

The outcome of adopting CAT tools has direct consequences on the translators' performance as a micro business, that can be translated into benefits realised from the adoption of CAT tools and problems that this adoption may have originated. There is a need to define the factors that lead to a successful adoption and to benefits for the business, and to identify problems that are likely to arise in the process of adopting CAT tools or when reaching a higher degree of sophistication.

This study focuses on subjective measures of organisational performance and adopted the instrument developed by Khandwalla (1977) to measure the index of subjective performance based on the manager's assessment of the company's ability relative to

its competitors. While the instrument was originally developed and tested in large organisations, it has also been adapted and validated in the SMEs context by (Miller and Droge, 1986; Raymond *et al.*, 1995; Hussin, 1998; Ismail, 2004b). This resulted in five items measuring translator's performance, which are represented by the box at the right of the model, and summarised in Table 3.3.

Table 3.3 Impacts of CAT tool adoption

Items (source: Khandwalla, 1977)
1. Long term profitability
2. Amount of translation work undertaken
3. Financial resources (liquidity and investment capacity)
4. Client base
5. Professional image and client loyalty

3.3.4. Strengths and limitations of the research model

The proposed research model follows an interdisciplinary approach in order to devise a model on specialist ICT (CAT tools) adoption in a particular sector (translation industry), in the context of micro businesses (freelance translators). The Information Systems research on models of IT adoption has been used with the objective of testing its findings in the specific context of translation micro businesses in the UK. This can be considered as an innovation in the translation studies domain, as previous models just focused on purely linguistic aspects of the translation businesses and have not addressed the particular context of the freelance translator.

One of the limitations observed in most of the ICT adoption stage models available, that is, the impossibility of taking into consideration future technologies, has been taken into account in the development of the model. Most ICT adoption models (for example, Churchill *et al.*, 1969; Nolan, 1973, 1979) describe the evolution of IS assuming certain technologies as driving forces (Saarinen, 1989). This is also the case of previous research in translation studies, with models classifying translation technologies by the linguistic processes involved, or by types of application (for example, Melby, 1998; Austermühl, 2001), which have been taken into account.

While they focused on previous or current types of application, the proposed model identifies a core type of technology (CAT tools) for translators, which is part of a bigger picture of ICT available to translators supporting a number of activities that are part of the freelance translator's workflow. For this reason, this research model presents a comprehensive framework for the use of ICT by freelance translators, as it studies the use of CAT tools in the context of the ICT supporting translators' activities.

A preliminary limitation observed is the potential difficulty in measuring the impacts of CAT tools for the translation business, as there are no established measures in the translation studies or the IS domain that can be straightforwardly applied in the context of freelance translators. Previous research looking at the CAT tools has claimed for a number of benefits arising from the use of these tools (such as increased volume of work in less time, or improvements in the cohesion and coherence of translations); however, few empirical studies have directly reported benefits of using CAT tools in translation businesses, and even less have provided evidence of such benefits in the freelance translator context. The present research, although based on previous studies, presents an innovative model, and more validation of the overall framework and measures utilised is likely to be needed.

Regarding the business size, the fact that freelance translators are very small micro businesses, may be a limitation for applying a framework that has been developed bringing together previous IS research on ICT adoption in SMEs that has generally focused on manufacturing or accounting firms – which, although being SMEs are not usually very small or micro businesses. Further testing of this framework in the micro business context should help to further validate its application to this smaller type of SME.

3.4. Research questions

Taking the major issues being identified in the literature under review, a research model has been devised in order to provide a conceptual framework that allows to

analyse CAT tool adoption by freelance translators, the relationship of CAT tool adoption with the degree of ICT sophistication of freelance translators, the relationships with factors that motivate and inhibit the adoption, the characteristics of the translators and the translation business which affect the adoption of CAT tools, and the impacts derived from the adoption of CAT tools in the freelance translator context.

3.4.1. CAT tool and ICT adoption by freelance translators

Previous studies have used the concept of “ICT sophistication” to explain the nature, complexity and interdependence of ICT usage and management in an organisation (for example, Ein-Dor and Segev, 1981; Raymond and Paré, 1992). The core component of the research model proposed focuses on identifying the level of CAT tool adoption among freelance translators, and understanding it in relation to the degree of ICT adoption supporting the activities in the translator’s workflow.

Table 3.1 shows the activities that are part of the translator’s workflow and that are supported by the use of ICT. In the present research, CAT tool adoption is understood as part of this workflow, and is supporting translators’ core activity (translation creation). This is represented in the central box of the research model (see Figure 3.1). The rest of activities supported by ICT that might be affecting CAT tool adoption are also represented in this part of the research model, as it is described in more detail in Figure 3.2.

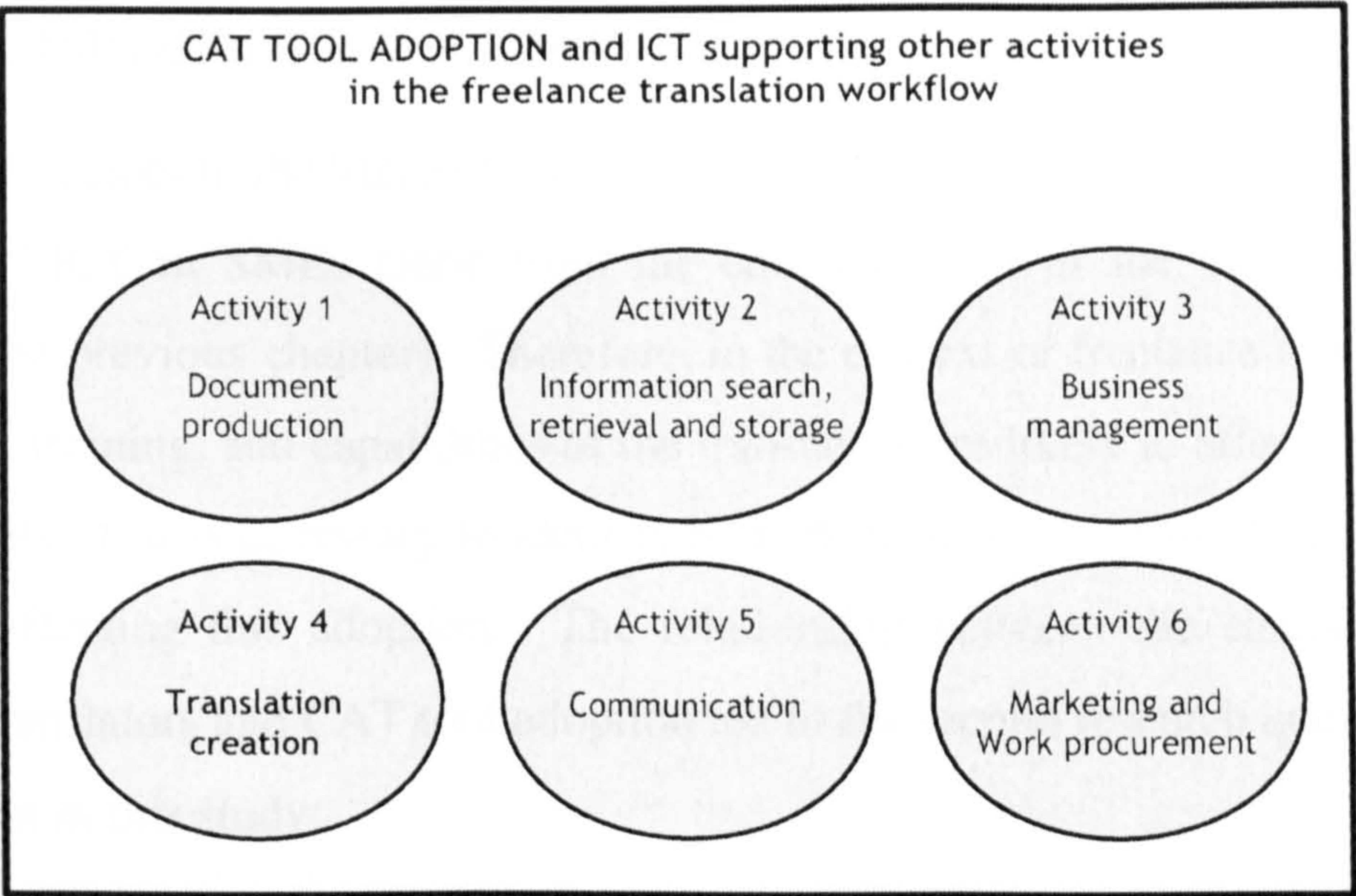


Figure 3.2 CAT tool adoption and ICT in the translation workflow

The adoption of CAT tools and the possible links with ICT supporting other activities in the freelance translator’s workflow led to the first research question, and two related questions, of this study:

Research Question 1 (RQ1)

What is the level of adoption of CAT tools by freelance translators?

Related research question 1.1

What is the level of adoption of ICT by freelance translators in each of the activities in their workflow?

Related research question 1.2

Is there a relationship between the adoption of CAT tools and the adoption of other ICT?

3.4.2. Characteristics of freelance translators

Some of the factors in the literature reviewed that were more importantly affecting the adoption of ICT in SMEs came from the characteristics of the CEO (see section 2.3.1.2 in the previous chapter). Therefore, in the context of freelance translators, the knowledge, training, and capabilities of the translators are likely to affect the adoption of CAT tools. It was necessary to identify how characteristics of freelance translators might be affecting this adoption. The relationship between the characteristics of freelance translators and CAT tool adoption led to the second research question and its sub question in this study:

Research Question 2 (RQ2)

What are characteristics of freelance translators who have adopted CAT tools?

Research sub question 2.1

How do the characteristics of CAT tool adopters differ from those of non-adopters?

3.4.3. Characteristics of freelance translation businesses

Similarly, the organisational characteristics of the business have been found to be affecting the adoption of ICT in SMEs in the literature reviewed (see section 2.3.1.2 in the previous chapter). In the context of freelance translators, the characteristics of the translation business are likely to affect the adoption of CAT tools. It was necessary to identify how the characteristics of the freelance translation businesses might be affecting this adoption. The relationship between the characteristics of the translation business and CAT tool adoption led to the third research question and its sub question in this study:

Research Question 3 (RQ3)

What are the characteristics of the freelance translation businesses in which CAT tools have been adopted?

Research sub question 3.1

How do the characteristics of CAT tool adopting translation businesses differ from those of non-adopting businesses?

3.4.4. Perceptions of CAT tools

Another group of determinants of CAT tool adoption came from how freelance translators perceived ICT in general and CAT tools in particular. The investigation of such perspectives allowed understanding better the strategies followed by freelance translators to adopt CAT tools. Based on the factors that affect the adoption, and the attitudes of translators towards technologies; it was important to evaluate how translators' CAT tool adoption is affected by their perceptions of ICT. These issues led to the fourth research question and its four sub questions of this study:

Research Question 4 (RQ4)

What perceptions do freelance translators have of CAT tools?

Research sub question 4.1

What perceptions do freelance translators have of ICT in general?

Research sub question 4.2

How do freelance translators' perceptions of CAT tools differ from those of other ICT?

Research sub question 4.3

How do perceptions of CAT tools differ between adopters and non-adopters?

Research sub question 4.4

How do perceptions of ICT differ between CAT tool adopters and non-adopters?

3.4.5. Motivators and inhibitors of CAT tool adoption

In addition to determining the organisational characteristics that affect CAT tool adoption (i.e. the characteristics of the freelance translators, the translation business, and translators' perceptions of ICT), the identification of the factors that motivate or inhibit the adoption has previously helped to achieve a better understanding of how ICT adoption is affected in the IS domain. For the purposes of this study, it was therefore important to understand what factors had a positive effect on the decision to adopt CAT tools (motivators), and what factors had a negative effect on this decision. This led to the formulation of the fifth and sixth research questions of the present study:

Research Question 5 (RQ5)

What are the factors that motivate a freelance translator's decision to adopt CAT tools?

Research Question 6 (RQ6)

What are the factors inhibiting the adoption of CAT tools by freelance translators?

3.4.6. Impacts of CAT tool adoption

Apart from the adoption, previous research has highlighted the importance of evaluating the impacts that the adoption of technology may have on an organisation and its environment and identify the potential problems that may arise from the adoption of ICT. According to the claims in the literature about translation technologies, the (successful) adoption of CAT tools by freelance translators should bring a number of benefits, thus improving the performance of translators. Given the scarcity of measures to determine how successful CAT tool adoption has been, this study tries to identify the impacts derived from the adoption of these tools, which may result in a number of benefits and a number of problems for the productivity and

overall performance of freelance translators. This issue led to the formulation of the seventh research question of this study:

Research Question 7 (RQ7)

Is there a relationship between the adoption of CAT tools and the performance of a freelance translation business?

Based on the above discussion, the research model presented is presented in Figure 3.3 showing the study’s research questions.

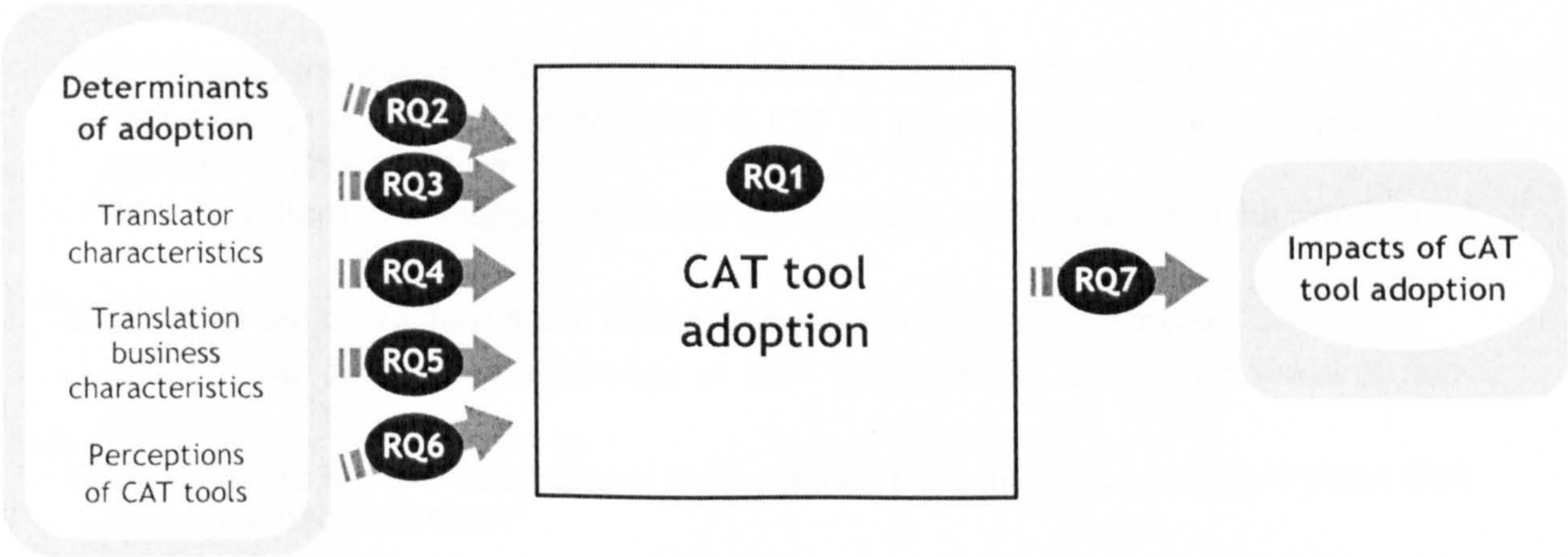


Figure 3.3 Research Model & Research Questions

3.5. Summary of the chapter

Based on existing literature, this chapter has discussed the research model and the components of this model that provide a conceptual framework permitting the analysis and answering of the proposed research questions. The research model has been defined in detail, and related to the literature reviewed in Chapter 2. The outcomes of the framework devised are seven research questions that try to fulfil the objectives of this research. Table 3.4 presents a summary of the research questions.

The next chapter presents the details related to the design of this research.

Table 3.4 Research questions of the study

RQ1: What is the level of adoption of CAT tools by freelance translators? RQ1.1: What is the level of adoption of ICT by freelance translators in each of the activities in their workflow? RQ1.2: Is there a relationship between the adoption of CAT tools and the adoption of other ICT?
RQ2: What are characteristics of freelance translators who have adopted CAT tools? RQ2.1: How do the characteristics of CAT tool adopters differ from those of non-adopters?
RQ3: What are the characteristics of the freelance translation businesses in which CAT tools have been adopted? RQ3.1: How do the characteristics of CAT tool adopting translation businesses differ from those of non-adopting businesses?
RQ4: What perceptions do freelance translators have of CAT tools? RQ4.1: What perceptions do freelance translators have of ICT in general? RQ4.2: How do freelance translators' perceptions of CAT tools differ from those of other ICT? RQ4.3: How do perceptions of CAT tools differ between adopters and non-adopters? RQ4.4: How do perceptions of ICT differ between CAT tool adopters and non-adopters?
RQ5: What are the factors that motivate a freelance translator's decision to adopt CAT tools?
RQ6: What are the factors inhibiting the adoption of CAT tools by freelance translators?
RQ7: Is there a relationship between the adoption of CAT tools and the performance of a freelance translation business?

Chapter 4. Research Design

4.1. Introduction

In the previous chapter, a research framework was developed in order to address the research questions that this study seeks to investigate. This chapter is focused on the selection of a suitable research method to collect the data required to answer those research questions. Some of the research methods used in previous studies in related research areas are reviewed, notably in ICT adoption research, and in translation studies research. The particular choice of research design for this study is then discussed. Then, the context of the study is presented, focusing on a description of the population and a definition of the sampling frame. A detailed description is given of the design of the instruments used to conduct the fieldwork. Finally, an overview is given of the data analysis performed in the fieldwork.

4.2. Research approaches

Chapter 2 was dedicated to a review of previous research literature in the key disciplines that inform this study, namely translation studies, information systems, and small business management. This study is, therefore, interdisciplinary. As Oppenheim states "Cross-disciplinary research, [...] requires familiarity with measuring techniques in more than one discipline" (Oppenheim, 1992:7). Studies in the disciplines informing this study have followed various research approaches, which are summarised in this section.

Easterby-Smith *et al.* (1999) identify three reasons why the exploration of philosophy may be significant with regard to research methodology: Firstly, it can help the

researcher to refine and specify the research methods to be used in a study, that is, to clarify the overall research strategy to be used. This would include the type of evidence gathered and its origin, the way in which such evidence is interpreted, and how it helps to answer the research questions posed. Secondly, knowledge of research philosophy will enable and assist the researcher to evaluate different methods and avoid inappropriate use and unnecessary work by identifying the limitations of particular approaches at an early stage. Thirdly, it may help the researcher to be creative and innovative in either selection or adaptation of methods that were previously outside his or her experience. There has long been a debate about the underlying philosophy that should guide valid research, where quantitative research has generally been associated with positivist philosophical traditions, and qualitative research has commonly been associated with interpretivism. Within the social sciences there is an increasing belief that this debate between positivists and anti-positivists is inadequate to address the problems facing researchers in today's world (Cornford and Smithson, 1996).

Oppenheim has suggested that “no single approach is always or necessarily superior; it all depends on what we need to find out and on the type of question to which we seek an answer” (Oppenheim, 1992:12). It is now widely acknowledged that a research approach (or strategy) must be selected according to the object of study, the specific research questions and objectives of that study, and the setting in which the research is undertaken so that valid answers are obtained to the research questions. This choice should then be more a matter of appropriateness, rather than a decision only driven by philosophical perspective (Crossan, 2003).

A number of research approaches are available to information systems researchers, each having its own strengths and weaknesses (Mumford *et al.*, 1986). Galliers (1992) proposed a taxonomy¹ of information systems research approaches which

¹ This taxonomy is a revised and amended version of the one proposed in Galliers & Land, 1987, and then published in Galliers, 1992

identified and compared the following ten research strategies used in IS research: theorem proof, laboratory experiments, field experiments, case studies, surveys, forecasting, simulation, argumentative studies, interpretive studies, and action research.

Although various research strategies have been employed to study ICT adoption in small firms, including, interview-based studies (Baker, 1987), longitudinal studies (Cragg and King, 1993), and case studies (King and McAulay, 1989; King, 1998; Caldeira and Ward, 2002), most of the previous research undertaken in this area has been conducted from a positivist perspective², through the use of questionnaire-based surveys (see for example Raymond, 1985; Lees, 1987; Raymond, 1987; DeLone, 1988; Lefebvre and Lefebvre, 1988; Montazemi, 1988; Raymond, 1989; Kagan *et al.*, 1990; Yap *et al.*, 1992; Daniel *et al.*, 2002).

Much of the research on ICT adoption in the translation sector has been devoted to the adoption of translation tools. However, previous studies have not tended to be focused specifically on freelance translation businesses, but rather considered translation tools adoption in translation businesses in general, in large organisations or a mix of both large and small translation organisations. Among these studies there have only been a few in-depth surveys (see for example, Webb, 2000; Fulford, 2001; LISA, 2003; Sánchez-Gijón, 2003), and a number of case studies on translation tools adoption in large organisations (see for example, King, 1998; Jaekel, 2000; Langé and Bennett, 2000). Most of the studies in the translation sector, like in the area of IS, have been conducted from a positivist perspective.

Interpretivist approaches (i.e. simulation, argumentative studies, interpretive studies, and action research), and the other empirical approaches available (i.e. theorem proof, laboratory experiments, field experiments, and forecasting), according to Galliers' taxonomy (1992), have not been used much in previous studies of ICT adoption, and

² Orlikowski and Baroudi (1991) noted that 96.8% of research in leading information systems journals follows the positivist tradition.

did not seem to suit the particular context of this research. Accordingly, survey and case study research approaches are further discussed below to identify the most suitable approach for conducting the present study.

Survey research permits the examination of a phenomenon in a wide variety of natural settings. This examination essentially comprises a snapshot of practices, situations or views at a particular point in time, and is typically undertaken using questionnaires or structured interviews, from which inferences may be drawn (Galliers, 1992). In survey-based research the researcher has a clearly defined model with independent and dependent variables and the factors that affect it, so that anticipated relationships can be tested against observations of the phenomenon under investigation. The major strength of the survey approach is that it permits the collection of data from a large number of subjects, thus allowing quantitative analysis to test inferences, and giving the potential to generalise the findings to an even larger number of cases. One of the major disadvantages of this approach is that the variables under study have to be known in advance. Thus, it can only be used in relatively well understood situations.

The case study approach is commonly used in the study of issues that are not well understood, or where relationships between the context and the phenomenon under study, are not clear (Yin and Campbell, 2002:13). The strength of the case study approach is that it enables the researcher to capture reality in considerably greater detail than is possible in a questionnaire survey. Weaknesses of the case study approach include the fact that its application is usually restricted to a single organisation, or to just a small number of organisations.

4.3. Research approach: selection and justification

In order to investigate the adoption of CAT tools by freelance translators in the UK, and the factors affecting that adoption, a survey approach was deemed to be the most suitable method for data collection. A key advantage of the survey approach is that it permits the collection of data from a large number of subjects (Galliers, 1992). In the present study, a survey would thus enable data to be gathered from a substantial

proportion of the translation sector in the UK. The types of survey frequently used in social research include questionnaires, interview, observation studies, and content analyses (Bryman and Bell, 2003). For practical reasons, a questionnaire survey was deemed to be a suitable method for data collection in the present study. A list with the mail addresses of a large number of potential respondents was made available to the researcher (see later sections on population and sampling frame), therefore, the mailed questionnaire method seemed the most suitable way of obtaining a substantial number of responses from a geographically dispersed sample (freelance translators in the UK). The options of using telephone or email surveys were discarded as suitable contact details were not available to the researcher. In an online survey, there would have been no straightforward means of control over the reliability of the eventual participants. As a result, the mailed questionnaire survey approach was chosen as the most appropriate data collection method.

The survey approach was deemed to be more powerful than a case study approach for quantifying relationships in the research model. However, questionnaire-based surveys can be weak at providing insights about particular issues. Therefore, a decision was made to follow the gathering of quantitative data in the questionnaire survey with a more in-depth study of individual cases in order to permit the closer examination of issues and relationships. The initial survey exploring the adoption of CAT tools and other ICT by translators in the UK was followed by further fieldwork in order to gain more detailed insights about the decision to adopt CAT tools. The aim of this second phase of the fieldwork was to shift the study from a 'descriptive' to an 'analytical' design (Oppenheim, 1992:12). Candidates for participation in this second phase were identified from among the respondents to the initial questionnaire survey. The research design for this second phase of the study is further explained in Chapter 9. The use of mixed approaches is recommended in the literature.

Bryman maintained that "the use of more than one method [...] can greatly enhance the process of fusing problem and method, by allowing the researcher to reap the opportunities presented by two or more techniques" (Bryman, 1989:248). Others point out the legitimacy of combining methods in the research design if such a

strategy addresses the study's research questions (Miles and Huberman, 1994; Brannen, 1995). Burgess (1984) defines 'multiple research strategies' as the use of diverse methods in tackling a research problem. This strategy has traditionally been referred to as 'triangulation' (Denzin, 1970). Denzin distinguishes four different types of triangulation: multiple methods, multiple investigators, multiple data sets, and multiple theories. Multiple methods triangulation can be between-methods or within-method. A within-method approach involves the same method being used on different occasions, while between-methods means using different methods in relation to the same object of study. The design of this study fits into the 'multiple methods'- 'between methods' approach defined by Denzin.

To sum up, this research was structured into two phases:

- **Phase 1: CAT tool usage study;** conducted through a mailed questionnaire.
- **Phase 2: Organisational impacts analysis and evaluation of ICT sophistication;** focused on a selected part of the sample.

The following sections of the chapter explain in detail the design of the questionnaire used in the first phase of the fieldwork, then describe the population from which the sampling frame for this questionnaire survey was defined, and an overview of the data analysis undertaken.

4.4. Phase 1 – CAT tool usage study

This study comprised a mailed questionnaire survey among UK freelance translators. Its main aim was to obtain a snapshot of CAT tool usage among freelance translators, that is, to provide a profile of translators and their use of translation technologies, as well as their attitudes towards such tools. In addition, this questionnaire survey permitted the identification of a sample of CAT tools users and CAT tool non-users that could be studied further in the next phase of the research.

The sampling frame was defined as detailed in a later section of the chapter, and the questionnaire designed. A number of improvements were made to the questionnaire, during the pre-tests described later in the chapter, before the final version of the questionnaire was sent. Responses started to arrive three weeks after and were collected during a period of eight weeks.

4.4.1. Questionnaire design considerations

The questionnaire was designed following suggestions from previous studies about survey methods, principally Dillman's recommendations for a total (1978) and tailored (2000) design method. Dillman's Total Design Method (TDM) for the development and use of a mail questionnaire (Dillman, 1978) was borne in mind in order to ensure a satisfactory response rate following the maxims of minimising the cost for responding, maximising the rewards for doing so, and establishing trust that those rewards would be delivered. Dillman's most recent contribution to the design of mail surveys (defined as the Tailored Design Method in Dillman, 2000) also offered useful recommendations on writing questions, constructing the questionnaire, and implementing the survey.

Following Dillman's recommendations, a cover letter was produced along with the questionnaire. This letter highlighted the relevance of the study, the importance of the participation of the translators, as well as the benefits that they would obtain from participating in the study. As an additional incentive to encourage participation in the study and increase the response rate, two measures that were adopted: the offer to respondents of a copy of a summary of the findings of the study and an additional prize draw with prizes of book vouchers for three of the respondents. Following another recommendation made in the survey research literature, stamped addressed envelopes were provided for return of the questionnaire (Dillman, 1978).

In addition to the cover letter, a letter of endorsement was enclosed with the questionnaire. This letter was written by the Director and Chief Executive of the

professional body from which the mailing list was obtained. Copies of the cover letter and the letter of endorsement are reproduced in Appendix A.

All these measures helped to give the questionnaire a professional appearance, making it clear, interesting, and easy to return. In addition, these efforts would help to involve translators in the study and, it was hoped, increase the response rate substantially.

The layout of the questionnaire was kept simple and visually attractive, offering a professional look that would encourage translators to take it seriously. Sans serif fonts were used in the questionnaire to increase its readability, as well as bold formatting and text boxes to enable the identification of the different sections of the questionnaire. The front cover was kept simple, but eye-catching, and it clearly identified the researcher's name, organisation (including Loughborough University's logo), and contact information, as well as a title that related directly to the study. Moreover, basic instructions for completing the questionnaire, as well as a clause ensuring confidentiality and thanking the participants for their cooperation, were included at the bottom of the front cover. A copy of the questionnaire is included in Appendix B.

4.4.2. The structure of the questionnaire

In order to establish the sequence of the sections of the questionnaire, Dillman's suggestions were considered for increasing the respondents' motivation for, and confidence in, completing the questionnaire (Dillman, 1978). Accordingly, questions that are similar in content or type were grouped together. The order of the questions took advantage of the cognitive ties that respondents were likely to make among the groups of questions. Questions that were more likely to be difficult were placed after questions that were likely to be easier to answer.

As a result, the questionnaire was structured in four sections as follows:

- **Section A: Translator profile**
- **Section B: Information Technology (IT) usage**
- **Section C: Internet usage**
- **Section D: IT strategy**

Where appropriate, validated research instruments were drawn from existing research on ICT adoption, and adapted for this study. The sections of the questionnaire and the instruments used are presented in detail below.

4.4.2.1. *Section A: Translator profile*

This section contained questions regarding translators' characteristics and the characteristics of their translation business. In particular the following issues were addressed:

- *educational background*: such as educational level and translation qualifications
- *demographic data*: such as age and gender
- *data about their employment situation*: such as whether they were working in-house, as a freelancer, or managing a translation company; how many years had they been working as translators; their workload; the services they provided; the language combinations they translated; and the subject fields they worked in.

Also, in order to help with the pre-screening of freelance translators, translators were required, immediately after the section on translator profile, not to continue with the rest of the questionnaire if they were not, at that point in time, actively involved in translation work.

4.4.2.2. *Section B: Information Technology usage*

This section consisted of questions about the IT skills and IT qualifications of the translators, followed by a question about their familiarity with, and their working knowledge of, a number of software applications.

With regard to the IT current usage, Raymond and Paré's instrument for measuring IT sophistication in small manufacturing businesses (Raymond and Paré, 1992) was used to develop the question on about IT usage (17). These authors defined IT usage in terms of "technological sophistication" and "informational sophistication". These aspects of IT sophistication basically refer to "the number or diversity of information

technologies used by small businesses” (i.e. the type of technology used) and “the nature of the applications portfolio” (i.e. the function of the type of applications). In this study, the translators were asked to indicate whether they were currently using a number of IT applications, which had been grouped according to their function (e.g. document production, business management, translation production).

With regard to the IT knowledge, Magal and Lewis (1995:76) defined IT knowledge “in terms of awareness of, familiarity with, exposure to, or a working knowledge of technology, rather than expertise”. They measured IT awareness by providing a representative list of software commonly used by SMEs and asked the respondent to indicate the extent to which they were familiar with the application or software. Hussin *et al.* (2002) and Ismail (2004a) adapted and tested the measures with a sample of small manufacturing firms in the UK and with a sample of Malaysian manufacturing SMEs, respectively. The present study has also adapted Magal and Lewis’s instrument in the question about IT usage. The respondents were asked to indicate their level of familiarity with, and knowledge of, IT on a 4-point Likert-type scale with the following (ordinal) categories: a score of 1 represented ‘Not familiar’, a score of 2 represented ‘Familiar, but with no working knowledge’, a score of 3 represented ‘Familiar, with some working knowledge’, and a score of 4 represented ‘Familiar, with extensive working knowledge’.

4.4.2.3. Section C: Internet usage

This section of the questionnaire was designed similarly to the second part of section B, but in this case translators were asked about their familiarity and working knowledge with Internet-based tools and resources. It was separated from the earlier question on IT usage largely for pragmatic reasons of length and format. Participants were also asked whether they had their own website to promote their services.

For the question on usage and experience with Internet-based tools and resources (19), Raymond and Paré’s (1992) and Magal and Lewis’ (1995) instruments were used in a

similar way to that of the earlier question of usage. Similarly, the same 4-point Likert-type scale was used for this purpose.

4.4.2.4. *Section D: IT strategy*

This section of the questionnaire consisted of three different types of questions regarding translators' opinions on the technologies referred to in sections B and C of the questionnaire. After asking if the translators had a written business plan, a question was asked about the translators' opinions on the importance and current use of IT for a number of tasks undertaken by translators. Chenhall and Morris (1986) developed and tested an instrument designed to measure accounting information systems (AIS) design in large organisational context, which was later adapted and tested in the small business context by Gul (1991), and recently adapted to measure both AIS requirement and AIS capacity in accounting SMEs by Ismail (2004). The scales used by Ismail's instrument were used in the present study to obtain translators' opinions on the relevance of IT in their work. This relevance and use were measured using a 4-point scale ranging from "Not important" to "Very important" and from "None" to "Extensive" use.

Questions 22 and 23 measured the perceptions that translators have of ICT in general, and CAT tools, in particular. The instruments used in these questions were based on an instrument developed by Cragg (1990) to measure computerisation success, where the author was asking the respondents what they thought of a number of issues regarding the use of computers. For question 22, the original instrument measured the attitudes of users and non-users of computers, which were phrased accordingly to obtain the information on translators' perceptions of ICT in general. For question 23, the statements in the original instrument on ICT in general were worded differently to capture translators' perceptions of one particular type of ICT (CAT tools). One of the items ("Computerisation significantly improves my communication with customers") could not apply to the use of CAT tools, and was substituted by an item asking about the respondents' opinion on the cost of these tools (i.e. "CAT tools are well worth

their cost’”), which was one of the translators’ concerns that arose from the literature examined on CAT tools.

The last question (question 24) further enquired about the translators’ ICT strategy. This question was adapted from Hussin’s instrument (1998) to measure various aspects of ICT strategy, which covered Earl’s (1989) three levels of strategy related to ICT, namely, the Information Systems strategy, the Information Management strategy, and the Information Technology strategy. Respondents were asked to indicate their position with regard to the bipolar alternatives listed in Table 4.1.

Table 4.1 IT strategy bipolar items

Statement A	↔	Statement B
I treat each decision about a new IT investment independently		My decisions about IT investments are guided by a formal IT strategy
I am concerned with using IT to solve short-term problems		I am concerned with using IT to solve medium to longer-term problems
I am concerned with matching technology to my business needs		I am concerned with getting the most up-to-date technology
I am concerned with how to better manage my IT resources		Managing IT is not as critical as managing other non-translation related resources
I am concerned with achieving a greater level of integration of my computer systems		I am concerned that the majority of my computer systems remain as standalone applications
The primary benefits I seek from IT are improved productivity and efficiency		Computer systems bring a wide range of benefits including competitive advantage

Finally, the back cover of the questionnaire included a free text box for respondents to comment on the questionnaire or the study as a whole. A question was also included about whether the participant would be willing to participate in other stages of the research. Also, there was space for providing the participant’s contact details (name, address, and email) if they wanted to receive a copy of the summary of the survey findings.

4.4.3. Questionnaire refinement

As suggested by Dillman (1978) the questionnaire was refined before carrying out the data collection. The refinement of the questionnaire followed two stages: pre-testing by academics and research students, and pre-testing by translators.

The questionnaire was first pre-tested by academics in the researcher's university department, who had prior experience with surveys on ICT adoption, and also by fellow research students, who had designed and used questionnaires in their research. Useful feedback arose from these pre-tests. Overall, the layout of the questionnaire was perceived to be appealing, neat and easy to follow, although comments from the pre-testers helped with the rewording of some questions and statements to clarify their meaning, with the reordering of some statements to make them easier to follow, and with improvements to the layout of the questionnaire. Based on this feedback, the researcher made amendments to the questionnaire.

After pre-testing the questionnaire in an academic environment, it was rigorously pre-tested by six translators who were likely to have similar characteristics to the participants in the survey. This rigorous process of assessing the questionnaire's content and clarity provided useful feedback which was used to improve it, until the questions could be clearly understood and answered without problems by the translators. The translators were also asked to answer the questionnaire and the overall impression from the answers given and the comments made by them was that the questionnaire was appropriate and ready to be delivered to the translators in the sample. The final version of the questionnaire is presented in Appendix B.

4.5. Population

As noted earlier, the translation sector is an increasingly important sector in the UK economy due to an increase in the demand for translated documents. At the same time, the significant increase in the number of freelance translators and the

proliferation of more sophisticated technologies that translators can use to improve their productivity and efficiency, make this sector an interesting one to study.

4.5.1. SMEs, micro businesses and freelance translators

There is no single, uniformly accepted definition of a small firm, mainly because of the wide diversity of businesses. According to the Small Business Service³, the best description of the key characteristics of a small firm remains that used by the Bolton Committee in its 1971 Report on Small Firms. This stated that a small firm is an independent business, managed by its owner or part-owners and having a small market share.

However, researchers in the domain of small businesses recommend using the European Union size categories for defining the small firm if there is no need for a complex definition (Curran and Blackburn, 2001). In 1996, the European Commission adopted a communication setting out a single definition of SMEs (Recommendation 96/280/EC), which, on 1 January 2005 was replaced by a newer official document (Recommendation 2003/361/EC). Changes were made to the financial thresholds to take into account subsequent price and productivity increases since 1996, however the number of employees of each type of small business remain unchanged. Table 4.2 presents the three categories of enterprise recognised by the EU.

Table 4.2 **Types of SME**

Enterprise category	Headcount	Turnover	or	Balance sheet total
medium-sized	< 250	≤ € 50 million		≤ € 43 million
small	< 50	≤ € 10 million		≤ € 10 million
micro	< 10	≤ € 2 million		≤ € 2 million

Source: Enterprise and Industry, European Commission

³ The Small Business Service (SBS) is an agency of the Department of Trade and Industry in UK (<http://www.sbs.gov.uk>)

A comprehensive definition of the EU definition of an SME can be found on their website⁴.

There is no previous study, or any official statistics regarding the translation businesses in the UK. However, as some researchers have indicated (see for example Fraser and Gold, 2000), many translators now work on a freelance basis, which according to the EU classification of SMEs given above, would put them in the 'micro' business category.

4.5.2. Sampling frame

A sampling frame is a list from which a sample can be taken and which leads ultimately to the sample of units from which information is to be obtained. According to Hague and Harris (1993), a suitable and good sampling frame for the population being sampled should have the following characteristics:

- The frame should contain a list of members of the defined population.
- The frame should be a complete, up-to-date list of the population.
- No population member should be listed more than once.
- The list should contain information about each individual that could be used for stratifying the sample.

The study needed a comprehensive list of freelance translators in the UK. Although there is no official register of translation businesses in the UK, there are three institutions to which many translators in the UK may belong, namely the Chartered Institute of Linguists (IoL), the Institute of Translation and Interpreting (ITI), and the Association of Translation Companies (ATC). The IoL and the ITI are professional associations for freelance and in-house translators and interpreters, as well as for translation and interpreting companies. The IoL is the larger of the two. The ATC is

⁴ http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm

a professional association representing the interests of translation companies in the world, with many of its members based in UK.

The IoL was approached, and permission was kindly granted to use a list of the names and addresses of 1400 translator members based in the UK. This list is the largest directory of translators in the UK, and contained up-to-date contact information of all the translators belonging to the IoL, some of whom belonged also to the ITI, and provided the sampling frame for this research. Translators who belong to this institute are required to meet various criteria to demonstrate their language proficiency as linguists and provide evidence of their qualifications before they are admitted as members. Therefore, apart from being comprehensive, this list was deemed to be more reliable than commercial directories of translators, and than sending the survey via a mailing list populated by translators⁵.

4.5.3. Pre-screening exercise

This section presents the results of the descriptive statistics that helped profile the freelance translators participating in the survey. The translators in the sampling frame described above included freelance translators who work on a self-employed basis, and in-house translators working in small or medium sized translation companies or departments. Therefore, it was recognised from the outset that the survey would need to be designed to accommodate a certain amount of pre-screening of the list to identify those translators working in a freelance capacity. The results of the survey are presented, and, after a description of the pre-screening exercise undertaken, the profile of the freelance translators is described.

⁵ Mailing lists such as LANTRA-L have previously been used by other researchers to survey translators, although using such list means it is impossible to know the total number of translators contacted, and thus the reliability of the responses tends to be compromised.

4.5.3.1. Profile of the respondents

The survey questionnaire was mailed to a sample of 1400 translators in the UK at the end of 2003. 591 usable responses were received in early 2004. In the pre-screening exercise, 152 of those responses were eliminated on the grounds that the respondents reported that translation was not their principal job, but rather an activity that they combine with other undertakings, such as teaching, training, or interpreting. The remaining 439 valid responses represented a response rate of 35%. Of those 439 valid responses, 48 (11%) were received from in-house translators, and 391 (89%) from freelancers. It is the 391 responses from freelancer translators that form the sample for the present research.

In comparison with other studies of translators, both the response rate to this survey, and the sample size generated for analysis, were encouraging. The LETRAC Project survey, for example, generated a sample of just over 110 'individual translators' from an indeterminable sampling frame (Reuther, 1999). Earlier studies, such as the Translator's Workbench Project survey, also had a sample size of 110 translators, of which only a small proportion were freelancers (Fulford *et al.*, 1990). In the Translation Practices survey (reported in Smith and Tyldesley, 1986), 280 responses were received from a mailing of 1800 (16% response rate), of which 141 were from freelancers. The 2002 and 2004 surveys conducted by the Localisation Industry Standards Association (LISA) generated 134 and 274 responses respectively (both surveys were administered by making them available via a web site, and so the survey response rate could not be quantified). Another survey conducted by Fraser in two stages (1997; 1999) looked at freelance translators and their satisfaction levels in relation to their client base. The former study focused on freelance translators based in the UK, and presented findings for 158 translators (53% response rate); the latter focused on ITI members living outside the UK and presented findings from 138 translators (40% response rate). A subsequent similar survey by Fraser and Gold (2000) looked at a larger sample of UK-based freelance translators of "just over 1200", from which 253 responses were obtained (21% response rate). In this chapter, comparisons are made, where possible, with the findings of these other surveys.

4.5.3.2. Respondents' role

Translators responding to the survey could be working as in-house translators (either in a team in a translation company or in the translation department of a large enterprise), as freelance translators, or as translation managers. As part of the pre-screening exercise, it was necessary to exactly identify which role (or roles) they were fulfilling before proceeding to further analysis. Table 4.3 shows the breakdown of the sample based on the role of the respondents.

Table 4.3 Respondents' role

Role groups (N = 439)	Frequency	Percent
Freelance	347	79.2
In-house	25	5.7
Manager	10	2.3
Other	11	2.3
Freelance + Manager	15	3.4
In-house + Manager	2	.5
Freelance + In-house	9	2.1
Freelance + Other	20	4.6
<i>Total</i>	<i>439</i>	<i>100.0</i>

As Table 4.3 shows, the sample was overwhelmingly made up of freelance translators, 391 in total (89% of the respondents). The presence of in-house translators (8%) or managers of a translation company or a translation department (6%) represented a smaller part of the sample. Also, a number of respondents were combining their freelance role with in-house or managerial roles, in most cases meaning that they were only working part-time as freelance translators. Finally, 7% of the respondents were also employed in other areas different not directly related to translation. This finding contrasts somewhat with the 54% of freelance translators in Fraser and Gold's survey (2000) who "had one or more other [language-related] source(s) of income" or the 50% of freelance translators who "had income from other non-language activities". Table 4.4 presents a summary of the roles being fulfilled in conjunction with freelance translation.

Table 4.4 Other respondents' roles

Other roles	Frequency	Percent
None	409	93.2
Academic	7	1.6
Business	2	.5
Engineer	1	.2
Government	4	.9
Interpreter	8	1.8
Linguist	1	.2
Owner of translation company	2	.5
Secretarial	2	.5
Sessional translator	1	.2
Solicitor	2	.5
<i>Total</i>	<i>439</i>	<i>100.0</i>

Among those respondents having 'other roles', the majority were working as interpreters (8 respondents) or had an academic job (7 respondents). These findings were in line to some extent with Fraser and Gold's findings, as they found 'interpreting' (42%), 'proof-reading' (32%) and 'teaching' (22%) as the most common 'other roles' undertaken by the freelancers in their sample. Proportions of interpreters (2%) and academics (2%) are far smaller than in Fraser and Gold's study, but they still account for the majority of the 'other roles' indicated by the respondents in the present study. Moreover, a larger number of freelancers in the sample stated they were offering 'interpreting' (11%), 'proof-reading' (8%), and 'language teaching' (24%) as additional services to their main translation activity.

4.5.4. Non-response bias

According to Dillman (2000), there are four possible sources of error in sample survey research. He calls them the "cornerstones for conducting a quality survey" (p. 9). These four sources are sampling error, coverage error, measurement error, and non-response error and are described as follows:

- Sampling error is the result of surveying only some, and not all, elements of the survey population (Dillman, 2000). This type of error always exists at some

level when a random sample is drawn. It can be reduced through larger samples but cannot be eliminated completely unless one conducts a census (Lindner *et al.*, 2001)

- Coverage error is the result of not allowing all members of the survey population to have an equal or known nonzero chance of being sampled for population in the survey (Dillman, 2000)
- Measurement error is the result of poor question wording or questions being presented in such a way that inaccurate or uninterpretable answers are obtained (Dillman, 2000). Researchers can reduce this type of error by using items that are valid, reliable, and unambiguous to the research subjects (Lindner *et al.*, 2001)
- Non-response error is the result of people who respond to a survey being different from sampled individuals who did not respond (Dillman, 2000)

Of these four types of error, non-response has received the least attention (Lindner *et al.*, 2001), possibly due to time and cost pressures (Lambert and Harrington, 1990). The most common protection against non-response bias is to attempt to increase the response rate. Among the methods that can be used include advance letters or telephone calls, first class outgoing mail and hand-stamped return envelopes, personalisation of material for sensitive issues, assurance of confidentiality for sensitive issues, incorporation of the cover letter into the questionnaire, and follow-up questionnaires/letters (Lambert and Harrington, 1990; Diamantopoulos and Schlegelmilch, 1996). However, Oppenheim (1992) emphasised that non-response bias will occur in mail surveys despite increasing sophistication in the approaches to respondents. Diamantopoulos and Schlegelmilch (1996) confirmed non-response as the most serious problem of mail questionnaires as it has implication for both quantity and quality of the data obtained.

Lambert and Harrington (1990) suggested that potential non-response bias needed to be addressed when response rates fall below 40% after appropriate procedures have been carried out. However, various authors have stated that non-response error is a

concern for response rate as high as 90% (Lindner et al., 2001). The present study received a response rate of 35%, and therefore it was important to estimate the effects of non-response bias as it might have affected the generalisability of the survey results.

A variety of ways have been suggested to deal with the potential problem of non-response bias. Armstrong and Overton (1977) and Lindner et al. (2001) discuss extrapolation methods for estimating the response of non-respondents. The extrapolation method is based on the concept that subjects who respond late (either by answering later or by requiring more prodding before answering) have similar characteristics to non-respondents. In this method, known characteristics of groups that respond readily and less readily are compared and extrapolated. If the groups do not differ in their characteristics, it is assumed that there are no systematic differences in their responses, suggesting that the non-response bias is not a significant factor. Lambert and Harrington (1990) recommended that a condensed version of the questionnaire that contains key variables be sent to a sample of the non-respondents for detection of bias. More recently, Lindner et al. (2001) while discussing the above methods, proposed an alternative approach using 'days to respond' as a regression variable for addressing non-response error. Using this approach, 'days to respond' is coded as a continuous variable, and used as an independent variable in a regression equation in which primary variables of interest are regressed on the variable 'days to respond'.

For the present study, the comparison of early to late respondents or 'extrapolation method' was adopted to analyse non-response bias. Lindner et al. (2001:52) defined late respondents as those who respond in the last 'wave' of respondents in successive follow-ups to a questionnaire. To ensure that the number of late respondents is large enough to be meaningful, both practically and statistically, the respondents were divided into two groups comprising the first 30 and the last 30 responses received. The intermediate respondents were excluded to clearly demarcate early and late respondents. The groups were then compared using some of the main variables measuring the respondents' characteristics and usage of ICT.

The results of a Mann-Whitney test (presented in Appendix C) showed that none of the variables tested produced significant differences (at 5% significance level) between early and late respondents. This suggests that, although bias in the response may exist in the sample of questions tested, they are not a significant factor which could affect the conclusions about the variables being studied.

4.6. The data analysis scheme

The type of data analysis that was carried out for the first phase of this study is depicted in Figure 4.1.

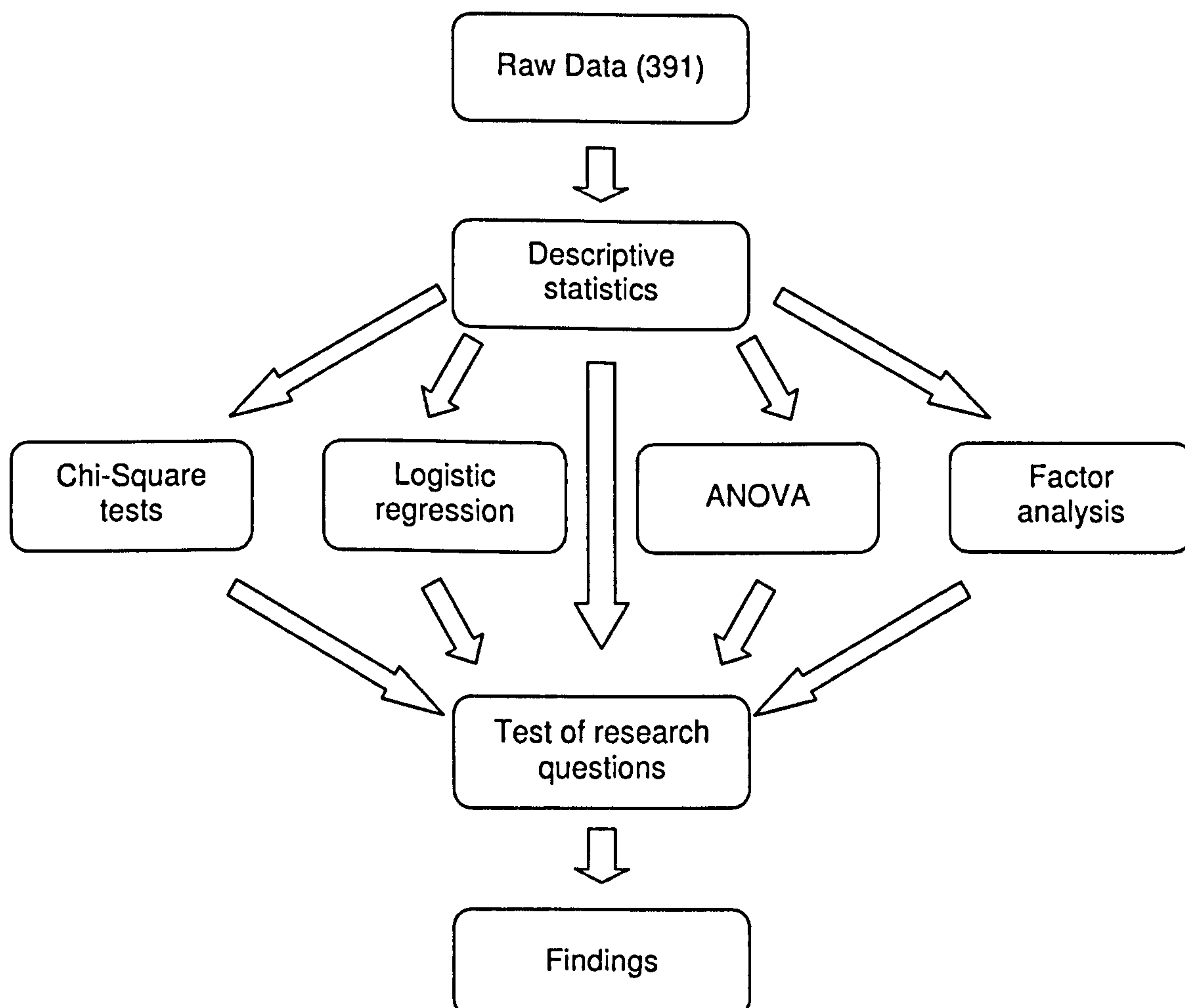


Figure 4.1 Steps for data analysis of first phase of study

Descriptive statistics were examined to find out whether the sample was representative or not, and to understand better the study sample. In exploring CAT tool adoption (Chapter 6), in addition to descriptive statistics of CAT tool uptake, Chi-Square tests and Logistic regression analyses were used to test the relationships between the adoption of CAT tools and the adoption of, and experience with, other ICT that were supporting translators in the activities in their workflow (i.e. investigation of research question 1 and its sub research questions).

In order to investigate the characteristics of the freelance translators who had adopted CAT tools and of their freelance translation businesses (Chapter 7), Chi-Square tests and Logistic regression analyses were used, leading to the definition of a profile of CAT tool adopter (i.e. investigation of research questions 2 and 3 and their sub research questions).

Factor analysis was then conducted to explore and examine the perceptions of ICT in general, and CAT tools in particular, among the translators in the survey sample (Chapter 8). The perceptions of CAT tool adopters and non-adopters were then compared and their differences assessed through ANOVA tests. In addition, perceptions of the translators with different levels of experience with CAT tools were also compared through ANOVA tests. In Chapter 8, research question 4 and its sub research questions were then investigated.

After these analysis chapters, the second phase of the fieldwork is presented (Chapter 9), along with the analysis and findings arising from that part of the present research.

Finally, the result of testing the research questions is presented and discussed (Chapter 10), leading to the conclusions of this study.

4.7. Summary of the chapter

This chapter has described the overall approach taken to test the research propositions. It was envisaged that the study would require two phases of fieldwork, an exploratory investigation of CAT tool adoption among freelance translators in the UK, and a

subsequent in-depth study of the perceptions of adopting CAT tools and the impacts that the adoption may have on freelance translation businesses. The research design for the second phase of the study is presented in Chapter 9.

In view of the extensive nature of information required in this large-scale empirical work and for practical reasons, data were collected via the mailed questionnaire survey research method. The sample consisted of 391 freelance translators. Prior to data collection, the questionnaire was refined through a rigorous process of pre-testing. The sampling frame was then defined and non-response bias issues addressed.

Finally, an overview of the data analysis has been presented.

Chapter 5. The Sample

5.1. Introduction

This chapter presents the descriptive findings of the questionnaire survey. The characteristics of the respondents are described.

5.2. Profile of respondents

In this section, background information is provided about the freelance translators who participated in the survey. The characteristics examined include age, gender, educational background, length of experience as a translator, professional affiliations, language pairs translated, subject areas translated, and additional professional services offered.

5.2.1. Age

Table 5.1 presents the responses obtained regarding the age of the translators in the sample. The age groups shown comprise the typical working years of a person, on the assumption that people under 20 are likely to be enrolled in full-time education, and people over 60 are likely to have retired from full-time professional employment.

Table 5.1 Age of respondents

Age range	Frequency	Percent
20-29	17	4.3
30-39	91	23.3
40-49	116	29.7
50-59	101	25.8
60 or above	66	16.9
<i>Total</i>	<i>391</i>	<i>100.0</i>

As shown in Table 5.1, most of the respondents fell within the three central age-groups (i.e. they were aged between 30 and 59), with the highest proportion being in the 40-49 age group. These figures also show that most of the respondents were aged 30 years or above (96%).

These findings were broadly in line with those of the survey of the working conditions of freelance translators conducted by Fraser and Gold (2000). In their survey, 95% of the respondents were aged over 35, and, as the authors stated, they were fairly evenly distributed across the age groups defined by them: 32% were between 35 and 44; 34% between 45 and 54; and 29% 55 or over. Although their sampling frame was different from that used in the present study, the respondents in both surveys were UK-based freelance translators, and thus similarities in the findings about the age distribution helps to authenticate each of the studies.

5.2.2. Gender

Table 5.2 presents information about the gender of the respondents, and shows that the majority were female (63%).

Table 5.2 Gender of respondents

Gender	Frequency	Percent
Male	143	36.6
Female	248	63.4
<i>Total</i>	<i>391</i>	<i>100.0</i>

Findings about gender distribution in the Fraser and Gold (2000) survey were similar: in their survey 61% of the respondents were female.

Data from the Labour Force Survey in UK (ONS, 2003) with regard to self-employment, industries and gender for the years 1991 to 2003 indicated that, although self-employment is more common among men than women, when looking at industries as a whole, men tend to be under represented in the category which would include translation services. So again the findings in this survey seem valid.

5.2.3. Educational level

The respondents were asked to indicate their educational level, as this background information has been found in other studies to have some bearing on the level of ICT adoption, or the willingness to adopt ICT (see for example Baker, 1987; Lefebvre and Lefebvre, 1988; Cragg and King, 1993). Table 5.3 shows the breakdown of responses relating to educational level.

Table 5.3 Translators' educational level

Educational level (N = 382) ^a	Frequency	Percent
University - bachelor degree	148	38.7
University - masters degree	149	39.0
University - doctorate	23	6.0
Postgraduate level diploma	30	7.9
Other	32	8.4
<i>Total</i>	<i>382</i>	<i>100.0</i>

^a. 9 respondents did not reply to this question

The overriding majority (84%) of the respondents had obtained a university degree. The remainder of the respondents held postgraduate-level diplomas. The 'Other' category included a number of UK further education level qualifications, and some overseas qualifications of indeterminable, or unspecified level. Therefore, the translators surveyed were highly educated, many of them having university bachelor and / or masters.

5.2.4. Translation qualifications

Respondents were also asked to indicate whether they had obtained a qualification in translation (rather than simply a general qualification in languages). Table 5.4 presents the responses, indicating that 71% had a translation qualification.

The findings also showed that some respondents had obtained more than one qualification in translation: for example, some had undertaken a postgraduate degree programme in translation studies, and also obtained a postgraduate-level diploma in translation from a professional language or translation institute.

Table 5.4 Respondents' translation qualifications

Translation qualifications	Frequency	Percent
None	114	29.2
Univ degree only	17	4.3
PG degree only	36	9.2
Translation diploma only	186	47.6
Univ + PG degree	8	2.0
Univ/PG degree + Trans Dipl	30	7.7
<i>Total</i>	<i>391</i>	<i>100.0</i>

These findings also served to make the responses more reliable, as a majority of the respondents were not only members of UK language or translation professional bodies, but also were well qualified as translators as they held specific translation qualifications.

5.2.5. Length of translation experience

The number of years that a respondent has been working as a translator helped to give an indication of his / her level of experience and knowledge of the translation sector. Table 5.5 present the findings for length of translation experience.

Table 5.5 Length of translation experience

Length of translation experience (N = 385)	Frequency	Percent
Less than 5 years	78	20.3
6-20 years	229	59.5
More than 20 years	78	20.3
<i>Total</i>	<i>385</i>	<i>100.0</i>

The overriding majority of the respondents (80%) were quite established in the profession, as they had 6 or more years of experience. Among those, the majority

(60% of the total) had fewer than 20 years of experience. The data showed a median value of 11 years and a mean value of 13 years of translation experience.

These findings were broadly in line with Fraser and Gold's survey (2000), at least, with regard to the overall proportion of translators with fewer than 20 years of experience (70% of their sample and 80% of this study's sample). More specifically, this 10% difference was found in those translators with less than 10 years of experience (30% of their sample, against 44% of the present study), which indicated that overall, the translators in the present sample were slightly less experienced than those in Fraser and Gold's.

5.2.6. Membership of professional bodies

Respondents were asked to indicate their membership affiliations to UK language or translation professional bodies, such as the Chartered Institute of Linguists (IoL), and the Institute of Translation & Interpreting (ITI). All the respondents were members of the Chartered Institute of Linguists, and 38% of them were also members of the Institute of Translation & Interpreting. A small number were also members of the Translator's Association of the Society of Authors or the American Translators Association (ATA).

5.2.7. Volume of translation work undertaken

The translation work carried out by each respondent was measured in terms of the number of words translated per week (volume of translation) and the number of hours dedicated to translation work per week (hours worked). Table 5.6 presents the findings for the volume of translation work undertaken.

Table 5.6 Respondents' average workload

Words per week	
<i>N</i>	350
Mean	7283.54
Median	6000.00
Mode	10000
Minimum	50
Maximum	100000

The table shows a median value of 6,000 words per week. The most usual workload (measured by the mode) was 10,000 words per week.

Table 5.7 shows the results for the number of hours per week spent on translation tasks. While the most usual number of hours was 40 (i.e. full time), the median value decreased to 25 hours per week, indicating that a large number of translators were part time workers.

Table 5.7 Number of hours per week spent on translation tasks

Hours per week	
<i>N</i>	354
Mean	25.116
Median	25.000
Mode	40.0
Minimum	.5
Maximum	84.0

5.2.8. Languages translated

For ease of interpretation and discussion, official languages of the European Union other than English were grouped together, and languages that were not official EU languages or from out of Europe were grouped as 'Non-European Union languages'. Table 5.8 presents the findings for the languages translated by the respondents.

Table 5.8 Languages translated

Language Combinations ^{a,b}	Frequency	Percent
EN > EU	50	12.8
EN < > EU	56	14.3
EN > EU + EU > EU	12	3.1
EU > EN	183	46.8
EU/NonEU > EN	32	8.2
EN > NonEU	15	3.8
EN < > NonEU	21	5.4
NonEU > EN	22	5.6
Total	391	100.0

a. EN = English; EU = European Union language; Non-EU = Non-European Union Language

b. > = From X to Y

Almost half of the respondents (47%) were translating from an EU official language into English, while 13% were translating in the reverse direction, and 14% translated these languages in both directions. The most common EU source languages that respondents were translating into English were German, French and Spanish.

5.2.9. Subject areas translated

Table 5.9 presents a summary of the responses obtained for the subject areas translated by respondents.

Table 5.9 Subject areas translated

Subject area	Frequency	Percent of total (N = 391)
Business/Commerce	307	78.5
Technical	213	54.5
Legal	206	52.7
Financial	157	40.2
Scientific	110	28.1
Literary	79	20.2
Medical	33	8.4
Academic	11	2.8

The table shows that business/commerce (79%) was the most common subject area translated, and that more than half of the respondents were working in the areas of technical (55%) and legal (53%) translation.

5.2.10. ICT training

The present study focuses on the adoption of CAT tools by translators, therefore it was deemed important to be aware of any ICT-related training that the respondents may have followed. Respondents were asked to indicate how they had acquired their ICT knowledge and skills, such as through taught courses or through private study. Table 5.10 provides a summary of the findings about ICT training.

Table 5.10 ICT training		
ICT acquisition	Frequency	Percent of total (<i>N</i> = 391)
Only self-taught	149	38.1
Self-taught plus one of the following:	334	85.4
Professional training courses	144	36.8
Workshops run by professional institutes	70	17.9
University/college course	59	15.1
IT modules university degree	32	8.2
In-house training (in a previous in-house job)	14	3.6
As part of previous work experience	14	3.6

38% of the respondents had acquired their ICT knowledge and skills on a self-taught basis only. However, the vast majority of the respondents in the sample (85%) acquired their ICT knowledge and skills on a self-taught basis and through some other type of ICT training. As shown in the table, other types of ICT training included professional training courses (37%), workshops run by professional institutes (18%), university or college courses (15%), or individual IT modules as part of a university degree (8%). In addition, some respondents also stated that they had developed their ICT skills while undertaking in-house training (4%) in a previous in-house translation job or while working (4%) in some other kind of job.

5.2.11. ICT qualifications

In addition to providing details of how they had acquired their ICT skills, respondents were also asked to indicate whether they had received any formal qualifications in ICT. The findings showed that only 18% of the respondents held an ICT qualification, the majority of which were professional ICT qualifications / certificates, such as ECDL. A small number (8%) had university degrees in computing-related areas, and some (23%) had undertaken ICT-related assessed modules as part of other degree programmes. Table 5.11 provides a summary of the ICT qualifications obtained by the respondents.

Table 5.11 ICT qualifications

Type of IT qualification	Frequency	Percent of total (<i>N</i> = 71)
University degree in computing/IT	6	8.4
IT modules on University degree	16	22.5
School/College qualification	14	19.7
Professional certificate	35	49.3
In-house training certificate	4	5.6

5.3. ICT usage

In this section, an overview of the various information and communication technologies being used by the translators in the sample is presented. A number of activities undertaken by freelance translators were identified and discussed in chapter 2. In this section, findings relating to ICT usage are presented according to that categorisation of activities, namely document production, information search and retrieval, business management, translation creation, communication, and marketing and work procurement. Respondents were asked to indicate the software applications and online facilities they use.

5.3.1. Document production activities

Among the software applications to support document creation activities, perhaps inevitably, word processing software was in widespread use (99% of respondents were using it). Smaller numbers of respondents (25%) used graphical or presentation software (e.g. Microsoft PowerPoint), and 17% used desktop publishing packages (e.g. PageMaker, QuarkXpress).

5.3.2. Information search and retrieval activities

For ICT to support information search and retrieval activities, Internet search engines were in widespread use (85% of respondents used them). A number of online reference resources were also being consulted, including online encyclopaedias (38%), online academic journals (30%), electronic databases (30%), and electronic libraries (27%). A high proportion of respondents (79%) consulted online dictionaries and / or glossaries, and 59% made use of multilingual terminology databanks. Text corpora and / or document archives were also being used by half of the translators in the sample. However, only a small number of translators (24%) were using dedicated terminology management systems, such as MultiTerm, Lingo or TermWatch, for managing their personal terminology collections.

5.3.3. Business management activities

Among the software used to support business management activities, the findings revealed that many respondents (79%) used spreadsheet packages. Database packages were used by 25% of the sample. Special-purpose business management software was used by only a few translators; for example, only 13% used dedicated accounting / financial management packages. Project management software was used by a very small minority of the respondents (2%).

5.3.4. Translation creation activities

Among the software applications to support translation creation activities, Computer-aided translation (CAT) tools, such as translation memory (e.g. Trados, Déjà Vu, SDLX and Transit), were being used by 28% of the translators. Machine translation systems were used by only 5% of the sample, and online machine translation services were used by even fewer respondents (4%). A small number of translators (2%) were using localisation tools. These findings suggested that most translators were not using CAT tools, and were carrying out translation in the ‘traditional’ way.

5.3.5. Communication activities

For ICT to support communication activities, electronic mail was in widespread use: 93% of the translators used it. Approximately one third of the respondents participated in electronic mailing lists or online discussion groups for translators. File Transfer Protocol (FTP) software was being used by a third of the respondents to send and receive files electronically.

With regard to Internet connections, the majority of respondents (68%) relied on dial-up connections, and only 27% used broadband. The remainder (5%) tended to use a combination of dial-up and broadband connections to the Internet.

5.3.6. Marketing and work procurement activities

For ICT to support marketing and work procurement activities, one third (33%) of the translators in the sample used online translation marketplaces for marketing and / or work procurement (e.g. ProZ.com, TranslatorsCafe.com, Aquarius). Respondents were asked whether they had their own web site to promote their translation services; 21% responded in the affirmative. Web publishing software, such as Dreamweaver or FrontPage, was used by only 13% of the freelancers.

5.3.7. Summary of findings on ICT usage

Overall, ICT used by the translators in the sample was mostly supporting three types of activity: communication activities (47.8%), document production activities (47.1%), and information search and retrieval activities (46.8%). After this group of three activities, ICT was being used by less than a third of the translators to support business management activities (29.7%), marketing and work procurement activities (22.2%), and translation creation activities (9.8%). These figures show that the breadth of use of general-purpose software and online facilities by translators (i.e. ICT used within the first three types of activity) was higher than the breadth of use of ICT to support other activities for which more specialised software is available (e.g. accounting software, translation marketplaces or CAT tools). Therefore, there was a progression from larger ICT breadth of usage for activities which required more general-purpose ICT to lesser ICT breadth of usage for activities which required a more specialist type of ICT.

At the same time, a similar progression can be observed within the range of ICT to support each of the activities, especially with regard to those activities closer to the nature of the translation work (i.e. information search and retrieval, and translation creation). ICT were being used by a greater proportion of the respondents in those types of activity of a more general use (e.g. online search engines or online dictionaries) than specialist-purpose applications (e.g. terminology management systems). Even within the translation creation activities category, more specific types of application, like localisation software (used by 2.3% of the respondents), were being used by a much smaller proportion of the translators than CAT tools (28.3%).

Table 5.12 presents a summary of the findings on ICT usage and the activities supported, ranked in descending order of ICT usage.

Table 5.12 ICT usage

Software application / online facility	Frequency (F)	Total cases (N)	ICT usage
Communication			
Email	350	376	93.1%
Discussion mailing lists	118	320	36.9%
FTP (File Transfer Protocol)	102	320	31.9%
Online discussion groups	92	315	29.2%
<i>Total activity usage</i>	<i>662</i>	<i>1331</i>	<i>47.8%</i>
Document production			
Word processing software	386	391	98.7%
Graphical / presentation software	82	325	25.2%
Desktop Publishing software	57	328	17.4%
<i>Total activity usage</i>	<i>525</i>	<i>1044</i>	<i>47.1%</i>
Information search and retrieval			
Online search engines	316	372	84.9%
Online dictionaries / glossaries	292	372	78.5%
Online multilingual terminology databanks	202	344	58.7%
Text corpora / document archives	172	339	50.7%
Online encyclopaedia	126	331	38.1%
Academic journals	98	324	30.2%
Electronic databases	94	318	29.6%
Electronic libraries	85	320	26.6%
Terminology management systems	77	322	23.9%
<i>Total activity usage</i>	<i>1462</i>	<i>3042</i>	<i>46.8%</i>
Business management			
Spreadsheet software	291	370	78.6%
Database software	84	335	25.1%
Accounting / bookkeeping software	42	317	13.2%
Project and workflow management software	6	309	1.9%
<i>Total activity usage</i>	<i>423</i>	<i>1331</i>	<i>29.7%</i>
Marketing and work procurement			
Online translation marketplaces	103	316	32.6%
Own web site offering translation services	82	391	21.0%
Web publishing software	41	316	13.0%
<i>Total activity usage</i>	<i>226</i>	<i>1023</i>	<i>22.2%</i>
Translation creation			
CAT tools	94	332	28.3%
Machine translation systems	16	313	5.1%
Online machine translation services	11	308	3.6%
Localisation software	7	301	2.3%
<i>Total activity usage</i>	<i>128</i>	<i>1254</i>	<i>9.8%</i>

5.4. Familiarity and experience with ICT

In addition to indicating respondents' actual usage of ICT, they were asked to indicate their degree of familiarity and experience with each of the types of tool / online

facility discussed for each activity in the translator's workflow. This was measured by a scale of familiarity and experience (see Chapter 4), where values 1 to 4 were assigned to the various levels of familiarity and experience, namely, 'Not familiar', 'Familiar, but with no working knowledge', 'Familiar, with some working knowledge', and 'Familiar, with extensive working knowledge'. Although these labels (which represented ordinal data) did not provide a scale value on their own, values 1 to 4 were assigned because it was a convenient way of measuring them and because they provided a simple way of summarising respondents' answers. In this section, an overview of these findings is presented and a summary of the data is displayed in Table 5.13.

5.4.1. Document production activities

Word processing software was not only the most widespread type of ICT being used by the respondents, but also the one they had most experience with (89% having extensive experience and 11% having some experience with it). With regard to the other two types of software supporting document production activities (i.e. graphical or presentation software and desktop publishing software), which were being used by less than a quarter of the translators, around 42% of the respondents were not familiar with them, and around 22% were familiar with them but had no experience of using them.

5.4.2. Information search and retrieval activities

Online search engines were in widespread use (85%) and just a few translators were not familiar with them at all (4%) or knew about them but had no experience of using them (3%). Among those who had experience of using them, most (72%) had extensive experience with this online facility. Most of the translators in the sample had some (43%) or extensive (44%) experience with online dictionaries and / or glossaries, which were being used by 79% of the respondents. Text corpora /

document archives (used by around half of the translators) followed with translators having some (41%) or extensive (30%) experience, although they were unknown to 14% of the respondents and 15% were aware of them but had no experience with them.

Multilingual terminology databanks, which were being used more (59%) than text corpora / document archives, were slightly more unknown to the translators (19% of them had no familiarity with this online facility), and 13% knew of, but had no experience with them. Degrees of experience with multilingual terminology databanks were similar to experience with text corpora / document archives: 39% had some experience, and 30% had extensive experience with them.

Other online reference resources that were being used by around a third of the respondents were unfamiliar to around a third of them: 26% were unaware of online encyclopaedias, 28% of online academic journals, 35% of electronic databases, and 41% of electronic libraries. Also, among those who were familiar with these online facilities, 19% had no experience with online encyclopaedias, 22% with online academic journals, 21% with electronic databases, and 20% with electronic libraries. As shown in detail in Table 5.13, around a third of those who did have experience with these facilities had some experience with them, and around 17% had extensive experience with them.

With regard to terminology management systems, the least used ICT (by 24%) among those supporting information and search retrieval, half of the translators were not familiar with these tools at all, and 21% were aware of but had no experience with them. Among the translators with experience, 19% had some and 10% had extensive experience.

Overall, the computer tools supporting information search and retrieval activities with which translators were more experienced were online search engines and online dictionaries and / or glossaries (technologies which were in widespread use), followed by a ICT like text corpora / document archives, multilingual terminology databanks (which were being used by around half of the respondents). After these ICT,

translators were less experienced with a group of technologies used by around a third of the respondents (namely, online encyclopaedias, online academic journals, electronic databases, and electronic libraries), leaving terminology management tools as the less used and less familiar type of ICT supporting information search and retrieval activities. This reflected an overall better knowledge and usage of more general ICT, as opposed to lower levels of awareness and experience with ICT particularly designed to support translators' activity (with terminology management systems as the most clear example).

5.4.3. Business management activities

Spreadsheet packages, used by 79% of the respondents, were not familiar to 6% of them, and another 8% had no experience in working with them. The majority of the respondents (57%) had some or extensive (29%) experience with spreadsheet packages.

On the other hand, the rest of the ICT supporting business activities were more unfamiliar to the translators: database packages were not familiar to 34% of the respondents, dedicated accounting / financial management packages to 65% of them, and the vast majority (87%) were unaware of project management software. These types of software were familiar to less than a third of the respondents who had no experience with them: 28% (databases), 18% (accounting software), and 8% (project management), respectively. Translators had more experience with databases (31% some and 8% extensive experience) than with the other accounting / financial packages (12% with some, and 5% with extensive experience), and just 4% had some experience with project management software.

5.4.4. Translation creation activities

28% of the respondents were using CAT tools, and around 18% had some experience with them, and 18% had extensive experience with them. 40% of the translators were

not familiar at all with this type of technology, while 25% were aware of them but had no experience in using them. The rest of ICT supporting 'translation creation activities' (i.e. machine translation systems, online machine translation services, and localisation software) were being used by a minority (between 2% and 5% of the respondents), and the majority of the respondents (between 64% and 91%) were not familiar with these technologies. There was very little evidence of experience (and to a small extent) with them, 11% had experience with machine translation systems, 7% had experience with online machine translation services, and 4% had experience with localisation software.

5.4.5. Communication activities

Electronic mail was not only in widespread use, but the vast majority of the respondents (89%) also had plenty of experience with it. Around two thirds of the respondents were not making use of online mailing lists and discussion groups, and around 36% had no familiarity with them. Around 20% of the translators were familiar with these online facilities but had no experience with them, and around 40% did have some degree of experience with electronic mailing lists or online discussion groups for translators. 32% of the translators were using FTP software, but 34% of them were not familiar with this type of software. 18% knew it, but had no experience, and around half of the translators had experience with FTP applications.

5.4.6. Marketing and work procurement activities

66% of the respondents were not familiar at all with web publishing software, used by only 13% of the respondents. Another 18% were familiar but had no experience with this type of applications, and just 16% had some (12%) or extensive (4%) experience with them. Online translation marketplaces were being used by around a third of the translators, however, almost half of them (43%) were not familiar at all with these online facilities for marketing and / or work procurement. 18% of the translators were

familiar with them but had no experience with them, and almost 40% had some (22%) or extensive (17%) experience with them.

Table 5.13 summarises the findings on ICT familiarity and experience for the activities supported, showing the percentage of responses for each degree of familiarity and experience, and the mean of the value obtained from the scale measuring this degree. Activities and ICT within each activity are ranked in descending order of experience.

Table 5.13 Familiarity and experience with ICT

Type of software application / online facility	Not familiar	Familiar but no experience	Familiar with some experience	Familiar with extensive experience	Total responses	Scale mean
Communication						
Email	1.7	0	9.6	88.7	354	3.85
FTP (File Transfer Protocol)	33.5	17.7	27.8	20.9	316	2.36
Discussion mailing lists	38.1	18.3	22.1	21.5	312	2.27
Online discussion groups	35.2	24.8	22.3	17.7	310	2.23
Activity average mean						2.68
Information search and retrieval						
Online search engines	3.7	3.1	21.6	71.6	356	3.61
Online dictionaries / glossaries	4.2	9.1	43.2	43.5	361	3.26
Text corpora / document archives	14.2	14.5	40.9	30.3	330	2.87
Online terminology databanks	18.6	12.9	38.9	29.6	334	2.80
Online encyclopedias	25.8	18.7	35.3	20.2	326	2.50
Academic journals	27.9	22.2	32.7	17.1	315	2.39
Electronic databases	35.4	21.1	26.6	16.9	308	2.25
Electronic libraries	40.7	19.9	22.1	17.3	312	2.16
Terminology management systems	50	20.8	18.9	10.2	322	1.89
Activity average mean						2.64
Document production						
Word processing software	0.5	0	10.7	88.8	366	3.88
Graphical / presentation software	41.6	23	28.3	7.1	322	2.01
Desktop Publishing software	43.7	21.5	27.7	7.1	325	1.98
Activity average mean						2.62
Business management						
Spreadsheet software	6.5	7.9	57	28.7	356	3.08
Database software	33.5	27.5	30.8	8.2	331	2.14
Accounting / bookkeeping software	64.8	17.8	12.4	5.1	315	1.58
Project management software	87.1	8.4	4.2	0.3	309	1.18
Activity average mean						1.99
Marketing and work procurement						
Online translation marketplaces	43.6	17.6	21.8	17	312	2.12
Web publishing software	65.9	18.2	11.8	4.1	314	1.54
Activity average mean						1.83
Translation creation						
CAT tools	39.2	24.9	17.6	18.2	329	2.15
Online machine translation services	64.3	24.7	8.8	2.3	308	1.49
Machine translation systems	75	17.6	5.1	2.2	312	1.35
Localisation software	90.7	5.7	2.7	1	300	1.14
Activity average mean						1.53

5.5. Relationship between ICT usage and familiarity and experience with ICT

Once findings of ICT usage and the degree of familiarity and experience of the respondents have been presented in relation to the activities that are part of the translator's workflow, this section shows how the degree of usage and the degree of familiarity and experience are related for each type of activity. Figure 5.1 presents a summarised view of this relationship.

Each activity, represented by a circle with a number, was plotted according to its breadth of usage average and to its mean on the scale of familiarity and experience. As it can be observed, there are two groups of activities; communication (A1), document production (A2), and information search and retrieval (A3), which account for higher ICT usage and higher experience with ICT (going towards extensive usage and experience); and business management (A4), marketing and work procurement (A5), and translation creation (A6), which account for little ICT usage and little familiarity and experience.

Also, it should be noticed that A5, and especially A3 and A6 were positioned slightly lower than an imaginary diagonal line that would show an exact correlation between usage and experience. This was reflecting those activities with software that were specifically developed for translators (e.g. CAT tools, terminology management systems, or translation marketplaces), with which the translators had more experience than should match with their actual usage. This implies that some translators might not actually be using these types of translation specialised software although they were experienced with them. This may reflect a sense of 'craftsmanship' about translation, and a reluctance to use technologies that may automate certain tasks.

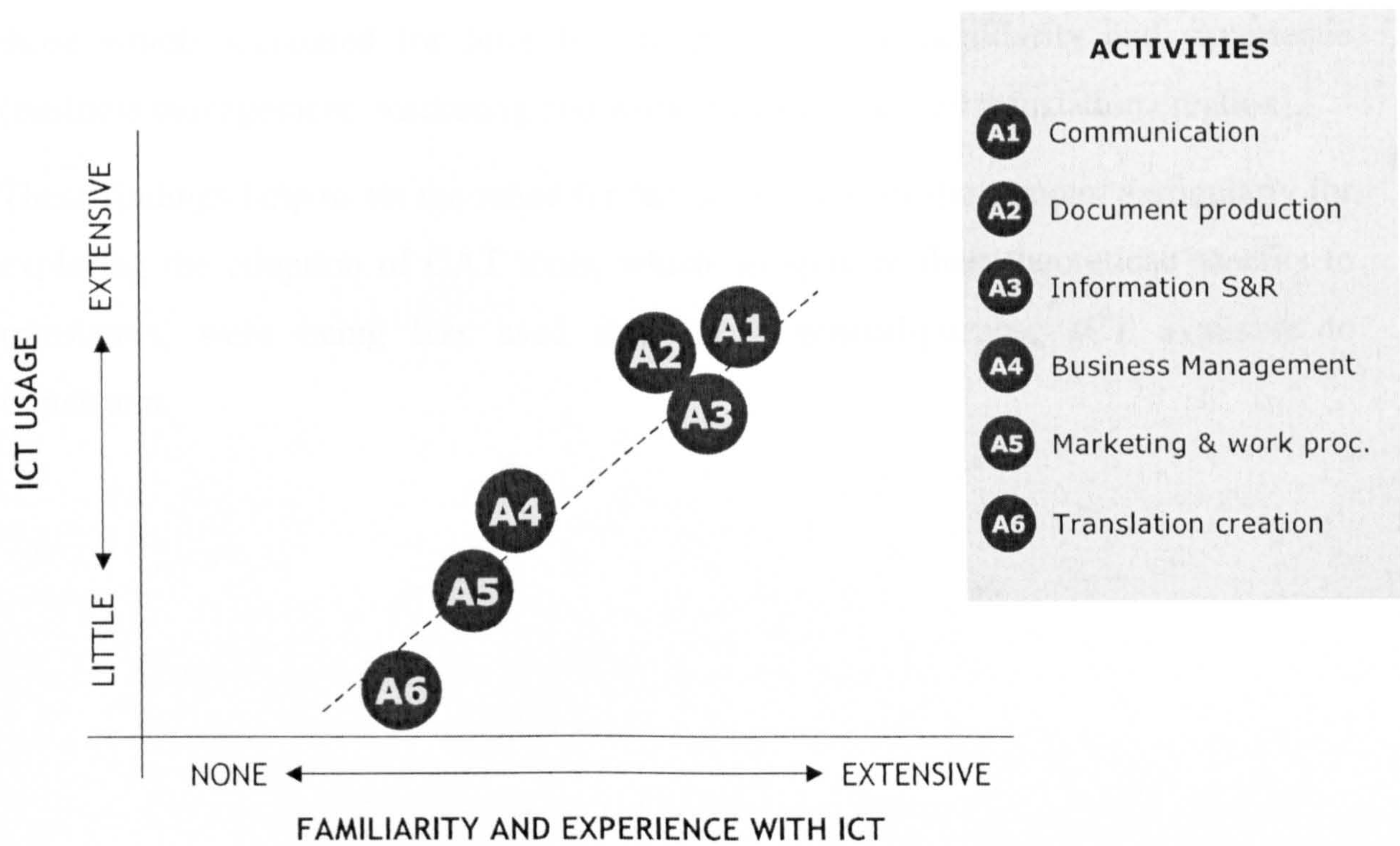


Figure 5.1 **ICT usage and familiarity and experience with ICT**

5.6. Summary of the chapter

This chapter has provided a summary of the characteristics of the translators in the survey sample and their usage of, and experience with, ICT in relation to the activities that form part of the translator’s workflow. Overall, translation specific ICT (e.g. CAT tools, terminology management systems, and translators’ marketplaces) was less used than general-purpose ICT. This lower usage usually corresponded with low levels of familiarity (i.e. no awareness or no experience with the ICT); however, CAT tools constituted a good example of non-usage while being aware or having previous experience at the same time.

In addition, the relationship between ICT usage and experience for translators’ activities have been presented, showing that there were two groups of activities: those which accounted for higher ICT usage and higher experience with ICT (communication, document production, and information search and retrieval); and

those which accounted for little ICT usage and little familiarity and experience (business management, marketing and work procurement, and translation creation).

These findings help to set the scene for further analysis of the sample, particularly for exploring the adoption of CAT tools, which, in spite of their theoretical benefits to translators, were being less used than other general-purpose ICT available to translators.

Chapter 6. Exploring the Adoption of CAT Tools

6.1. Introduction

One of the main aims of this research is to explore the adoption of CAT tools by freelance translators in the UK. In the previous chapter, the descriptive findings of the survey were presented and the characteristics of the respondents summarised. In this chapter, the relationship between the adoption of ICT generally and the adoption of CAT tools in particular is analysed and discussed, and the relationship between CAT adoption and the levels of knowledge of ICT in general are assessed. The analysis conducted in this chapter helped to answer the related research question 1.2 (Is there a relationship between the adoption of CAT tools and the adoption of other ICT?)

6.2. Exploring the relationship between the adoption of CAT tools and the adoption of ICT

The basis of the analysis used to explore the relationship between the adoption of ICT generally and the adoption of CAT tools in particular was an expectation-based adoption model. This model searched for those translators most likely to adopt CAT tools depending on their adoption and degree of experience with other ICT. Logistic regression and discriminant analyses are two statistical methods often used for this kind of classification problem. Logistic regression builds a model to predict which category translators belong to based upon a set of predictors. Discriminant analysis takes the same approach but makes stronger assumptions about the predictor variables, specifically that the values of the variables follow a multivariate normal distribution with identical covariance matrices (Ye, 2003:49). Based upon this,

discriminant analysis is seldom appropriate since these assumptions are rarely met in practice. Logistic regression carries fewer assumptions than does discriminant analysis, particularly the ability to include categorical predictors such as being the user of a particular software application. Logistic regression is used when it is important to predict whether a translator will adopt CAT tools or not based upon certain characteristics of the translator. It is particularly suitable where a binary (zero or one) or dichotomous dependent variable exists (e.g. in this case, translators who did not adopt CAT tools and translators who did adopt them).

Logistic regression estimates the coefficients of a probabilistic model, involving a set of independent variables in order to best predict the value of the dependent variable. A positive coefficient for an independent variable increases the predicted probability, while a negative value decreases the predicted probability of the outcome being in either of the two dependent variable categories (Hair *et al.*, 1998:130-1). In predicting the probability effects of multiple independent variables on a single dichotomous dependent variable, the model used is:

$$p(y = 1) = \frac{1}{1 + e^{-z}}$$

where:

$$z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n$$

x_i = an independent variable

β_0 = an intercept term

β_i = the parameter for the independent variable x_i

e = the quantity 2.71828+, the base of natural logarithms

y = the dichotomous dependent variable, here CAT adoption

$p(y = 1)$ = the probability of a translator being classified as a CAT adopter.

6.2.1. The prediction model

Looking at the CAT tool usage variable, of the 391 translators, 94 (24%) could be classified as CAT tools users, while 238 (61%) could be classified as non-users, and the remaining 59 (15%) constituted missing values.

Multiple logistic regression analysis was undertaken using this dichotomous CAT user variable (ignoring the missing values) as the dependent variable, and the variables on the usage of and degree of experience with the rest of the software applications as the independent variables. A total of 279 of the 391 cases were used to estimate the model. 112 cases were not included because they contained missing data for one or more of the variables.

The first step of the logistic regression analysis included the following variables in the model: Word processing usage and experience, Spreadsheet usage and experience, Database usage and experience, Computer-based accounting usage and experience, Desktop Publishing usage and experience, Web publishing usage and experience, Graphics usage and experience, Information retrieval tool usage and experience, Groupware usage and experience, Project and Workflow Management usage and experience, Terminology management usage and experience, Machine Translation usage and experience, Localisation usage and experience. Once the variables were entered, backward elimination was used to remove variables which were not significantly related to CAT tool adoption.

Table 6.1 shows all of the statistics for the final model obtained using logistic regression. The column headed 'B' contains the logistic regression coefficients. The second column (S.E.) contains the standard errors for the 'B' coefficients. The Wald statistic was used to test whether the predictor variables were significantly related to the outcome measure (i.e. the adoption of CAT tools) adjusting for the other variables in the model. Generally the Wald statistic has a chi-squared distribution with one degree of freedom. The column Exp (B) presents the 'B' coefficient raised to the exponential power, and these coefficients can be interpreted in terms of an odds shift in the outcome.

Table 6.1 CAT tool adoption (Logistic regression model)

		Variables in the Equation					
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 20	Spreadsheet usage	1.935	.768	6.345	1	.012	.966
	Graphics experience	-1.028	.356	8.313	1	.004	-.298
	Graphics usage	1.883	.714	6.965	1	.008	2.717
	Terminology Mgment experience	.724	.316	5.266	1	.022	1.935
	Terminology Mgment usage	2.886	.702	16.876	1	.000	17.919
	Localisation experience	1.235	.699	3.123	1	.077	3.438
	Constant	-5.108	1.182	18.666	1	.000	.006

a. Variable(s) entered on step 1: Word processing usage and experience, Spreadsheet usage and experience, Database usage and experience, Computer-based accounting usage and experience, Desktop Publishing usage and experience, Web publishing usage and experience, Graphics usage and experience, Information retrieval tools, Groupware usage and experience, Project and Workflow Management usage and experience, Terminology management usage and experience, Machine Translation usage and experience, Localisation usage and experience.

Classification Table for CAT tool usage^a

		Predicted		
Observed		CAT user		Percentage Correct
		No	Yes	
CAT user	No	197	15	92.9
	Yes	15	52	77.6
Overall Percentage				89.2

a. The cut value is .300

The results of the logistic regression model for the CAT tool adoption were as follows:

The independent variables with a strong positive influence on the model were found to be usage of, and experience with, terminology management tools, usage of, and experience with, graphics applications; and usage of spreadsheets. The most influential variable was usage of terminology management tools with a Wald score of 16.876 and a significance of 0.000. The variables that were not statistically significant at the 5% confidence level were localisation tool experience and the

remaining software applications usage and experience variables that were left out of the final model results in the logistic regression analysis.

The overall accuracy of the CAT tool adoption model was 89.2% as shown in Table 6.1. Non-adopters were correctly classified in 92.9% of the cases, while adopters were correctly assigned in 77.6% of the cases. This seemed to offer a very good prediction of the adoption of CAT tools based upon the use of and experience with spreadsheet software, terminology management tools, graphics software, and localisation software (nine out of ten CAT tool adopters would be using these ICT), within an overall high percentage of accuracy (89.2%) of the prediction model developed.

6.2.2. Comparison with Chi-Square results

The results obtained through the logistic regression model were then compared with those obtained through Chi-Square tests conducted individually between each of the nominal variables measuring ICT usage and the nominal dependent variable 'CAT adopter: Yes/No'.

Chi-Square (χ^2) is a general test designed to evaluate whether the difference between observed frequencies and expected frequencies under a set of theoretical assumptions is statistically significant or simply random variation. This statistical test is most often applied to problems in which two nominal variables are cross-classified in a bivariate table (Frankfort-Nachmias and Nachmias, 1992:464). In this study Chi-square was utilised to determine whether relationships existed between the use of each of the technologies available to translators and the groups of CAT tool adopters / non-adopters.

Table 6.2 summarises the results obtained for the various types of ICT classified according to the activities undertaken by translators.

Table 6.2 CAT Users and Use of other ICT

Type of ICT	Chi-Square	Significance
<i>Communication activity</i>		
FTP (File Transfer Protocol)	24.171	0.000
<i>Information search and retrieval activity</i>		
Terminology management systems	167.665	0.000
<i>Document production activity</i>		
Word processing software	2.005	0.157
Graphical / presentation software	18.539	0.000
Desktop Publishing software	14.896	0.000
<i>Business management activity</i>		
Spreadsheet software	21.389	0.000
Database software	2.644	0.104
Accounting / bookkeeping software	1.582	0.208
Project management software	0.222	0.638
<i>Marketing and work procurement activity</i>		
Web publishing software	8.813	0.003
<i>Translation creation activity</i>		
Machine translation systems	11.846	0.001
Localisation software	21.984	0.000

Chi-Square analysis found a significant relationship between most of the ICT supporting translators' activities. In particular, the technologies that were not found significant for the adoption of CAT tools were 'Word processing software' (Chi-Square statistic = 2.005 and p value = 0.157), 'Database software' (Chi-Square statistic = 2.644 and p value = 0.104), 'Accounting / bookkeeping software' (Chi-Square statistic = 1.582 and p value = 0.208), and 'Project management software' (Chi-Square statistic = 0.222 and p value = 0.638). Among those ICT that were found to be statistically related to the adoption of CAT tools, the stronger relationships (all of them with a p value of 0.000) were between CAT tool adopters and 'Terminology management systems' (Chi-Square statistic = 167.665), 'FTP applications' (Chi-

Square statistic = 24.171), 'Localisation software' (Chi-Square statistic = 21.984), 'Spreadsheet software' (Chi-Square statistic = 21.389), and 'Graphical / presentation software' (Chi-Square statistic = 18.539).

The results of the Chi-Square broadly supported those obtained through the logistic regression model. The use of ICT that had a stronger influence on the model (i.e. use of 'Terminology management systems', 'Graphical / presentation software', and 'Spreadsheet software') were among the variables that were most significant in the Chi-Square analysis. In particular, in both analyses, the strongest link between ICT and CAT tool adoption was found to be with 'Terminology management systems'. This made sense as this type of ICT is usually marketed and sold in an integrated package with CAT tools.

6.3. Exploring the relationship between CAT tool adoption and levels of knowledge of ICT

In order to investigate the relationships between the adoption of CAT tools and the level of knowledge of ICT, further Chi-Square tests were performed. The analysis included each of the nominal variables measuring the degree of familiarity and experience with the ICT available to translators and the nominal dependent variable 'CAT adopter: Yes/No'. In order to obtain a richer picture of the relationship of CAT tool adoption with the level of knowledge of the ICT for the activities in the translator's workflow, Internet-based ICT was also included in this part of the analysis. Since there were four possible values for the level of knowledge, these Chi-Square statistics should generally be compared with the Chi-Square distribution with three degrees of freedom. Table 6.3 summarises the results obtained for the ICT categorised according to activity.

Table 6.3 CAT Users and Familiarity with other ICT

Type of ICT	Chi-Square	Significance	Scale mean
<i>Communication activity</i>			
Email	5.291	0.071	3.85
FTP (File Transfer Protocol)	28.762	0.000	2.36
Discussion mailing lists	14.796	0.002	2.27
Online discussion groups	15.099	0.002	2.23
<i>Activity average mean</i>			2.68
<i>Information search and retrieval activity</i>			
Online search engines	17.707	0.001	3.61
Online dictionaries / glossaries	17.810	0.000	3.26
Text corpora / document archives	2.902	0.407	2.87
Online terminology databanks	26.573	0.000	2.80
Online encyclopedias	9.455	0.024	2.50
Academic journals	1.764	0.623	2.39
Electronic databases	8.859	0.031	2.25
Electronic libraries	6.952	0.073	2.16
Terminology management systems	126.313	0.000	1.89
<i>Activity average mean</i>			2.64
<i>Document production activity</i>			
Word processing software	1.860	0.395	3.88
Graphical / presentation software	8.440	0.038	2.01
Desktop Publishing software	7.268	0.064	1.98
<i>Activity average mean</i>			2.62
<i>Business management activity</i>			
Spreadsheet software	10.718	0.013	3.08
Database software	13.923	0.003	2.14
Accounting / bookkeeping software	5.474	0.140	1.58
Project management software	14.625	0.002	1.18
<i>Activity average mean</i>			1.99
<i>Marketing and work procurement activity</i>			
Online translation marketplaces	22.999	0.000	2.12
Web publishing software	9.724	0.021	1.54
<i>Activity average mean</i>			1.83
<i>Translation creation activity</i>			
Online machine translation services	7.477	0.058	1.49
Machine translation systems	15.114	0.002	1.35
Localisation software	36.129	0.000	1.14
<i>Activity average mean</i>			1.53

The results of the Chi-Square analysis showed a significant relationship between CAT tool adoption and the degree of familiarity with most of the other ICT (p values ≤ 0.05 in bold). In Table 6.2 the mean of the scale measuring the degree of familiarity with each technology is also presented in the last column (i.e. 1 = 'Not familiar', 2 = 'Familiar, but with no working knowledge', 3 = 'Familiar, with some working knowledge', and 4 = 'Familiar, with extensive working knowledge'). These results are discussed below for each activity group.

For the ICT used in the communication activity, only experience with 'Email' was not found to be related to the adoption of CAT tools (Chi-Square statistic = 5.291 and p value = 0.071). The reason for this might be that almost all the translators in the sample were using it and had considerable experience with this type of ICT (mean value = 3.85). The relationships found between CAT tool adoption and experience with the other ICT supporting the communication activity, namely 'FTP applications', 'Discussion mailing lists', and 'Online discussion groups', suggested that translators who had adopted CAT tools also had experience with ICT for the communication activity. Overall, it seemed that experience with ICT supporting the communication activity was strongly related to the adoption of CAT tools.

Experience with three of the ICT for the information search and retrieval activity was not found to be related to the adoption of CAT tools, namely 'Text corpora / document archives' ($p = 0.407$), 'Academic journals' ($p = 0.623$), and 'Electronic libraries' ($p = 0.073$). The experience with the rest of the ICT supporting this type of activity were to a greater or lesser extent related to the adoption of CAT tools. In particular, this relationship was found to be highly significant ($p = 0.000$) for several of them, namely 'Terminology management systems' (Chi-Square statistic = 126.313), 'Online terminology databanks' (Chi-Square statistic = 26.573), and 'Online dictionaries / glossaries' (Chi-Square statistic = 17.810). These results showed that despite low levels of experience with 'Terminology management systems' there was a strong link with the adoption of CAT tools, possibly because most CAT packages included terminology management functions. Overall, it seemed that experience with

ICT for the information search and retrieval activity was strongly related to the adoption of CAT tools.

Conversely, when looking at experience with ICT for the document production activity (i.e. 'Word processing software', 'Graphical / presentation software', and 'Desktop publishing software'), only experience with 'Graphical / presentation software' presents a significant relationship with CAT tool adoption (Chi-Square statistic = 8.440 and p value = 0.038). This showed that overall, experience with ICT for the document production activity was not strongly related to the adoption of CAT tools. Possibly, because the experience with word processing software was extensive for most of the translators (3.88 mean value in the familiarity scale) and it did not represent a difference among the translators in the sample. Thus, having experience with ICT for the document production activity was not influencing the adoption of CAT tools.

When looking at experience with ICT for the business management activity, only experience with 'Accounting / bookkeeping software' was found to be unrelated to the adoption of CAT tools (p value = 0.140). Experience with 'Spreadsheet software' (Chi-Square statistic = 10.718 and p value = 0.013), 'Database software' (Chi-Square statistic = 13.923 and p value = 0.003), and 'Project management software' (Chi-Square statistic = 14.625 and p value = 0.002) were all found to be significantly related to the adoption of CAT tools. This showed that overall, those translators who had adopted CAT tools had experience with ICT for the business management activity like spreadsheet and database software. These types of ICT were general purpose, unlike accounting packages. Thus, it seems that experience with software to support the business management activity shows a higher ICT literacy and that those translators with experience with these type of ICT are more likely to adopt CAT tools.

In the last two activities, marketing and work procurement activity and translation creation activity, the levels of experience with the ICT were all rather low compared with the previous types of activity (the highest mean value was 2.12 for 'Online translation marketplaces'). However, most of these ICT showed a highly significant

relationship with the adoption of CAT tools (except for 'Online machine translation services' with a p value of 0.058). In particular, experience with 'Localisation software' (Chi-Square statistic = 36.129 and p value = 0.000), and with 'Online translation marketplaces' (Chi-Square statistic = 22.999 and p value = 0.000) showed highly significant relationships with the adoption of CAT tools. These results suggested that adopters of CAT tools had considerable experience with ICT for marketing and work procurement and translation creation activity. This seems sensible because findings indicated that the more ICT literate that translators are, the more likely they are to use CAT tools.

Figure 6.1 presents a more detailed account of the mean values of the experience scales of each type of ICT within each activity for both, adopters and non-adopters of CAT tools. These mean values help to further describe the degree of experience with and see the differences between adopters and non-adopters. However, these means should only be considered indicative since they are providing summaries of a scale that is really only ordinal in nature.

In every case, that is for all types of ICT for all the activities, the mean value for the adopters of CAT tools was higher than the mean value for the non-adopters. This reinforces the idea of CAT tool adopters being more used to, and experienced with, ICT than those who have not adopted CAT tools. Also, the largest differences between the groups of adopters and non-adopters can be seen in their experiences with those ICT highlighted by the Chi-Square tests as having a highly significant relationship with CAT tool adoption. Specifically, the biggest differences were, in descending order, observed for terminology management systems, FTP applications, online translation marketplaces, and online terminology databanks.

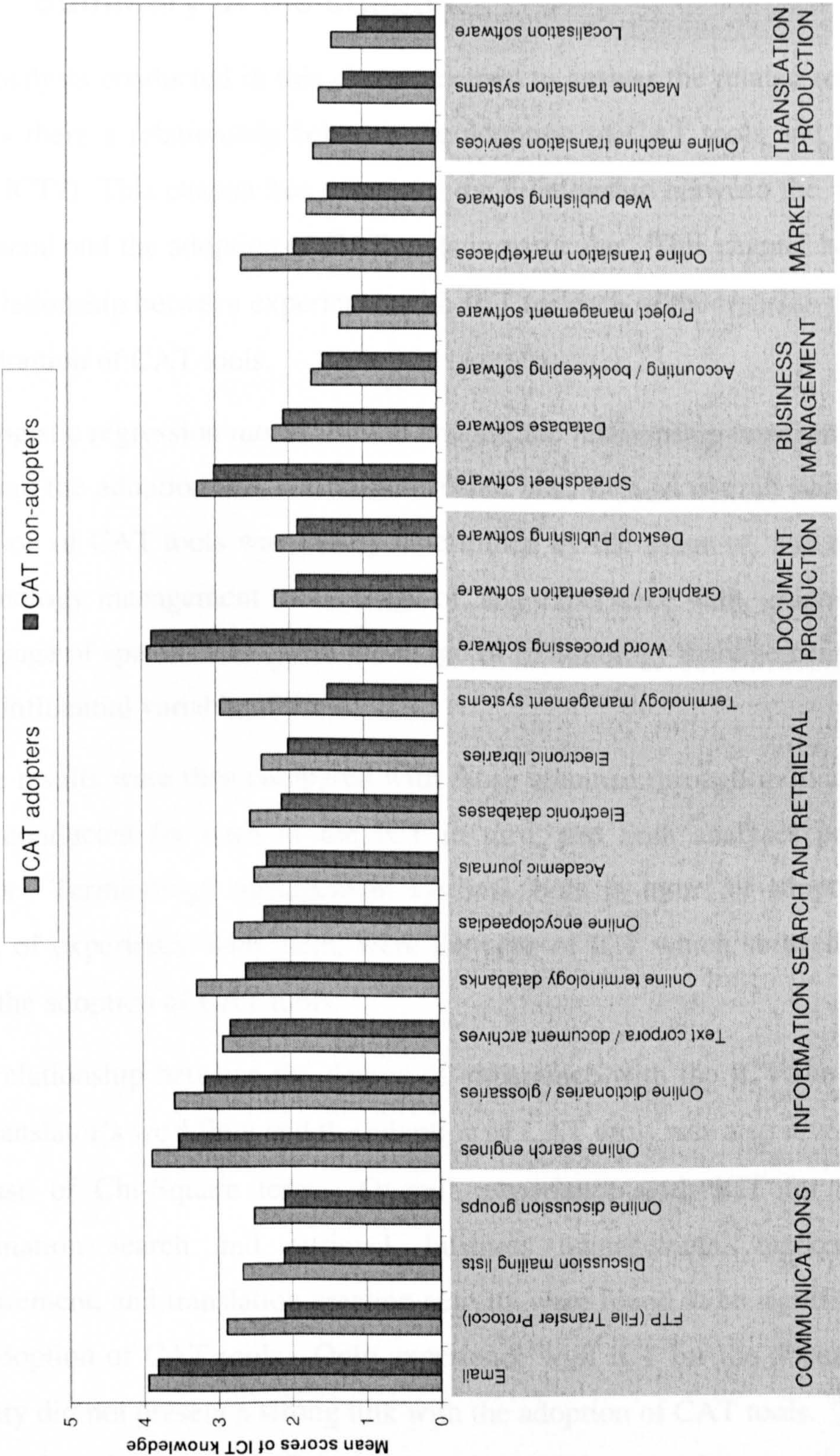


Figure 6.1 ICT support of adopters and non-adopters of CAT tools

6.4. Summary of the chapter

The analysis conducted in this chapter helped to answer the related research question 1.2 (Is there a relationship between the adoption of CAT tools and the adoption of other ICT?) This chapter has examined the relationship between the adoption of ICT in general and the adoption of CAT tools in particular. This chapter has also assessed the relationship between experience with ICT for each of the translator's activities and the adoption of CAT tools.

The logistic regression model used to analyse the relationship between the adoption of ICT and the adoption of CAT tools revealed that, with an overall accuracy of 89.2%, adoption of CAT tools was mostly determined by the usage of, and experience with, terminology management tools, usage of, and experience with, graphics applications, and usage of spreadsheets, with the usage of terminology management tools being the most influential variable of these.

These results were then compared with those obtained through individual Chi-Square tests conducted for each of the ICT in turn, and both analyses presented similar results. Terminology management systems, both in terms of adoption and also in terms of experience with them, were the type of ICT which showed strongest links with the adoption of CAT tools.

The relationship between the degree of experience with the ICT for each activity in the translator's workflow and the adoption of CAT tools was also investigated through the use of Chi-Square tests. Overall, experience with ICT for communication, information search and retrieval, business management, marketing and work procurement, and translation creation activity were found to be significantly related to the adoption of CAT tools. Only experience with ICT for the document production activity did not present a strong link with the adoption of CAT tools. This may be due to the fact that almost all translators were using word processing software for document production. In particular, those translators not using CAT tools (i.e.

undertaking their translations in a more ‘traditional’ way) would also be mostly using word processing software.

These findings were further considered through the comparison of the mean values of adopters and non-adopters of CAT tools in relation to their degree of experience with ICT for each activity in the translator’s workflow. It seemed that CAT tool adopters had more experience with ICT for other activities in their workflow. This implies that, generally, those translators who have more experience with, and are more confident with, general purpose ICT are more likely to adopt CAT tools. This conclusion was also supported by the findings of the specific predictors of CAT tool adoption (see logistic regression analysis).

The next chapter comprises an examination of the characteristics of CAT tool adopters and the factors that affect their adoption.

Chapter 7. Characteristics of CAT Tool Adopters

7.1. Introduction

One of the aims of this research was to examine the factors that affect the adoption of CAT tools by freelance translators in the UK. This chapter presents the characteristics of the freelance translators in the sample who have adopted CAT tools, and compares their profile against the profile of the translators in the sample as a whole.

7.2. Profile of CAT tool adopters

This section presents the characteristics of the sub sample of freelance translators who had adopted CAT tools (referred to from now on as ‘adopters’). 94 (24%) of the 391 freelance translators who made up the sample of this study were current users of CAT tools, 238 translators were not users at the moment of response, and 59 respondents did not specify their usage of CAT tools (and thus were excluded from analysis).

The characteristics examined included information on the adopters’ personal and professional background, namely, their age, gender, educational background, translation qualifications, IT qualifications, length of experience as a translator, professional affiliations, language pairs translated, workload, and subject areas translated. The links between the characteristics of the sample and the adopters of CAT tools were checked through the use of Chi-Square tests at the 0.05 significance level. A logistic regression model was also used to analyse the whole set of the respondents’ characteristics against the condition of adopting CAT tools. This type of

analysis also permitted the examination of certain characteristics (such as subject areas translated) which were not possible to test through the use of a Chi-Square test.

7.2.1. Chi-Square tests

Chi-Square (χ^2) is a general test designed to evaluate whether the difference between observed frequencies and expected frequencies under a set of theoretical assumptions is statistically significant or simply random variation. This statistical test is most often applied to problems in which two nominal variables are cross-classified in a bivariate table (Frankfort-Nachmias and Nachmias, 1992:464). In this study, Chi-square was utilised to determine whether relationships existed between each of the characteristics of the sample and the group of CAT tool adopters, that is, between profile nominal variables (e.g. age range, gender, education) and the nominal dependent variable 'CAT adopter: Yes/No'.

7.2.1.1. Age

Table 7.1 presents the responses obtained regarding the age of the adopters.

Table 7.1 Age of adopters

Age range		CAT USER		Total
		No	Yes	
20-29	Count	11	4	15
	%	73.3	26.7	100
30-39	Count	53	29	82
	%	64.6	35.4	100
40-49	Count	70	37	107
	%	65.4	34.6	100
50-59	Count	70	17	87
	%	80.5	19.5	100
60+	Count	34	7	41
	%	82.9	17.1	100
Total	Count	238	94	332
	%	71.7	28.3	100

The Chi-Square statistic (value 9.951) had a significance of 0.041 and thus confirmed that there was a relationship between the age of the respondents and the fact that they had adopted CAT tools. A closer look at Table 7.1 shows that there was a higher concentration of CAT adopters among the first three age groups. Hence, it can be concluded that CAT adopters were less likely to be aged 50 or more. This might be expected because respondents over 50 may have had less contact with technologies and may therefore be less likely to adopt ICT in general, and newer types of technology, in particular.

7.2.1.2. Gender

Table 7.2 presents the information about the gender of the adopters.

Table 7.2 Gender of adopters

		CAT USER		Total
		No	Yes	
Male	Count	87	33	120
	%	73	28	100
Female	Count	151	61	212
	%	71	29	100
Total	Count	238	94	332
	%	72	28	100

The Chi-Square statistic (value 0.061) had a significance of 0.805 and thus confirmed that there was no association between the gender of the respondents and the fact that they had adopted CAT tools. In this case, the variables presented a 2x2 table (i.e. two groups: CAT user / non-user, were compared on a dichotomous variable, gender), for which Fisher’s Exact Test could have been used to test the relationship between the variables. However, for consistency purposes the standard Chi-Square test was used, as Fisher’s test would show little difference in the results for such a large sample (332 responses) (Fleiss, 1981).

7.2.1.3. Educational level

When focusing on the education level of the adopters, a problem arose. One of the caveats of the Chi-Square test is that, in order to produce reliable results, it needs a minimum expected value of 5 in at least 80% of the cells of the table displaying the crossed variables (Diamantopoulos and Schlegelmilch, 1997:177). In this case, as can be observed in Table 7.3, 25% of the cells had an expected count below 5 so the Chi-Square results (no significant relationship) might not be reliable. Two possible solutions to this problem were to either simplify the analysis by leaving out problematic groups, or to recombine these groups into a new category that met the criteria of the Chi-Square test (Diamantopoulos and Schlegelmilch, 1997:177). If the problematic groups (i.e. PG Diploma, DipTrans IoL, and Other) were omitted from the analysis, the problem regarding the unreliability of the Chi-Square disappeared and it clearly showed that there was no relationship (value = 0.401 and $p = 0.818$) between the educational level (university education in this new case) and the adoption of CAT tools. If the second solution was to be followed, that is recombining 'PG Diploma' and 'DipTrans IoL' into the 'Other' category, the problem with unreliable results disappeared as well and the Chi-Square test showed again that there was no relationship between educational level and the adoption of CAT tools (value = 1.293 and $p = 0.731$).

From both possible approaches it could be concluded that there was no statistical association between educational level and the use of CAT tools, regardless of whether only university education was observed, or other types of education were included.

Table 7.3 Adopters' educational level

Educational level		CAT USER		Total
		No	Yes	
University - bachelor	Count	89	38	127
	%	70	30	100
University - masters	Count	89	40	129
	%	69	31	100
University - doctorate	Count	13	4	17
	%	76	24	100
PG Diploma	Count	11	2	13
	%	85	15	100
DipTrans lol	Count	8	5	13
	%	62	38	100
Other	Count	20	5	25
	%	80	20	100
Total	Count	230	94	324
	%	71	29	100

7.2.1.4. Translation qualifications

Table 7.4 shows the translation qualifications of the adopters and non-adopters of CAT tools.

Table 7.4 Adopters' translation qualifications

Translation qualifications		CAT USER		Total
		No	Yes	
None	Count	62	27	89
	%	70	30	100
Univ degree only	Count	6	7	13
	%	46	54	100
PG degree only	Count	23	12	35
	%	66	34	100
Translation diploma only	Count	121	38	159
	%	76	24	100
Univ + PG degree	Count	2	5	7
	%	29	71	100
Univ/PG degree + Trans Dipl	Count	24	5	29
	%	83	17	100
Total	Count	238	94	332
	%	72	28	100

The Chi-Square statistic (value 14.659) had a very low *p* value (0.012) and thus the relationship between translation qualifications and the adoption of CAT tools was statistically very significant. A closer look at the results in Table 7.4 reveals that the higher concentration of CAT adopters was among those translators who held a translation-related university or postgraduate degree. Hence, it could be concluded that CAT adopters were less likely to adopt CAT tools if they only had a translation diploma. Also freelance translators are more likely to use CAT tools if they follow a university or postgraduate degree in translation studies. This might be because translation studies have been increasingly incorporating training in the use of new translation technologies, and CAT tools have then become part of the technological training received by translators during their university degrees.

7.2.1.5. IT self-learning and formal IT qualifications

Tables 7.5 and 7.6 show the adopters who learned to use IT by themselves and those having a formal qualification in IT.

Table 7.5 Adopters' learning IT skills on a self-taught basis

		CAT USER		
IT acquisition: self taught		No	Yes	Total
No	Count	147	58	205
	%	72	28	100
Yes	Count	91	36	127
	%	72	28	100
Total	Count	238	94	332
	%	72	28	100

Table 7.6 Adopters' IT qualifications

		CAT USER		
Formal IT qualifications		No	Yes	Total
No	Count	191	77	268
	%	71	29	100
Yes	Count	47	17	64
	%	73	27	100
Total	Count	238	94	332
	%	72	28	100

The Chi-Square statistic had significance values of 0.992 and 0.729 respectively, and thus confirmed that there were no associations between the fact that the respondents had learned to use IT by themselves or had a formal IT qualification, and their adoption of CAT tools. In both cases, the variables presented a 2x2 table for which Fisher's Exact Test could have been used to test the relationship between the variables. However, for consistency purposes the standard Chi-Square test was used, as Fisher's test would show little difference in the results for such a large sample (332 responses) (Fleiss, 1981).

7.2.1.6. *Length of experience as a translator*

This variable presented a similar problem as the one discussed earlier regarding educational level. The minimum of 5 expected observations in at least 80% of the cells of the table displaying the crossed variables was not met. A number of cells (45%) had an expected count below 5, so Chi-Square results (no significant relationship) might not be reliable. Again, this limitation of the Chi-Square test had two possible solutions: to simplify the analysis by leaving out problematic groups or to recombine them into a new category that met the criteria of the Chi-Square test.

The most appropriate solution in this case was clearer than for the educational level variable. As years of experience had been initially gathered in groups of 5 years, when the number of responses started to decrease (and thus create a problem for Chi-Square reliability), i.e. from over 26 years of experience, the groups were recombined into one single group ('> 26 years'). Table 7.7 presents the results for the final grouping of the years of experience as a translator.

Table 7.7 Adopters' experience as a translator

Years of experience		CAT USER		Total
		No	Yes	
< 5 years	Count	51	20	71
	%	72	28	100
6-10 years	Count	50	31	81
	%	62	38	100
11-15 years	Count	56	21	77
	%	73	27	100
16-20 years	Count	36	9	45
	%	80	20	100
21-25 years	Count	8	5	13
	%	62	38	100
>26 years	Count	34	6	40
	%	85	15	100
Total	Count	235	92	327
	%	72	28	100

The Chi-Square test results (value = 9.716) did not find the relationship between years of experience and CAT adoption significant at the 0.05 level ($p = 0.084$). Hence experience is unrelated to CAT tool adoption.

7.2.1.7. Volume of translation work

Tables 7.8 and 7.9 present the results for the volume of translation work undertaken by CAT adopters and non-adopters, in terms of words translated per week (workload) and number of hours dedicated to translation-related tasks per week (time employed).

Table 7.8 Adopters' workload

Words per week		CAT USER		Total
		No	Yes	
< 6000	Count	114	18	132
	%	86	14	100
6000-12000	Count	64	47	111
	%	58	42	100
> 12000	Count	24	29	53
	%	45	55	100
Total	Count	202	94	296
	%	68	32	100

The Chi-Square test for the number of words translated per week and the adoption of CAT tools (value 38.631) was found to be highly significant ($p = 0.000$) and thus it could be concluded without hesitation that there was a relationship between weekly productivity and the adoption of CAT tools. A closer look at the results in Table 7.8 reveals that the likelihood of adopting CAT tools increased as the number of words translated per week increased. Hence, it could be concluded that translators were more likely to adopt CAT tools if they translate a larger volume of words. This result has face validity as CAT tools could make processing a large volume of work less laborious.

Table 7.9 Hours of work undertaken by the adopters

Hours per week		CAT USER		Total
		No	Yes	
< 20	Count	94	16	110
	%	85	15	100
20-40	Count	89	34	123
	%	72	28	100
> 40	Count	27	43	70
	%	39	61	100
Total	Count	210	93	303
	%	69	31	100

The Chi-Square test for the number of hours devoted to translation tasks per week and the adoption of CAT tools (value 45.107) was also found to be highly significant ($p = 0.000$) and thus it could be concluded without hesitation that there was a relationship between time spent translating per week and the adoption of CAT tools. A closer look at the results in Table 7.9 reveals that the likelihood of adopting CAT tools approximately doubled as the number of hours translating doubled. Hence, it could be concluded that CAT adopters were more likely to adopt CAT tools if they work for a longer number of hours, and if translators devote more than 40 hours per week, the likelihood increased dramatically.

7.2.1.8. Languages translated

Table 7.10 shows the language combinations of the adopters and non-adopters of CAT tools.

Table 7.10 Languages translated

Language Combination		CAT USER		Total
		No	Yes	
EN>EU	Count	24	20	44
	%	55	45	100
EN<>EU	Count	36	12	48
	%	75	25	100
EN>EU + EU>EU	Count	6	4	10
	%	60	40	100
EU>EN	Count	111	47	158
	%	70	30	100
EU/NonEU>EN	Count	20	7	27
	%	74	26	100
EN>NonEU	Count	11	2	13
	%	85	15	100
EN<>NonEU	Count	11	1	12
	%	92	8	100
NonEU>EN	Count	19	1	20
	%	95	5	100
Total	Count	238	94	332
	%	72	28	100

The Chi-Square statistic (value 16.324) was found to be significant (p value = 0.022) and thus the relationship between the language combination and the adoption of CAT tools was statistically very significant. A closer look at the results in Table 7.10 reveals that the highest concentration of CAT adopters was among those translators who translated to or from English and another EU language. Hence, it could be concluded that translators were more likely to adopt CAT tools if they translated between English and another EU language (regardless of the language direction). Also translators who worked with Non-European languages were less likely to adopt CAT tools. This makes sense because the majority of the respondents were working with European languages (mostly to or from English), and CAT tools tend to be part

of the ICT training offered by European higher education institutions in which many of these translators will have trained.

7.2.2. Logistic regression analysis

Logistic regression permitted the exploration of the relationship between all the adopter characteristics and the fact that they had adopted CAT tools, using an expectation-based adoption model. This model searched for those translators most likely to adopt CAT tools, depending on the characteristics of the translators. Logistic regression and discriminant analyses are two statistical methods often used for this kind of classification problem. Logistic regression builds a model to predict which category translators belong to based upon a set of predictors. Discriminant analysis takes the same approach but makes stronger assumptions about the predictor variables, specifically that the values of the variables follow a multivariate normal distribution with identical covariance matrices (Ye, 2003:49). Based upon this, discriminant analysis is seldom appropriate since these assumptions are rarely met in practice. Logistic regression carries fewer assumptions than does discriminant analysis, particularly the ability to include categorical predictors such as gender (which is one of the translator characteristics). Logistic regression is used when it is important to predict whether a translator will adopt CAT tools or not based upon certain characteristics of the translator. It is particularly suitable where a binary (zero or one), or dichotomous, dependent variable exists (here, translators who did not adopt CAT tools and translators who did adopt them).

As the logistic regression process has been explained in further detail in previous chapters, the prediction model for the exploration of the characteristics of the adopters is presented below.

7.2.2.1. *The prediction model*

Looking at the CAT tool usage variable, of the 391 translators, 94 (24%) could be classified as CAT tools users, while 238 (61%) could be classified as non-users, and the 59 (15%) constituted missing values.

Multiple logistic regression analysis was undertaken using this dichotomous CAT user variable (ignoring the missing values) as the dependent variable and the variables of the characteristics of the translators as the independent variables. A total of 240 of the 391 cases were used to estimate the model. 151 cases were not included because they contained missing data for one or more of the variables.

The first step of the logistic regression analysis included the following variables in the model: age, gender, educational background, translation qualifications, length of experience, volume of work undertaken per week, hours worked per week, language pairs translated, subject areas translated, IT qualifications. Once the variables were entered, backward elimination was used to remove variables which were not significantly related to CAT tool adoption.

Table 7.11 shows all of the statistics for the final model obtained using logistic regression. The column headed 'B' contains the logistic regression coefficients. The second column (S.E.) contains the standard errors for the 'B' coefficients. The Wald statistic was used to test whether the predictor variables were significantly related to the outcome measure (i.e. the adoption of CAT tools) adjusting for the other variables in the model. Generally the Wald statistic has a Chi-squared distribution with one degree of freedom. The column Exp (B) presents the 'B' coefficient raised to the exponential power, and these coefficients can be interpreted in terms of an odds shift in the outcome.

Table 7.11 CAT tool adopters' characteristics (Logistic regression model)

		Variables in the Equation					
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 11	Length of experience	-1.005	.282	12.655	1	.000	.366
	Volume of work per week	.942	.266	12.526	1	.000	2.565
	Hours per week	.830	.257	10.440	1	.001	2.292
	Languages translated			9.921	7	.193	
	Languages translated(1)	3.026	1.194	6.426	1	.011	20.615
	Languages translated(2)	2.391	1.209	3.911	1	.048	10.929
	Languages translated(3)	2.475	1.371	3.260	1	.071	11.876
	Languages translated(4)	2.469	1.154	4.579	1	.032	11.816
	Languages translated(5)	1.845	1.244	2.201	1	.138	6.328
	Languages translated(6)	1.343	1.453	.855	1	.355	3.832
	Languages translated(7)	-5.357	17.474	.094	1	.759	.005
	Subject area: technical	1.381	.349	15.675	1	.000	3.980
	Constant	-5.434	1.297	17.541	1	.000	.004

a. Variable(s) entered on step 1: age, gender, educational background, translation qualifications, length of experience, volume of work per week, hours working per week, language pairs translated, subject areas translated, IT qualifications.

Classification Table^a

		Predicted		
		Software apps USAGE: CAT		Percentage Correct
Observed		No	Yes	
Software apps USAGE: CAT	No	129	58	69.0
	Yes	18	73	80.2
Overall Percentage				72.7

a. The cut value is .300

The results of the logistic regression model for the CAT tool adoption were as follows:

The independent variables with a strong positive influence on the model were found to be length of experience, volume of work undertaken per week, hours of work undertaken per week, the subject area of technical translation, and the language combinations of English and other EU languages. The most influential variable was subject area of technical translation with a Wald score of 15.675 and a significance of

0.000. Other variables with a high Wald score and a significance of 0.000 were length of experience (Wald = 12.655) and volume of work undertaken per week (Wald = 12.526). The variables that were not statistically significant at the 5% confidence level were age, gender, educational background, translation qualifications, other subject areas translated (financial, legal, scientific, business/commerce, and literary), IT qualifications, and the variable regarding language pairs translated, if not split into different categories. These variables, except for language pairs (because some of the sub categories were significant), were left out of the final model results by the logistic regression analysis. The results obtained through the logistic regression model were broadly similar to those obtained through the Chi-Square tests: in both analyses the volume of work undertaken per week, the number of hours worked per week, and the translation languages combination between English and other EU languages were found to be significant characteristics of the CAT tool adopters. On the other hand, the length of experience of the translators, which was found to be significant by the logistic regression analysis, was not found to be significant by the Chi-Square tests. Also, the logistic regression model could report on another significant characteristic which had not been able to be tested through a Chi-Square test: undertaking technical translation.

The overall accuracy of the CAT tool adoption model was 72.7% as shown in Table 7.11. Non-adopters were correctly classified in 69% of the cases, while adopters were correctly assigned in 80.2% of the cases. This seemed to offer a good prediction of the adopters' characteristics (four out of five CAT tool adopters would fit within these characteristics), within an overall high percentage of accuracy (72.7%) of the prediction model developed.

7.2.3. Summary profile of CAT tool adopters

After conducting Chi-Square and logistic regression analyses to examine the characteristics of the translators who were adopters of CAT tools, the following conclusions were drawn:

Chi-Square tests revealed that CAT adopters tend to be young, tend to have obtained a university degree in translation studies, tend to produce a high volume of work in terms of number of words translated per week, tend to work a high number of hours per week, and tend to translate to or from English and other EU languages. On the other hand, there was no association found with gender, their educational level, the length of experience as a translator, or their IT qualifications.

The logistic regression prediction model estimated that the length of experience, the volume of work undertaken per week, the number of hours of work undertaken per week, undertaking technical translation, and the language combinations of English and other EU languages were determinants of whether a translator would adopt CAT tools or not. Among these characteristics, it was important to highlight that the most significant variable was found to be undertaking technical translation, which could not be tested through Chi-Square tests. With the exception of the subject area variable, the findings obtained for the two methods were broadly the same, with the volume of work undertaken per week, the number of hours worked per week, and the translation between English and other EU languages as significant characteristics of the CAT tool adopters. On the other hand, the length of experience of the translators, which was found to be significant by the logistic regression analysis, was not found to be significant by the Chi-Square tests.

7.3. Summary of the chapter

This chapter has examined the characteristics of the CAT tool adopters in the sample. The analysis suggests that the main characteristics of the CAT tool adopters that they were typically young translators, had a university degree in translation studies, and tended to produce a high volume of work in terms of number of words translated per week, worked a high number of hours per week, translated to or from English and other EU languages, and undertook technical translation.

Chapter 8. Freelancer Perceptions of CAT Tools

8.1. Introduction

This chapter presents the results of factor analysis to explore the perceptions that translators have of ICT in general and of CAT tools in particular. Then, it focuses on the perceptions of adopters of CAT tools. Finally, the perceptions of CAT tools are compared across groups of translators with different levels of CAT tool experience.

8.2. Exploring perceptions of ICT and CAT tools

The perceptions that translators had of ICT in general and of CAT tools in particular were measured through the instruments in questions 22 and 23 of the questionnaire. This section discusses the results of factor analysis conducted for all 22 items that measured translators' perceptions of ICT in general (11 items) and of CAT tools in particular (11 items). The main aim of this part of the analysis was to explore translators' perceptions by understanding the issues (factors) underlying their opinions. In addition, factor analysis was used to assess the reliability of the adaptation of the instrument, and therefore served to validate the questionnaire.

In order to achieve a better understanding of the structure of the data and to identify eventual underlying dimensions, factor analysis is a multivariate statistical method that analyses the interrelationships (correlations) among a number of items, and then determines the extent to which each variable is explained by each dimension, known as a factor (Hair *et al.*, 1998:90).

The main objective of factor analysis is to reduce the wide-ranging number of variables into more manageable groups of factors (Lehman, 1989). The technique

assumes that there are only a few basic dimensions that underlie attributes of a certain construct to be measured and it then correlates the attributes to identify these basic dimensions (Churchill Jr., 1999). Factor loadings produced from factor analysis are used to indicate the correlation between each attribute and each score, the higher the factor loading the more significant those attributes are in interpreting the factor matrix (Hair *et al.*, 1998:106).

To use factor analysis, a number of requirements need to be met. According to Sproull (1988), variables under study have at least to be of interval scale for factor analysis to be appropriately applied. In this study, the variables used measured the translators' perceptions of ICT through an ordinal scale. However, this does not preclude the use of factor analysis because an ordinal scale can be treated as an interval scale if one assumes that the distortion introduced by assigning numeric values to ordinal categories is not very substantial (Kim, 1975). Kim and Mueller (1978) indicated that many ordinal variables may be given numeric values without distorting the underlying properties, particularly, as in this case, when numeric values are shown on the questionnaire to guide respondents. Therefore, in this study, it was also assumed that the distortion effect, as a result of assigning numeric values to ordinal data, was not significant.

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy test and the Bartlett test of sphericity can be used to test whether it is appropriate to proceed with factor analysis. A small value on the KMO test indicates that the factor analysis may not be a good option. Kinnear and Gray (2000) suggest that the KMO value should be greater than 0.50 for the factor analysis to proceed. Kaiser (1974), quoted in Stewart (1981), suggests that a KMO measure in the 0.90s is considered to be 'marvellous' sample adequacy for factor analysis purposes, in the 0.80s to be 'meritorious', in the 0.70s is considered to be 'middling', in the 0.60s is considered to be 'mediocre', in the 0.50s is considered to be 'miserable', and below 0.50s is considered to be 'unacceptable'.

The Bartlett test of sphericity and its significance level consider whether the variables are independent (i.e. form an identity matrix) and hence determine whether factor analysis is an appropriate technique to use. If the Bartlett test value is not significant (that is, its associated probability is greater than 0.05) then it is likely that the correlation matrix is an identity matrix (where the diagonal elements are 1 and the off diagonal elements are 0) and is therefore unsuitable for further analysis (Kinnear and Gray, 2000). What is required is that Bartlett’s value for testing sphericity is large and the associated significance is small, that is, less than 0.05. When these criteria are present, the data are suitable for factor analysis.

8.2.1. Factor analysis on freelance translators’ perceptions of ICT

In order to determine whether factor analysis was appropriate for the instrument measuring translators’ perceptions of ICT, first, the adequacy of the correlations among the items of the instrument was examined. An initial inspection of the correlations revealed that 8 out of the 11 correlations were greater than 0.30 (i.e. they were statistically significant). This gave a first indication of the suitability of using factor analysis according to guidelines suggested for factor analysis adequacy (Hair *et al.*, 1998:99). Statistical tests such as KMO and Bartlett test of sphericity were also used to confirm the overall factorability of the correlation matrix. The results are reproduced in Table 8.1.

Table 8.1 **KMO and Bartlett’s tests results for perceptions of ICT**

KMO and Bartlett's Test		
<hr/>		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.816
Bartlett's Test of Sphericity	Approx. Chi-Square	983.498
	df	55
	Sig.	.000
<hr/>		

From Table 8.1, the observed value of Bartlett sphericity was very large (983.498) and its associated significance level was very low (0.000), although this test only checked the presence of non-zero correlations, not the pattern of these correlations. The other

overall test, the Kaiser-Meyer-Olkin measure of sampling adequacy, showed a value of 0.816. According to Stewart (1981), this indicates a 'meritorious' adequacy and hence indicates that the data are appropriate for factor analysis.

Another statistic which looks at the correlation of individual variables is the measure of sampling adequacy (MSA) in the anti-image correlation matrix. The measure of sampling adequacy was calculated for all of the variables and most of them were over 0.80, again falling in the 'meritorious' range (Kaiser, 1970, 1974). The MSA value for one of the variables was 0.49, i.e. slightly under the minimum acceptable value for MSA levels (> 0.50). However, this variable was not omitted from the factor analysis but its value was more fully considered after the factor analysis had been carried out. For example, it may be that this variable will create a factor just based on this one variable. Overall, the results of the statistical tests showed that factor analysis was suitable and could be appropriately applied to this set of variables.

Factor analysis was then conducted using principal components (PC) analysis. This approach is concerned with determining the number of factors which account for the maximum amount of variance in the data (Hair *et al.*, 1998). The latent root criterion suggested three factors since there were three eigenvalues greater than 1. Together these three factors represented 55.7% of the variability in the eleven variables. The scree test also suggested the same number of factors should be retained for the subsequent analysis. The scree plot is presented in Figure 8.1. The plot slopes steeply downwards from one factor to two factors, and more gently from two factors to three factors before becoming an approximately horizontal line. Although the first two factors were clearly differentiated from the rest, the third factor was also considered to be suitably differentiated from the rest. Also, using only the first two factors means that less than half of the variability (46.4%) is accounted for.

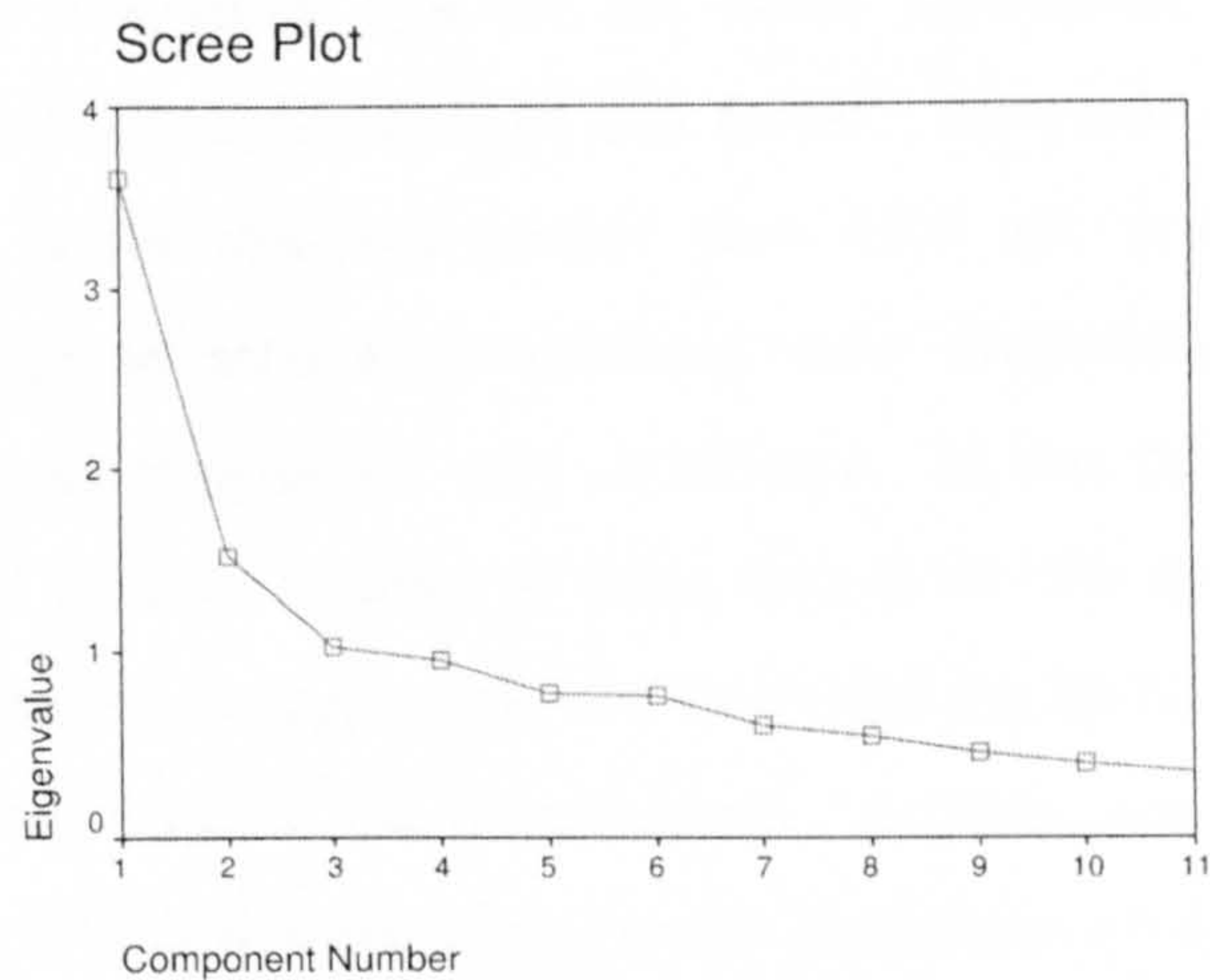


Figure 8.1 Scree test

The unrotated component matrix with three factors was then orthogonally rotated with the VARIMAX rotation method, the most widely used technique (Hair *et al.*, 1998; Kellow, 2005). The VARIMAX rotation criterion centres on simplifying the columns of the factor matrix and helps to make the pattern of the items associated with a given factor more distinct, thus increasing the interpretability of the factors (Kim, 1975).

The factor loadings and factor structure for all 11 items are presented in Table 8.2.

Table 8.2 Factor Analysis results for perceptions of ICT

	Rotated Component Matrix ^a		
	Component		
	1	2	3
ICT: prev. exp. necessary	.453	.595	-1.675E-02
ICT: computerisation = higher quality services	.705	-.101	1.254E-02
ICT: computerisation = time saving benefits	.623	-.356	-7.512E-02
ICT: + benefits IF integrated apps	.152	-2.114E-02	.714
ICT: computerisation = + effectiveness as translator	.777	-.213	1.598E-02
ICT: computerisation = + revenue	.732	-.201	.102
ICT: computerisation = + comms with customers	.642	1.659E-02	-2.735E-02
ICT: apps failed to meet requirements	-.106	.146	.806
ICT: computerisation = many problems	-.196	.558	.340
ICT: use of apps = failure so far	-.334	.707	-3.743E-02
ICT: computerisation = - benefits than expected	-.471	.615	7.695E-02

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
^a. Rotation converged in 5 iterations.

The results in Table 8.2 show that all the items measuring perceptions of ICT exhibited large factor loadings on at least one factor. As a rule of thumb, Hair et al. (1998) suggest that factor loadings greater than ± 0.3 are considered to meet the minimal level, loadings of ± 0.4 are considered more important, and if loadings are ± 0.5 or greater, they are considered very significant. In this case the results showed that all the items had a factor loading of more than 0.50 (the most demanding of the values suggested by Hair), implying that the items making up each of the factors were very significantly correlated to the factor itself. In fact, six of the variables had loadings greater than 0.7, which according to the guidelines given in Hair et al. (1998) would explain more than 50% of the variance in each of these variables.

Each of the items loaded significantly on exactly one of the three factors and examination of the communalities (which represent the amount of variability accounted for by the factor solution) met the acceptable levels of explanation. Hence, the three-factor solution showed that there were three differentiated groups of items. These three groups could be summarised as: items showing benefits, items representing problems, and items showing limitations. The items linked to the first factor were considered to be items showing benefits. The five items allocated to this factor had loadings ranging from 0.623 to 0.777.

The items linked to the second factor were considered to be items representing problems. The four items allocated to this factor had loadings ranging from 0.558 to 0.707.

The items linked to the third factor were considered to be items showing limitations. The two remaining items allocated to this factor had loadings of 0.714 and 0.806. The presence of just two items loading on the last factor implies that a larger number of questions on this area might have helped to define this factor more clearly. More questions on this area would probably have also helped to improve the measure of sampling adequacy in the anti-image test.

In summary, the results of factor analysis confirmed that there were three different types of perceptions of ICT, namely, benefits, problems and limitations. The

following sections present a more detailed analysis of the three groups of perceptions of ICT.

8.2.1.1. *Benefits of ICT*

The five items loading significantly on the 'benefits factor' are presented in Table 8.3 with their mean and standard deviation values.

Table 8.3 Benefits of ICT

Items loading on benefits	Mean	Std. Dev.
ICT: computerisation = higher quality services	4.26	.795
ICT: computerisation = time saving benefits	4.33	.757
ICT: computerisation = + effectiveness as translator	4.29	.836
ICT: computerisation = + revenue	4.06	.859
ICT: computerisation = + comms with customers	4.32	.850

The results in Table 8.3 show that the mean value for the items identified as benefits ranges from 4.06 to 4.33, which implies that most of the translators in the sample perceived all five items as important benefits of ICT. The highest mean value among the benefits was time saving, followed by improved communication with customers, and improved effectiveness as a translator. Providing higher quality services and increased revenue were perceived as slightly less important benefits, although they were still very significant. These findings suggest that translators in the sample considered their use of technologies as a way of improving their efficiency (time saving), their customer relations (communication with customers), and their productivity or quality levels (effectiveness as a translator). Nevertheless, the findings reveal that translators were also very concerned about 'minor' benefits such as meeting professional standards of quality through the use of ICT (higher quality of services) and obtaining better remuneration for their job (increase of revenue).

Since these five variables loaded onto the same factor, it also means that where translators see ICT hindering one of these items (higher quality services, time saving

benefits, effectiveness as a translator, good communication with customers), translators tend to see ICT as hindering all of them.

8.2.1.2. Problems associated with ICT

The four items loading significantly on the 'problems factor' are presented in Table 8.4 with their mean and standard deviation values.

Table 8.4 ICT problems

Items loading on problems	Mean	Std. Dev.
ICT: prev. exp. necessary	4.00	.836
ICT: computerisation = many problems	2.84	1.151
ICT: use of apps = failure so far	1.48	.669
ICT: computerisation = - benefits than expected	1.91	.927

The results in Table 8.4 show that the mean values for the items identified as problems range from 4.00 to 1.91, which reveals a great deal of variation in the relative importance of the perceived problems relating to ICT. The need for previous experience with computers was seen as the most critical problem by most of the translators in the sample. The rest of the problems identified through factor analysis were perceived as rather less important, showing that overall their use of ICT had not been a failure, that the use of technologies had not brought fewer benefits than expected, and that computerisation had not created many problems. These findings suggest that, overall, translators in the sample were very concerned about having enough experience to cope with new ICT (previous experience with computers is necessary for adopting new applications), that they considered that they had succeeded in using technologies so far (use of applications has not been a failure so far), and that their use of computers and the technologies associated with them have been more positive than expected (gained fewer benefits than expected). The relative importance of the number of problems created by ICT (computerisation = many problems) was not very clear: although its mean value (2.84) revealed that ICT were

not creating many problems, the standard deviation value (1.15) indicated a wide variation in the responses obtained. In other words, there could be some translators for whom ICT was creating few problems whilst there were other translators for whom it was creating many problems.

8.2.1.3. *Limitations of ICT*

The two items loading significantly on the 'limitations factor' are presented in Table 8.5 with their mean and standard deviation values.

Table 8.5 **Limitations of ICT**

Items loading on limitations	Mean	Std. Dev.
ICT: + benefits IF integrated apps	3.59	.949
ICT: apps failed to meet requirements	3.18	1.068

The results in Table 8.5 show that the mean value for the two items identified as limitations were 3.59 and 3.18. These mean values, along with standard deviation values close to 1 (0.94 and 1.06), imply that there was a wide diversity of positions with regard to the limitations of ICT. These findings suggest that there was not a majority of translators in the sample who considered that their use of technologies would bring them more or fewer benefits if their applications were more integrated (greater level of integration between applications). In a similar way, there was no majority of respondents who considered that the ICT they had used had matched or not their needs (applications failed to meet requirements).

Since these two variables loaded onto the same factor, it also means that where translators see that their use of technologies would bring them more benefits if their applications were more integrated, they also find that applications are meeting their requirements (and vice versa).

The scarcity of items that measured this factor was identified as a limitation of this research. More items need to be added to the instrument on perceptions of ICT, so

that this aspect of translators thinking could be more fully studied. Also, the fact that respondents gave a wide variety of responses means that there is scope for further research in this area. For example, why do some translators see that there would be benefits if their applications were more integrated, whilst other translators do not see this?

8.2.2. Factor analysis on the freelance translators' perceptions of CAT tools

For comparison purposes, the 11-item instrument used to measure perceptions of ICT was adapted to measure translators' perceptions of CAT tools. The statements in the original instrument were worded slightly differently to capture translators' perceptions of CAT tools. One of the items ("Computerisation significantly improves my communication with customers") was not applicable to the use of CAT tools, and was substituted by an item asking about the respondents' opinion on the cost of CAT tools (i.e. "CAT tools are well worth their cost"). This issue of costs was one that arose from the literature examined on translators' opinions about CAT tools. Factor analysis was again performed in order to achieve a better understanding of the structure of the data and to identify underlying dimensions. Factor analysis is a multivariate statistical method that analyses the interrelationships (correlations) among a number of items, and then determines the extent to which each variable is explained by each dimension, known as a factor (Hair *et al.*, 1998:90).

In order to determine whether factor analysis was appropriate for the instrument measuring the translators' perceptions of CAT tools, first the adequacy of the correlations among the items of the instrument was examined. An initial inspection of the correlations revealed that all the correlations but two (9 out of the 11) were greater than 0.30 (i.e. they were statistically significant). This gave a first indication of the suitability of using factor analysis according to guidelines suggested for factor analysis adequacy (Hair *et al.*, 1998:99). Statistical tests such as KMO and Bartlett

test of sphericity were also used to confirm the overall factorability of the correlation matrix. The result is reproduced in Table 8.6.

Table 8.6 **KMO and Bartlett's tests results for perceptions of CAT tools**

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.871
Bartlett's Test of Sphericity	Approx. Chi-Square	1771.253
	df	55
	Sig.	.000

From Table 8.6, the observed value of Bartlett sphericity was very large (1771.253) and its associated significance level was very low (0.000). The other overall test, the Kaiser-Meyer-Olkin measure of sampling adequacy, showed a value of 0.871. According to Stewart (1981), this also indicates a ‘meritorious’ adequacy and hence indicates that the data were appropriate for factor analysis. The anti-image correlation matrix with the measure of sampling adequacy (MSA) was also computed and all the correlations but one were over 0.80, again falling in the ‘meritorious’ range (Kaiser, 1970, 1974). The MSA value for one of the variables was 0.61 and this also falls within the acceptable MSA levels (albeit only in the ‘mediocre’ range). Overall, the results of the statistical tests showed that factor analysis was suitable and could be appropriately applied to this set of variables.

Factor analysis was then conducted using principal components (PC) analysis and again three eigenvalues were more than 1. However, in this case, the three factors with eigenvalues over 1 explained a larger proportion of the variability of the eleven variables: 68.7%. The scree test also suggested the same number of factors should be retained for the subsequent analysis. The scree plot is presented in Figure 8.2. Again, the plot shows a very clear first factor and then slopes gently from two factors to three factors before becoming an approximately horizontal line. Although the first and second factors were more clearly differentiated from the rest, the third factor was also considered to be suitably differentiated from the rest. Also, using the same number of

factors that were used in examining the perceptions of ICT in general would aid comparability when considering the perceptions of this particular type of ICT (CAT tools).

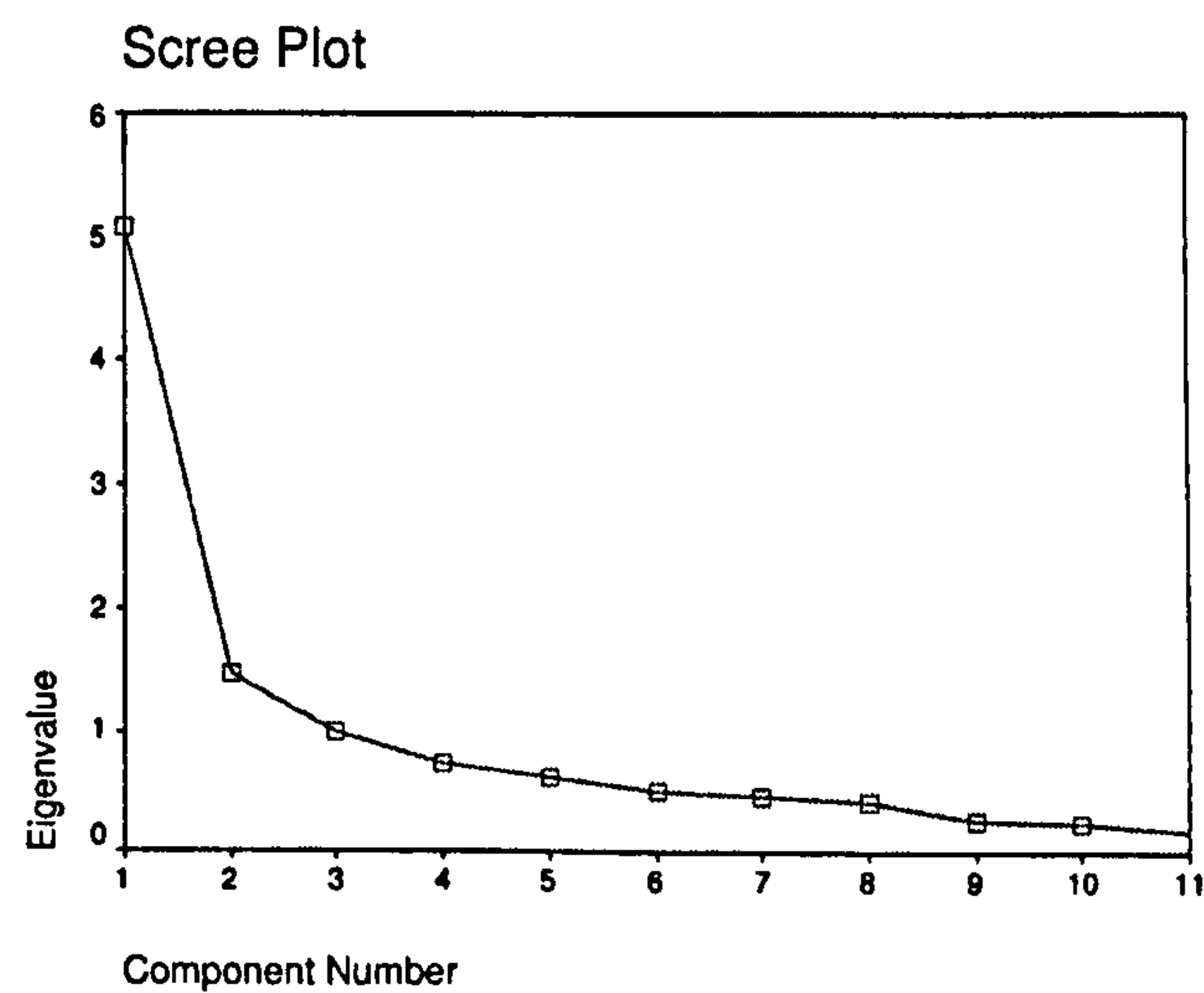


Figure 8.2 Scree test

The unrotated component matrix with three factors was then orthogonally rotated with the VARIMAX rotation method, the most widely used technique (Hair *et al.*, 1998; Kellow, 2005). The factor loadings and factor structure for all 11 items are presented in Table 8.7.

Table 8.7 Factor Analysis results for perceptions of CAT tools

	Rotated Component Matrix ^a		
	Component		
	1	2	3
CAT: prev. exp. necessary	-1.726E-02	.908	-6.343E-02
CAT= higher quality services	.808	-5.546E-02	2.670E-02
CAT = time saving benefits	.810	-.173	9.081E-02
CAT are worth their cost	.767	-.131	-.171
CAT = + revenue	.877	-7.996E-02	-1.330E-02
CAT = + effectiveness as translator	.860	-.165	4.282E-03
CAT = + effectiveness as translator IF integrated	.412	-.138	.590
CAT failed to meet requirements	-.120	4.979E-02	.845
CAT = many problems	-.463	.412	.425
CAT = failure so far	-.575	.556	.124
CAT = - benefits than expected	-.594	.403	.455

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
^a. Rotation converged in 5 iterations.

The results in Table 8.7 show that all the items measuring perceptions of CAT tools exhibited large factor loadings on at least one factor. As a rule of thumb, Hair et al. (1998) suggest that factor loadings greater than ± 0.3 are considered to meet the minimal level, loadings of ± 0.4 are considered more important, and if loadings are ± 0.5 or greater, they are considered very significant. In this case, the results showed that all the items had a factor loading of more than 0.50 (the most demanding of the values suggested by Hair), implying that the items making up each of the factors were very significantly correlated to the factor itself. In fact, seven of the variables had loadings greater than 0.7 (six of the seven even had loadings over 0.8, which is considered extremely high), which according to the guidelines given in Hair et al. (1998) would explain more than 50% of the variance in each of these variables.

Each of the items loaded significantly on exactly one of the three factors, except for the item about the problems created by CAT tools, which showed similar correlations with all three factors (ranging from 0.412 to 0.463). However, the examination of the communalities of the factor solution met the acceptable levels of explanation. The smallest communalities were slightly above 0.5 and were for the item about the problems created by CAT tools and the item about the integration of CAT tools.

One possible way to improve the clarity of the factor solution is to try a different number of factors, which, in this case, did not prove to help much. Another possible way to improve the clarity of the factor solution is to try a different rotation method. In particular, it was thought that a different orthogonal rotation method might be useful. In order to try and bring clarity to the allocation of the item on problems created by CAT tools, the factor analysis was re-run using QUARTIMAX rotation. Comparing the results obtained using QUARTIMAX rotation with the results obtained using VARIMAX rotation, it was found that overall they were very similar. However, the item on problems created by CAT tools now loaded significantly (0.577) only on the first factor, i.e. 'Benefits/Problems'.

Using the results of the QUARTIMAX rotation to allocate variables to factors, the three-factor solution showed that there were three differentiated groups of items: items

showing benefits and problems, one item showing experience, and items showing limitations. With regard to the ‘benefits/problems’ factor, eight items were allocated to this factor with loadings ranging from 0.575 to 0.877. Only one item loaded on the factor representing ‘experience’ with a factor loading of 0.908. Finally the two remaining items loaded on the ‘limitations’ factor with loadings of 0.590 and 0.845.

Overall these results are disappointing, in factor analysis it is expected that there will be several questions loading on each factor. Clearly, the factor structure apparent with general ICT does not simply carry over to the specific application (CAT tools). Further research (including qualitative research) is needed to identify underlying dimensions (types of perceptions) in translators thinking about CAT tools.

In conclusion, the results of the factor analysis showed that there were three different types of perceptions of CAT tools, namely benefits/problems, previous experience, and limitations. However, it is recognised that the instrument used needs to be extended to measure two of these types of perceptions (factors) better. The following sections present a more detailed analysis of the three groups of perceptions for the translators in the sample.

8.2.2.1. *Benefits and problems of CAT tools*

The eight items loading significantly on the ‘benefits/problems factor’ are presented in Table 8.8 with their mean and standard deviation values.

Table 8.8 **Benefits/Problems of CAT tools**

Items loading on benefits/problems	Mean	Std. Dev.
CAT= higher quality services	3.21	.809
CAT = time saving benefits	3.44	.792
CAT are worth their cost	3.03	.773
CAT = + revenue	3.21	.751
CAT = + effectiveness as translator	3.10	.859
CAT = many problems	3.05	.748
CAT = failure so far	2.64	.939
CAT = - benefits than expected	2.90	.911

The results in Table 8.8 show that the mean values for the items identified as benefits/problems range from 2.64 to 3.44, which is lower than the range of mean values for the ICT benefits (4.06 to 4.33). This suggests that most of the translators in the sample did not have a clear perception of the benefits and problems related to CAT tools. This variation in responses might be due to differences between the perceptions of translators who had adopted CAT tools and those who were not using them, which are examined in a later section of this chapter.

The highest mean value among the benefits/problems was time saving, followed in descending order by providing higher quality services, increased revenue, improved effectiveness as a translator, the origin of CAT tool problems, perceptions of the value of CAT tools, failure in using CAT tools, and obtaining fewer benefits than expected. These findings suggest that translators in the sample considered CAT tools to be a way of improving their efficiency (time saving), meeting professional quality standards (higher quality of services), obtaining a better remuneration for their job (increase of revenue), and increasing their production and quality levels (effectiveness as a translator).

Since these eight variables loaded onto the same factor, it also means that (for example) where translators see CAT tools as saving time they also see CAT tools as providing higher quality services and improving their effectiveness as a translator (and vice versa). There is no evidence here that CAT tools require a trade-off between cost (as measured by saving time) and quality.

8.2.2.2. *Experience and CAT tools*

The only item loading significantly on the 'experience factor' is presented in Table 8.9 with its mean and standard deviation values.

Table 8.9 Experience and the use of CAT tools

Items loading on experience	Mean	Std. Dev.
CAT: prev. exp. necessary	3.01	.888

The item measuring whether previous experience was necessary for using CAT tools arose as a separate factor with a very significant loading (.908). Despite this being the only item loading very highly on this factor, one of the items loading on the benefits/problems factor (use of CAT had been a failure so far) also loaded significantly on the experience factor (0.556). This suggests that the experience needed to use CAT tools was a clear concern among the translators in the sample. This suggests that whilst it was disappointing to have a factor with only one item loading on it, this was an important factor. However, the scarcity of items that measured this factor was identified as a limitation for this research.

8.2.2.3. Limitations of CAT tools

The two items loading significantly on the 'limitations factor' are presented in Table 8.10 with their mean and standard deviation values.

Table 8.10 Limitations of CAT tools

Items loading on limitations	Mean	Std. Dev.
CAT = + effectiveness as translator IF integrated	3.30	.760
CAT failed to meet requirements	3.20	.759

The results in Table 8.10 show that the mean values for the two items identified as limitations were 3.30 and 3.20. These findings suggest that there was some variation in responses when translators evaluated the limitations of CAT tools. Also, this implies that there was not a majority of translators in the sample who considered that their use of technologies would bring them more or fewer benefits if their applications

were more integrated (greater level of integration between applications). The lack of clarity obtained from this factor, the limitations of CAT tools, along with the scarcity of items that measured this factor were identified as a limitation of this research.

The findings obtained from the factor analysis discussed above helped to answer research question 4 (“What perceptions do freelance translators have of CAT tools?”) and its research sub question 4.1 (“What perceptions do freelance translators have of ICT in general?”).

8.2.3. A comparison of factor analysis results for perceptions of CAT tools and ICT in general

The results of factor analysis conducted to examine the attitudes that translators in the sample had towards ICT in general and towards CAT tools in particular revealed that there were important differences between the perceptions of the general use of ICT and the use of a specific type of ICT (CAT tools). Although CAT tools are indeed one type of ICT that is used by translators, it was not seen as ‘just another software package’ by the respondents. Comparing the results of factor analysis for ICT and for CAT tools, there were a number of similarities and differences between the items grouped for each factor as shown in Table 8.11.

Table 8.11 A comparison of ICT and CAT tool factors

Factors examining perceptions	towards use of ICT in general	towards use of CAT tools
Factor 1	Benefits	Benefits / Problems
Factor 2	Problems	Experience
Factor 3	Limitations	Limitations

Based on the findings presented in Table 8.11, there are two main differences observed in the grouping of the items, namely, the allocation of items relating to the

“problems” factor in both analyses, and the rise of a separate factor regarding the experience needed to use CAT tools.

When talking about ICT in general, benefits and problems were perceived as two different factors; however, when translators gave their opinions on CAT tools, items looking at benefits (or positive effects) and problems (or negative effects) were combined into the same factor. This suggests that the benefits perceived to be gained from ICT in general are clearly differentiated in the minds of translators from the problems they cause. All the benefits are loaded together as a first factor since they are seen to be strongly linked to each other, while all the perceived problems are loaded together as a second factor. On the other hand, the benefits from CAT tools are not differentiated in the minds of translators from the problems they cause. This might be because translators are less familiar with the benefits and problems of CAT tools. Alternatively, the difference might be inherent in the difference between ‘general’ and ‘specific’, and this offers scope for further research.

At a detailed level, all of the items in the factor ‘benefits of using ICT’ also appear in the factor ‘benefits/problems of using CAT’ (apart from the question about communications which was not one of the items for the CAT tools). Similarly, all of the items in the factor ‘problems of using ICT’ also appear in the factor ‘benefit/problems of using CAT’ apart from the question about experience. In other words, the issues which are clearly separated in the minds of translators when asking about ICT in general are joined together when asking about CAT in particular.

The other big difference concerns the item about previous experience (part of the ‘Problems’ factor with a loading of 0.595) which also had a rather significant loading on the ‘Benefits’ factor (0.453). This showed that previous experience was mostly linked to other problems in the minds of translators but also possibly had some links with the benefits in the minds of the translators. This possible ambiguity in the perception of the need for previous experience disappeared when the analysis turned towards the perception of CAT tools, where previous experience appeared as a separate factor.

Again at a detailed level, the factors identified as ‘limitations in using ICT’ and as ‘limitations in using CAT tools’ included the same items in both cases, i.e. that the translator’s effectiveness would be increased if there was a higher degree of integration within the applications they use, and that ICT and CAT tools had failed to meet their requirements. It seems, therefore, that the links between questions about limitations perceived for ICT in general also applied to the case of CAT tools.

8.2.3.1. Using other rotations

As a validation process, the factor analysis was re-run on the variables of both ICT and CAT tools using different rotation methods: another orthogonal rotation method, the QUARTIMAX rotation, and an oblique rotation method, OBLIMIN. The ultimate goal of a QUARTIMAX rotation is to simplify the rows of a factor matrix by rotating the initial factor so that all variables load fairly highly onto one factor and then each variable loads highly onto one, and only one, other factor. Oblique rotations are similar to orthogonal rotations in that they also aim to simplify the results, however oblique rotations allow correlated factors instead of maintaining independence between the rotated factors.

Interestingly, it was observed that the variables grouped for each factor for ICT and CAT tools were the same. As already discussed, the results from the QUARTIMAX rotation helped to clarify the allocation of the item on problems created by the use of CAT tools. This item loaded significantly on all three factors when using the VARIMAX rotation but loaded highly on only one factor when using the QUARTIMAX rotation. Therefore, it was reasonable to conclude that the three factors identified in each case were valid and stable.

In summary, it is clear that translators do not have the same perceptions of ICT in general as they do of CAT tools. While their perceptions of ICT in general clearly distinguished a number of benefits of using technologies in their work, from a number of problems that the use of technologies can carry, this distinction became blurred when considering one particular type of technology: CAT tools. Translators’

perception of CAT tools was more ambiguous, not showing a clear distinction in their thinking between what was considered a benefit or a problem. Nevertheless, there was a clear positioning with regard to the issue of previous experience when using CAT tools. While experience was just considered another potential problem of ICT in general, it stood as a separate issue that translators were concerned about for CAT tools.

The findings obtained from the analysis discussed above helped to answer research sub question 4.2 (“How do perceptions of CAT tools differ from those of ICT in general among freelance translators?”).

8.2.4. A comparison of CAT tool perceptions of adopters and non-adopters

In order to examine how perceptions of CAT tools differed between adopters and non-adopters, their mean values were compared and their statistical significance assessed using ANOVA at the 0.05 significance level. Table 8.12 presents the mean values of the responses to the perceptions of CAT tools of adopters and non-adopters.

As would be expected from those respondents who had not adopted CAT tools so far, all the perceptions of the members of this group (Group 2 in the table) were close to the middle value of the 5-point Likert scale ranging from “1 = Strongly Disagree” to “5 = Strongly Agree”. The middle value was labelled as ‘Don’t Know’.

Table 8.12 CAT perceptions of adopters and non-adopters

Perceptions on CAT tools	Mean Difference between Groups of respondents Based on CAT use			
	Mean Scores		F-Test (ANOVA)	
	Group 1:	Group 2:	F Ratio	Significance
	CAT adopters	CAT non-adopters		
Previous experience with CAT is necessary	2.68	3.15	18.379	0.000
CAT = higher quality services	3.84	2.97	97.233	0.000
CAT = time saving benefits	4.03	3.21	87.172	0.000
CAT are worth their cost	3.47	2.87	44.380	0.000
CAT = + revenue	3.74	3.00	76.953	0.000
CAT = + effectiveness as translator	3.82	2.83	114.372	0.000
CAT = + effectiveness as translator IF integrated	3.61	3.22	17.301	0.000
CAT failed to meet requirements	3.38	3.16	5.554	0.019
CAT = many problems	2.73	3.17	22.637	0.000
CAT = failure so far	1.71	3.03	195.909	0.000
CAT = - benefits than expected	2.46	3.11	35.041	0.000

As seen from the table, all the perceptions were found to be statistically very significant at the 0.05 level (all the variables had a 0.000 significance, except for ‘CAT failed to meet requirements’ which had a p-value of 0.019). The variable which showed the largest difference was ‘CAT = failure so far’, with an *F* value of 195.909. Here the mean value for adopters (1.71) was much lower than the mean value for non-adopters (3.03), and this indicates a clear difference between the perceptions in each group. In particular, the adopters largely disagreed with the statement formulated for this variable, showing that their use of CAT tools had not been a failure.

Other variables that were found to be very significant were ‘CAT = higher quality services’ (*F* = 97.233), ‘CAT = time saving benefits’ (*F* = 87.172), and ‘CAT = + revenue’ (*F* = 76.953) with mean values from the adopters group close to ‘4 - Agree’ (3.84, 4.03, and 3.74, respectively). This implied that adopters claimed that CAT tools helped them offer higher quality services, that they brought time savings, and that the use of CAT tools increased their revenue. Again it is important to note that

there is no evidence that CAT tools require a trade-off between cost (as measured by saving time) and quality.

The findings obtained from the analysis discussed above helped to answer research sub question 4.3 (“How do perceptions of CAT tools differ between adopters and non-adopters?”).

8.2.5. Level of CAT experience and CAT perceptions

In order to examine how perceptions of CAT tools differed within different levels of experience with CAT tools among the respondents, their mean values were compared and their statistical significance assessed using ANOVA at the 0.05 significance level. Table 8.13 presents the mean values of the responses to the perceptions of CAT tools across respondents with different levels of experience.

As would be expected from those respondents who were not familiar with CAT tools, all the perceptions of the members of this group (Group 1 in Table 8.13) were close to the middle value (which was labelled as ‘Don’t Know’) of the 5-point Likert scale ranging from “1 = Strongly Disagree” to “5 = Strongly Agree”.

Table 8.13 Perceptions of respondents with different levels of experience with CAT tools

Perceptions on CAT tools	Mean Difference between Groups of respondents Based on CAT experience				F-Test (ANOVA)	
	Mean Scores				F Ratio	Sig.
	Group 1: Not familiar	Group 2: Familiar with no experience	Group 3: Familiar with some experience	Group 4: Familiar with extensive experience		
Previous experience with CAT is necessary	3.14	3.20	2.84	2.67	5.743	0.001
CAT = higher quality services	2.95	3.01	3.30	3.95	27.509	0.000
CAT = time saving benefits	3.08	3.33	3.59	4.18	34.368	0.000
CAT are worth their cost	2.93	2.88	2.75	3.73	25.185	0.000
CAT = + revenue	3.00	3.05	3.09	3.97	32.054	0.000
CAT = + effectiveness as translator	2.83	2.81	3.34	3.18	47.634	0.000
CAT = + effectiveness as translator IF integrated	3.09	3.34	3.56	3.60	8.201	0.000
CAT failed to meet requirements	3.04	3.18	3.57	3.33	6.698	0.000
CAT = many problems	3.09	3.18	3.13	2.71	5.059	0.002
CAT = failure so far	3.03	2.99	2.58	1.47	61.533	0.000
CAT = - benefits than expected	3.04	3.08	3.32	2.08	26.233	0.000

As seen in Table 8.13, all the perceptions (for all groups) were found to be statistically very significant at the 0.05 level (all the variables had a 0.000 significance, except for ‘Previous experience with CAT is necessary’, which had a p-value of 0.001, and ‘CAT = many problems’, which had a p-value of 0.002). The variable which showed the largest difference was ‘CAT = failure so far’, with an *F* value of 61.533. Here the mean value for the group with “extensive experience with CAT tools) had a mean of 1.47 which was much lower than the means for the other groups. The progression in the mean values showed that the more experienced respondents were with CAT tools, the more success they had with this technology. However, it is recognised that this result might be ‘self fulfilling’ in the sense that if CAT was a failure for some translators then these translators would not persevere to achieve ‘extensive

experience'. On the other hand, none of the groups showed signs of failure in using CAT tools (i.e. the mean values for respondents in all experience groups disagreed with the statement 'My use of CAT tools has been a failure').

Other variables that were found to be very significant again included 'CAT = higher quality services' ($F = 27.509$), 'CAT = time saving benefits' ($F = 34.368$), and 'CAT = + effectiveness as translator' ($F = 47.634$) with mean values from the most experienced group near or above '4 - Agree' (3.95, 4.18 and 4.10 respectively). This implied that those respondents with more experience with CAT tools were the ones who saved more time and who had seen their effectiveness increase. Also, this again implies that there is no evidence that CAT tools require a trade-off between cost (as measured by saving time) and quality (including effectiveness as a translator).

8.3. Summary of the chapter

This chapter has examined the perceptions of CAT tools among the translators in the survey sample. The findings obtained from the analysis conducted helped to answer research question 4 about the perceptions that translators have of CAT tools and its research sub questions about translators' perceptions of ICT in general, and the differences in the perceptions between adopters and non-adopters. Using factor analysis, the differences in the perceptions of ICT in general and CAT tools in particular among the translators in the sample were examined. A comparison of the factor analyses conducted for the translators' perceptions of ICT in general and towards CAT tools in particular revealed that in both cases, their perceptions could be grouped into three factors. Whilst there was a common group of attitudes observed regarding 'limitations' of ICT and CAT tools, there were two main differences in the structure of the perceptions of ICT and CAT tools. Firstly, the 'benefits' and 'problems' were perceived separately when looking at ICT in general, but they formed a single factor when looking at CAT tools in particular. Secondly, 'experience' arose as a new factor for perceptions of CAT tools, treating it as a separate issue, rather than

being considered as a problem, as was the case for the factor analysis for perceptions of ICT in general.

The comparison of the mean values of adopters and non-adopters of CAT tools and the assessment of their significance through ANOVA analysis revealed that the most significant difference was found in the perception on the 'failure in using CAT tools'. Results showed that CAT tool adopters did not consider their use of CAT tools a failure at all. Finally, the results of further comparisons within the different levels of experience with CAT tools also revealed a relationship between more successful use of CAT tools and more experience with them.

Chapter 9. Technology Attributes Affecting CAT Tool Adoption

9.1. Introduction

In previous chapters, the level of uptake of CAT tools among a large number of freelance translators in the UK has been investigated. In addition, the characteristics of the adopters of CAT tools, the characteristics of their translation businesses, and the perceptions of translators about ICT in general, and CAT tools in particular, were analysed as part of the factors affecting the adoption of CAT tools in the freelance translation business context. The analysis of these factors helped to address the objectives of the first phase of the present research. The findings of this phase of the study indicated a rather low uptake of CAT tools among the translators in the sample, and generally low levels of awareness of these technologies. Also, a number of characteristics of CAT tool adopters and their businesses were revealed, representing a profile of likely users of CAT tools. Finally, a lack of clarity about the benefits and problems originated by these tools was also observed in the perceptions analysed from the translators in the sample. On account of these findings, further more in-depth investigation of the issues surrounding the adoption of CAT tools was deemed to be necessary to better understand CAT tool adoption. In particular, the findings of the first phase helped to shape the design of the second phase of the study, by dividing the sample into adopters and non-adopters of CAT tools, and showed that subsequent analysis needed to clarify and confirm the determinants of the adoption and the impacts of this adoption on freelance translation businesses.

This chapter focuses on the second phase of the research. As indicated in Chapter 4, the second phase of this study was designed to investigate freelance translators' decision to adopt CAT tools, and also to investigate the impacts of the adoption of CAT tools on translators' working environment.

As in the first phase of the study, instruments previously used in the information systems domain informed the design of the instruments used to measure translators' decision to adopt CAT tools. In particular, Moore and Benbasat's instrument for measuring "the various perceptions that an individual may have of adopting an information technology (IT) innovation" (Moore and Benbasat, 1991:192) was used. Data were collected through an online survey and analysed using a cross-case approach for two groups of translators: those who had already adopted CAT tools and had some degree of experience with them, and those who had not adopted CAT tools.

In the sections that follow, the research design of the second phase of the study, the analysis undertaken, and the findings obtained from this phase of the research are presented.

9.2. Research method

A number of research design options were considered for this phase of the research, including interviews, focus groups, and a further questionnaire survey.

Focus groups are typically designed to collect data from a limited number of participants through a focused discussion among the group of participants (Lewis-Beck *et al.*, 2003). Such groups may stimulate participants' thinking and elicit ideas about a specific topic (Gliner and Morgan, 2000:341); however, the aims of this second phase of the fieldwork required more detailed information from each individual adopter or non-adopter, and so focus groups were rejected. Interviews allow to gather data in more detail from each translator, and can be conducted either face-to-face, by telephone, or by online methods. However, a large number of

interviews would have had a high economic cost and they would have required a longer timescale than the available one, so interviews were ruled out because they did not allow to collect data from a large number of translators.

In the light of the above drawbacks of interviews and focus groups, a decision was made to conduct a further questionnaire survey. A survey approach would allow to collect data from a larger and geographically dispersed sample, and, at the same time, it would be possible to ask open questions and capture qualitative data.

Participants were identified from those in the sample from the first survey who had given their consent to collaborate further with this research. Therefore, contact email addresses were available to the researcher, and it was possible to conduct an online survey in this phase of the research.

Online data collection methods, are regarded as a faster and less costly way of collecting a larger volume of detailed information in shorter time scales than traditional data collection methods (Gaiser, 1997; Clarke, 2000; Dillman, 2000). At the same time, these methods simplify the data collection process, allow to collect a large amount of responses, and can ensure the accuracy of the collected data by writing a program to interpret the responses and read the answers directly into a database, offering significant savings in terms of data entry (Mann and Stewart, 2000).

In contrast with traditional data collection methods, some extra time should be devoted to design and plan this type of online study, but once ready, the time required to collect the data and prepare the responses for their analysis would be reduced.

The online survey included a combination of a web-page-based questionnaire with email messages in a similar way to what it is done in email surveys (Mann and Stewart, 2000), thereby gaining some of the advantages of this type of survey too. For example, the convenience of initially contacting participants to ask them to collaborate further in this research, to explain them how to access the website containing the questionnaire, and to enable a communication channel to ask the researcher about any issue with regard to the survey.

The advantages and potential of an online survey were clear in terms of getting access to the participants quickly, cost and time savings, eliminating transcription bias, and easier handling of data than by manual methods (for a more detailed discussion of the benefits of online research methods, see Mann and Stewart, 2000). Nevertheless, such methods also have disadvantages that can represent a challenge for the researcher (also discussed in detail by Mann and Stewart). In fact, these authors claim that “[o]nce a researcher has decided that CMC [Computer-Mediated Communication] is the way forward, the first practical step is to ensure that the researcher and all respondents have access to the required technology and the confidence to use it” (Mann and Stewart, 2000:66). The first challenge, therefore relates to the technological infrastructure and knowledge required to set up the survey and get the responses from the participants. Also, “establishing contact for individual person-to-person CMC usually involves a mutual exchange of email addresses”, which sometimes can create problems when recruiting participants and contacting them without their consent, as could be considered as ‘spamming’. These initial challenges were overcome by the characteristics of the sample and the researcher. The sample (see section on sampling frame later in this chapter) consisted of a number of participants who (1) agreed to collaborate further with this research after participating in the survey from the first phase, (2) provided their email addresses among their contact details, and (3) were regular email users and familiar with Internet technologies. The researcher’s expertise in HTML programming and Internet technologies was deemed satisfactory in order to set up the study and run it to the expected standards.

9.3. Research design

The design of the online study involved the development of the survey, adapting existing scales and measures where available, management of the technical issues involved in the creation of the web form, testing and piloting of the survey, the preparation of contact messages, handling the responses received, and keeping track

of the participants' interaction and their responses to the survey. These issues are explained in more detail in this section.

The questionnaire for the online survey was designed similarly to a semi-structured questionnaire, allowing to collect a larger number of responses than interviews, and using open-ended questions to collect a greater deal of qualitative data from the respondents than through the use of a structured questionnaire. Therefore, as noted by Easterby-Smith, Thorpe and Lowe (1999:112), this design is suitable for being analysed following the method suggested by Miles and Huberman (1994). Briefly, analysis of the data using this method is accomplished by drawing conclusions from the visual patterns observed in a matrix sheet that displays the data extracted from the responses through a data reduction process (e.g. coding). This method is further explained in a later section of this chapter.

9.3.1. Online questionnaire design considerations

A number of issues affecting online research methods were considered for the design of the online study. This section focuses on how such issues affected this study and how they were addressed.

In order to ensure that the participants had access to the required technology and the confidence to use it, an online study should be kept as easy as possible for respondents to access and complete (Dillman, 2000). Also, the virtual environment (i.e. the computer programs / types of interface) should be familiar to the respondents (Mann and Stewart, 2000). In search of these priorities, some advantages from email and web-page-based surveys were met. First, all the communications between the researcher and the participants were made through text-based email messages, making them convenient for the respondents because they required no facilities or expertise

beyond those that they use in their day-to-day email communication⁶. Second, a website containing a form was used to collect the data from the survey, avoiding typical problems of email-based surveys, such as selecting several answers when only one choice is required, deleting questions accidentally, or altering their format (Mann and Stewart, 2000), and providing a visually attractive interface⁷ that appeared identical to all respondents, was easy to complete and submit, and which data was in a completely predictable and consistent (coded) format, making automated manipulation and analysis possible by the researcher⁸.

Another challenge may arise from the perception of the notification email as from an unknown sender by the participants (Faught *et al.*, 2004). Although participants were familiar with this research and had previously agreed to collaborate further, previous communication with them was accomplished by postal mail. Therefore, it was possible that the first contact email informing the participants about the second phase of the fieldwork seemed unknown to them, their email clients filtered the message as “junk”/“spam” mail, or that they simply deleted the message before reading it. These problems are analogous to the ‘wastebasket problem’ for mail surveys, and the researcher needed to be aware of this issue and work to avoid filters and the delete button. To overcome this potential problem the researcher’s university email system was used, which identified the sender’s email address belonging to a UK university, and also used the university’s mail server, increasing the reliability of message handling. Moreover, neither graphic elements, nor attachments were sent along with

⁶ Other options such as online discussion groups were also considered, but email communication avoided the need for login procedures, preserved the privacy of the messages between the participants and the researcher, and allowed to contact each participant in a personal way. Moreover, since no discussion among participants was required, email messaging covered the communication requirements for this study satisfactorily

⁷ As opposed to long and dull email messages using plain text without any format typically employed in email surveys.

⁸ Text-based email surveys, once again, require additional editing before processing the responses.

the messages and email messages intentionally contained only text-based information, therefore reducing the risk of some email clients blocking the message for being potentially dangerous.

9.3.1.1. *The online questionnaire*

Prior to the development of the web form, and to sending contact messages to the participants, a survey implementation strategy was devised.

First, a tracking document was created using spreadsheet software and included information about the participants, the messages sent to them, the messages received from them, and the overall progress of the survey.

Second, contact messages to be sent were prepared and produced using *group mail* software⁹. These messages included an invitation letter to participate in the online study, a thank you message for completing the survey (to be sent individually or in small groups after receiving the responses), and a template for an apology message in the event of technical problems (to be modified and addressed individually in each case). A copy of the invitation message is reproduced in Appendix D.

Third, participants were split into two groups for sending the contact messages: the pilot group (21), and the rest of the participants (130).

After these preliminary tasks, the web page containing the questionnaire was designed. Separate sets of questions were produced for 'adopter' and 'non-adopter' groups. Once the contents were ready, the web page containing the questionnaire was designed in HTML¹⁰ following guidelines for good web design and principles for

⁹ After considering several choices of multiple emailing software, Infacta Group Mail free edition (version 3.4.206) was used to create groups of contacts, create the messages, and send the messages to each group of participants in one go, but individually addressed.

¹⁰ HTML stands for HyperText Markup Language, the coding system used to create pages which can be displayed by web browsers.

constructing and implementing web surveys. In the literature on research methods, it is highlighted that “Internet surveys need to be designed with the less knowledgeable, low-end computer user in mind” (Dillman, 2000), and that it is important to design with computer and questionnaire logic in mind: “Meshing the demands of questionnaire logic and computer logic creates a need for instructions and assistance, which can easily be overlooked by the designer who takes for granted the respondent’s facility with computer and web software. [...] The building of such instructions takes on the same level of importance as writing the survey questions” (Dillman, 2000).

Some of the design principles for web surveys discussed by Dillman (2000) and applied to this web survey were addressed as follows:

- “Introduce the Web questionnaire with a welcome screen that is motivational, emphasizes the ease of responding, and instructs respondents about how to proceed to the next page.” (p. 377) This was achieved by including a welcoming, motivation, and instructions statements in the contact email which also contained a link pointing to the web address where the web survey was located.
- “Provide a PIN number for limiting access only to people in the sample.” (p. 378) Since the invitation to participate was sent privately to the participants, password protection access was considered unnecessary; moreover, for ease of use reasons, it was considered that a login process would complicate the access to the survey.
- “Present each question in a conventional format similar to that normally used on paper self-administered questionnaires.” (p. 379) Questions and scales were reproduced in a similar way to a paper questionnaire, although taking advantage of colouring, formatting, and shading features offered by HTML format.
- “Restrain use of color so that figure/ground consistency and readability are maintained, navigational flow is unimpeded, and measurement properties of questions are maintained.” (p. 382) As mentioned above, HTML formatting

features were used, but only using colouring and bold font face in a sensible way, so that it enhanced the readability of the questions. Moreover, all the questions including a list of items across scales were designed using resizable tables to ensure the integrity of the proportions and consistency were maintained.

- “Avoid differences in the visual appearance of questions that result from different screen configurations, operating systems, browsers, partial screen displays, and wrap-around text.” (p. 385) All text used relative font sizes so text could be enlarged or reduced using the text size options available in visual browsers, and a flexible page format was used so pages could be automatically resized for different window sizes and screen resolutions avoiding annoying wrap-around effects regardless of the participants’ computer or software used to display the web survey.
- “Provide skip directions in a way that encourages marking of answers and being able to click to the next applicable question.” (p. 394) This principle was applied several times giving explicit instructions to click on a link that forwarded the respondent to the following question (i.e. “please click here to go to next section”).

The final version of the survey web page is reproduced in Appendix E, and was made available online for the duration of the study through the university web servers.

9.3.2. The structure of the online questionnaire

As in the design of the questionnaire in the first phase of the study, suggestions made in research methods’ literature were considered to define the structure and sequence of the sections in the online questionnaire (Dillman, 2000). Accordingly, questions that are similar in content or question type were grouped together. The order of the questions took advantage of the cognitive ties that respondents were likely to make

among the groups of questions. Questions that were more likely to be difficult were placed after questions that were likely to be easier to answer.

The web questionnaire was structured in four parts (A-D). Parts A and C related to the larger project of which this research forms a part. The focus for this study was on the part of the questionnaire about CAT tools (Part B), and on the part dealing with the characteristics of the freelance translation businesses (Part D).

Instead of using the term 'CAT tools', part B of the web questionnaire was worded using the term 'translation memory' (which is the core component of CAT tool packages), to differentiate it from Part A, where specific information was collected on 'terminology management tools' (which can be either stand alone applications or be part of CAT tool packages) for the purposes of the larger project.

Standard instruments were used for the survey questions where possible, drawing on existing instruments used in previous research on ICT adoption and adapting them for this study. The sections and the instruments are presented in detail below, and a copy of the questionnaires developed for adopters and non-adopters of CAT tools can be found in Appendix E.

9.3.2.1. CAT tools

Questions in Part B of the study were formulated using Moore and Benbasat's instrument, which was designed to "measure the various perceptions that an individual may have of adopting an information technology (IT) innovation" (Moore and Benbasat, 1991:192). Moore and Benbasat's instrument was designed to "be generally applicable to a wide variety of innovations, especially other types of information technologies" (p. 194). They developed this instrument using the theoretical framework of innovation adoption developed by Rogers (1983). In this instrument, eight constructs were used to measure the perceptions of adopting an information technology innovation. According to Moore and Benbasat, the reason for using the *perceived* characteristics of innovations, rather than perceptions of the innovation itself, was that "the findings of many studies which have examined the

primary characteristics of innovations have been inconsistent” (p. 194). They argue that “primary attributes are intrinsic to an innovation independent of their perception by potential adopters”, while “the behaviour of individuals [...] is predicated by how they perceive these primary attributes” (p. 194). In addition, they further claim that “studying the interaction among the perceived attributes of innovations helps the establishment of a general theory” (p. 194).

The constructs used in the instrument were relative advantage, compatibility, voluntariness, image, ease of use, result demonstrability, visibility, and trialability; and were defined by Moore and Benbasat, relying on the work of Rogers (1983), as follows:

- *Relative advantage*: “the degree to which using an innovation is perceived as being better than its precursor” (p. 196).
- *Compatibility*: “the degree to which [using] an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters” (p. 195).
- *Voluntariness*: “the degree to which use of the innovation is perceived as being voluntary, or of free will” (p. 195).
- *Image*: “the degree to which use of an innovation is perceived to enhance one’s image or status in one’s social system” (p. 195).
- *Ease of use*: “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (p. 197, cited from Davis, 1986:82).
- *Result demonstrability*: the degree to which “the results of using [an] innovation” are communicated (p. 203).
- *Visibility*: the degree to which “the results of using [an] innovation” can be observed (p. 203).
- *Trialability*: “the degree to which an innovation may be experienced with before adoption” (p. 195).

The present study needed an instrument that measured the adoption of CAT tools (i.e. an IT innovation) within freelance translation businesses (i.e. a very small organisation). Furthermore, Moore and Benbasat's instrument was measuring the perceptions of an individual, which perfectly suited the case of the translation micro businesses under study, where the freelance translators were not only the users of the technology, but also the ones making the decision of adopting CAT tools.

Questions 1 to 3 on CAT tools were based on Moore and Benbasat's instrument. All the items of the constructs in the complete instrument that were applicable to an individual were used in these questions. The wording was slightly modified to reflect the purpose of this research and the specific context of freelance translators. All perceptual items in the instrument were measured by five-point Likert scales representing a range from "Strongly Disagree" to "Strongly Agree".

The items for each question and the constructs they relate to are presented in Tables 9.1 to 9.3:

Table 9.1 **Items for question 1: Using CAT tools**

	Item	Construct
CAT tools...	1. Enable me to accomplish tasks more quickly.	<i>RELATIVE ADVANTAGE</i>
	2. Improve the quality of work I do.	
	3. Make it easier for me to do my job.	
	4. Improve my job performance.	
	5. Are overall advantageous in my job.	
	6. Enhance my effectiveness in my work.	
	7. Give me greater control over my work.	
	8. Increase my productivity.	
	9. Are compatible with the type of translation assignments I undertake.	<i>COMPATIBILITY</i>
	10. Fit well with the way I like to work.	
	11. Are cumbersome to use.	<i>EASE OF USE</i>
	12. Require a lot of mental effort.	
	13. Are often frustrating.	
	14. Do what I want to do easily.	
	15. Are easy for me to use.	
	16. Were easy for me to learn.	

Table 9.2 **Items for question 2: CAT tools and the translation sector**

	Item	Construct
CAT tools...	1. My clients expect me to use them.	VOLUNTARINESS
	2. My use of them is voluntary.	
	3. Using them improves my image within the translation sector.	IMAGE
	4. Clients prefer to work with translators who use them.	
	5. Translators who use them have a high profile in the translation sector.	
	6. Having them is a status symbol among translators.	

Table 9.3 **Items for question 3: Learning about CAT tools**

	Item	Construct
CAT tools...	1. I have seen how other translators use them.	VISIBILITY
	2. Many freelance translators use them.	
	3. Before deciding whether to use them, I was able to try them out fully.	TRIALABILITY
	4. I was permitted to use them on a trial basis long enough to see what they could do.	
	5. I had ample opportunity to try them out before buying.	
	6. I would have no difficulty telling others about what they can do.	RESULT DEMONSTRABILITY
	7. I believe I could communicate to others the advantages and disadvantages of using them.	
	8. The benefits of using them are apparent to me.	

The items in these questions were accordingly reworded for the questionnaire addressed to non-adopters of CAT tools.

In question 4 the participants were asked about the extent to which the use of CAT tools affected a number of elements of the translators’ business (for adopters); and the impacts of the potential use of these tools, in the case of CAT tool non-adopters. For this purpose, a 5-point scale ranging from “Large Decrease” to “Large Increase” was used for the items in Table 9.4.

Table 9.4 Items for impacts of CAT tools

Items	
Impacts of CAT tools on...	Translators' turnover
	Size of translators' customer base
	Quality of translators' translations
	Translators' productivity
	Volume of work translators undertake
	Number of clients translators have
	Volume of work offered to translators by clients
	Prices translators charge for work they undertake

9.3.2.2. Translation business characteristics

In this part of the online survey, participants were asked to provide some details about their professional background as translators, and the type of work they undertake. For this purpose, questions relating to their translation assignments, the environment of their freelance translation business, and about ways of learning to use new software tools were formulated. In addition, a 5-point performance scale (ranging from very weak to very strong) was adapted to the context of freelance translators from an original performance scale developed by Khandwalla (1977) to measure the index of subjective performance based on the manager’s assessment of the company’s ability relative to its competitors. While the instrument was originally developed and tested in large organisations, it has also been adapted and validated in the SMEs context by (Miller and Droge, 1986; Raymond *et al.*, 1995; Hussin, 1998; Ismail, 2004b). This resulted in five items measuring translator’s performance, namely: (a) Long term profitability, (b) Amount of translation work undertaken, (c) Financial resources (liquidity and investment capacity), (d) Client base, and (e) Professional image and client loyalty.

9.3.3. Online survey trial and piloting of the questionnaire

After uploading the web pages containing the survey to the researcher’s web space on the university server, a number of access tests were carried out from different

locations and using different computer specifications to ensure compatibility with different machines and Internet connections.

Once electronic access to the survey was tested, the questionnaire was piloted to gain some insights into the likely response rate, and the expected types of response, as well as to gain assurance that the wording of the questions was clear. As suggested by Oppenheim (1992), respondents in pilot studies should be as similar as possible to those in the main survey, so the questionnaire was then sent to 21 random translators for the pilot exercise. Twelve responses were obtained and showed that the questions were clearly understood, that they could be answered without problems by the translators, and the overall impression and the feedback from the piloting respondents was very satisfactory.

9.3.4. Sampling frame

In this second phase of the fieldwork, the sample frame was reduced to a subsample extracted from the respondents of the first survey, selecting all those freelance translators that had given their consent to collaborate further, and who had provided valid responses in the first survey.

As stated by Faught *et al.* (2004), other studies using online surveys that created a sampling frame by obtaining a list of email addresses for a certain population resulted in a lower response rate than expected. However, these researchers also acknowledge that other studies which have achieved higher response rates resulted from more focused populations. The fact that the sampling frame for this study was focused on a number of the respondents from the first survey, along with the positive feedback and response rate obtained from the piloting exercise, was deemed to be an indicator of a satisfactory expected response rate.

In order to meet the aims of this second phase of data collection, as already indicated, the online survey had to be undertaken within the specific contexts of adoption and non-adoption. Therefore, the sample of the online study, was further divided into two

sub samples, namely, those who had adopted CAT tools and those who had not adopted these tools. The final sample for this second phase of the fieldwork consisted of 151 freelance translators divided into two groups: 100 CAT tool non-adopters and 51 CAT tool adopters.

In addition, a script was programmed in *perl* language¹¹ to automatically handle the responses from each group of respondents, and prepare the data for entering in a database. A copy of the script used to handle the responses from adopters is presented in Appendix F.

After implementing and conducting the study, 53 responses were received over a period of 30 days (34 coming from non-adopters, and 19 from adopters of CAT tools). It should be noted that the initial number of participants (151) was cut down to 124 because responses from 27 of them could not be obtained due to invalid contact details (email addresses errors or changes) and a few technical problems (six cases) for submitting the form online. Therefore, the response rate obtained for the online survey was 43%.

9.4. Data analysis and findings

This section discusses the results of the analysis of the study presented here.

For this analysis, the qualitative data analysis framework developed by Miles and Huberman (1994) for cross-case analysis was followed. This data analysis framework involved three major activities: data reduction, data display, and conclusion drawing and verification (Miles and Huberman, 1994:10). These activities are as follows:

- *Data reduction* helps to sharpen, sort, focus, discard, and organise the data in a way that allows for “final” conclusions to be drawn and verified. Data can

¹¹ *Perl* (Practical Extraction and Report Language) is an interpreted programming language with a number of features that make it very useful for manipulating textual data. For more information visit <http://www.perl.org>

be reduced and transformed through such means as selection, summary, paraphrasing, or through being subsumed in a larger pattern (p. 10).

- *Data display* involves taking the reduced data and displaying it in an organised, compressed way so that conclusions can be more easily drawn (p. 11).
- *Conclusion drawing and verification* is the activity in which the researcher begins to decide what things mean. He / she does this by noting regularities, patterns, explanations, possible configurations, casual flows, and propositions (p. 11).

9.4.1. Data reduction

For each case (i.e. for each translator), responses obtained for each construct (i.e. relative advantage, compatibility, voluntariness, image, ease of use, result demonstrability, visibility, and trialability) were reduced by converting degrees of agreement to numerical data and averaging them. As well as permitting the exploration of each respondent's views, numeric conversion of the scale data facilitated the calculation of the relative frequency with which each issue was present, as well as the intensity with which they were expressed (as the scale values represented ordinal data).

9.4.2. Data display

Data displays allow the analysts to understand what is happening and extrapolate enough information to discern systematic patterns and interrelationships. Miles and Huberman (1994) identified a number of valid types of display, namely, matrices, graphs, charts, and networks, to assemble organised data into an immediately accessible form which facilitates its understanding for conclusion drawing or further analysis.

For the present study, cross-case matrix data displays were extremely helpful for showing a comprehensive picture of the data collected for each case, i.e. within-case analysis of each translator (Miles and Huberman, 1994:174); and for identifying patterns across the constructs investigated to determine the factors affecting the adoption of CAT tools, i.e. variable-oriented analysis across the cases (Miles and Huberman, 1994:175). The decision to adopt CAT tools was likely to vary from one translator to another, based on factors such as the respondents' perceptions of the adoption of CAT tools, the translators' personal characteristics, and the differences in the translation businesses.

In this study, each translator who participated represented a case (i.e. the rows of the displays), and the constructs used¹² represented the variables under study (i.e. the columns of the displays). A mixed strategy was followed to perform a cross-case analysis, combining case-oriented and variable-oriented approaches, which had been found to be a desirable way of analysing data from multiple cases (Miles and Huberman, 1994:176). As noted by Ragin (1987), each approach has pluses and minuses: variable-oriented analysis is good for finding relationships among variables, but poor at handling the complexities of causation; and case-oriented analysis is good at finding specific patterns common to small sets of cases, but its findings often remain particularistic. One strategy suggested by Miles and Huberman (1994) to follow a mixed approach for cross-case analysis is called by them "stacking comparable cases". After series of cases have been entered for a set of variables, matrices are used to analyse each case in depth. When each case has been understood, it is "stacked" in a "meta-matrix", which presents a further condensed and comparable display. The present study followed a "stacking comparable cases" strategy to perform cross-case analysis.

¹² i.e. relative advantage, compatibility, voluntariness, image, ease of use, result demonstrability, visibility, and trialability.

Through cross-case analysis, a description and understanding of the settings of the cases under study can be achieved “to increase generalizability” to reassure the researcher that “the events and processes in one well-described setting are not wholly idiosyncratic”, and at a deeper level, “to see processes and outcomes across many cases, to understand how they are qualified by local conditions, and thus to develop more sophisticated descriptions and more powerful explanations” (Miles and Huberman, 1994:172).

9.4.2.1. Descriptive meta-matrix displays

Two descriptive matrix displays were created including all the data obtained from the data reduction process for each translator, and they were stacked according to their different contexts (CAT adoption or CAT non-adoption), which would enable comparison between them. One matrix included the data from 19 translators who had already adopted CAT tools, and the other display included data from 34 translators who had not adopted CAT tools to date.

Tables 9.5 and 9.6 present extracts of these displays focusing on the summarised indexes created for each construct under investigation.

Table 9.5 Descriptive matrix of factors affecting CAT tool adoption among adopters

ID	CAT TOOL USED	READ	COMP	EASU	VOLU	IMAG	VISI	TRIA	REDE	Main subject areas*	Main type of client
ad01	Trados SDLX Transit	5.0	5.0	4.3	4.5	3.0	3.0	2.0	4.3	1, 2, 4	Translation agencies
ad11	Trados	5.0	5.0	3.8	1.5	2.8	4.0	4.0	4.0	1, 3	Translation agencies
ad15	Wordfast	5.0	5.0	5.0	4.0	2.5	4.0	5.0	5.0	1, 2, 4	Translation agencies
ad17	Trados	5.0	4.0	3.8	1.5	3.0	3.0	1.0	3.7	1, 2	Translation agencies
ad18	Déjà Vu	5.0	4.5	3.5	4.5	2.0	4.5	4.3	5.0	1, 5	Direct clients
ad19	Trados	5.0	4.5	3.0	3.0	3.8	2.5	1.0	4.0	1, 6	Translation agencies
ad07	Déjà Vu	4.5	3.0	3.5	5.0	2.8	3.5	5.0	4.0	1, 3	Translation agencies
ad03	LionLinguist Trados WordFast	4.3	3.0	2.5	2.0	4.0	3.5	1.3	4.0	1, 6	Direct clients
ad14	Star Transit	4.3	4.0	4.0	3.5	3.3	4.0	4.0	4.3	1, 3	Half agencies, half direct
ad02	Déjà Vu & SDLX before	4.0	4.0	3.5	4.0	3.0	2.5	1.7	4.0	1	Translation agencies
ad10	Wordfast	4.0	4.0	3.2	3.0	4.0	4.0	3.3	4.0	1, 2, 6	Translation agencies
ad16	Trados & Star Transit	4.0	4.0	4.0	2.5	3.8	3.5	2.0	4.0	1, 2	Translation agencies
ad04	Trados	3.9	4.5	4.2	2.5	3.3	3.0	1.3	2.7	1, 2	Translation agencies
ad05	Trados	3.9	4.0	3.7	3.0	4.0	1.5	1.0	4.0	2	Translation agencies
ad06	Trados	3.9	4.0	2.5	3.5	3.8	2.5	1.0	3.7	2, 4, 5	Translation agencies
ad12	Trados	3.8	4.0	3.0	2.5	3.0	3.0	2.0	4.0	2	Translation agencies
ad13	Wordfast	3.8	4.0	3.8	4.0	2.3	3.0	4.0	4.0	1, 2	Translation agencies
ad09	Trados	3.4	3.5	3.8	3.0	4.8	3.0	2.7	4.0	1, 6	Translation agencies
ad08	Déjà Vu	3.3	3.5	3.8	4.5	3.8	3.0	4.0	4.0	1, 2	Translation agencies

*Subject areas: 1 = Business/Commerce; 2 = Technical; 3 = Legal; 4 = Medical; 5 = Scientific; 6 = Arts/Tourism
Key for constructs: READ = relative advantage; COMP = compatibility; EASU = ease of use; VOLU = voluntariness; IMAG = image; VISI = visibility; TRIA = trialability; and REDE = result demonstrability.

Table 9.6 **Descriptive matrix of factors affecting CAT tool adoption among non-adopters**

ID	READ	COMP	EASU	VOLU	IMAG	VISI	TRIA	REDE	Main subject areas*	Main type of client
na01	3.1	2.0	3.0	5.0	3.0	2.0	3.0	3.0	1, 3	Direct clients
na02	4.3	3.5	4.3	5.0	3.5	3.5	3.3	4.3	6	Translation agencies
na03	3.4	2.0	2.2	2.0	3.0	3.0	3.5	2.3	1, 3, 4	Translation agencies
na04	3.0	1.0	1.8	4.0	3.3	3.5	3.5	3.7	1, 5	Direct clients
na05	4.0	4.0	4.5	5.0	1.0	2.0	3.0	4.0	1, 3	Translation agencies
na06	2.5	2.0	2.7	5.0	2.5	3.5	4.0	2.7	1, 3	Translation agencies
na07	2.6	2.5	2.3	3.0	3.0	2.0	2.5	1.7	1, 3, 6	Direct clients
na08	1.1	2.5	2.8	1.0	5.0	5.0	3.3	2.3	6	Translation agencies
na09	1.0	1.0	2.3	1.0	4.0	4.0	3.0	3.7	4	Translation agencies
na10	3.3	3.0	4.0	3.0	2.3	4.0	3.0	4.0	6	Half agencies, half direct
...	:	:	:	:	:	:	:	:	:	:
na30	4.0	4.0	3.7	2.0	4.5	4.0	2.0	3.3	3, 6	Direct clients
na31	3.0	3.5	3.5	4.0	3.5	2.0	2.8	3.3	3, 6	Direct clients
na32	3.4	3.0	3.3	5.0	3.3	3.5	3.0	3.3	3, 6	Direct clients
na33	4.0	4.0	2.3	4.0	1.5	2.5	1.0	3.7	1	Translation agencies
na34	2.3	2.0	2.3	4.0	2.8	5.0	4.5	4.5	1, 6	Direct clients

*Subject areas: 1 = Business/Commerce; 2 = Technical; 3 = Legal; 4 = Medical; 5 = Scientific; 6 = Arts/Tourism
Key for constructs: READ = relative advantage; COMP = compatibility; EASU = ease of use; VOLU = voluntariness; IMAG = image; VISI = visibility; TRIA = trialability; and REDE = result demonstrability.

Overall, the displays showed that there was not a clear pattern that permitted the identification of groups of translators, in general, adopters of CAT tools were showing more positive values for the perceptions of adopting CAT tools (such as the relative advantage that the use of CAT tools give them, or the compatibility with the tools); whereas non-adopters of CAT tools generally showed less positive values of the perceptions investigated.

In this first approach to the cross-case analysis of the cases, only two cases stood as examples of extreme cases according to the measured constructs (ad15, an adopter who had the highest values, and na23, a non-adopter who had the lowest values). Below, the findings obtained from the descriptive matrices are detailed for adopters and non-adopters of CAT tools.

CAT tool adopters

In general, among adopters the main issues outstanding from the descriptive matrix were those investigated by the constructs READ (i.e. relative advantage), COMP (i.e.

compatibility), and REDE (i.e. result demonstrability). More specifically, this matrix showed that adopters thought that using CAT tools conferred them a considerable advantage, that using CAT tools was considerably compatible with the type of work they undertook, and that they were considerably capable of communicating the results of using CAT tools. The extent to which these constructs and the issues they represented is studied in more detail in a later section of the chapter. With regard to the issues under the EASU (i.e. ease of use) construct, adopters did not find difficult to learn and use CAT tools. However, the perceptions of adopting CAT tools with regard to the rest of the constructs investigated, namely VOLU (i.e. voluntariness), IMAG (i.e. image), VISI (i.e. visibility), and TRIA (i.e. trialability), did not provide a clear position of the issues behind these. Therefore, there were mixed views on whether adopting CAT tools was a voluntary act, whether the use of CAT tools improved adopters' image, whether the results of using CAT tools were witnessed by adopters, and whether adopters had opportunities to try CAT tools before using them.

CAT tool non-adopters

Among non-adopters, there existed an overall greater level of uncertainty about the issues investigated by the constructs COMP (i.e. compatibility) and EASU (i.e. ease of use). More specifically, the non-adopters' descriptive matrix showed that they overall thought that using CAT tools would not be considerably compatible with the type of work they undertook, and that it would be difficult to learn and use CAT tools. The perceptions of adopting CAT tools with regard to the rest of the constructs investigated, namely READ (i.e. relative advantage), VOLU (i.e. voluntariness), IMAG (i.e. image), VISI (i.e. visibility), TRIA (i.e. trialability), and REDE (i.e. result demonstrability), did not provide a clear position of the issues behind these. Therefore, there were mixed views on whether using CAT tools would confer non-adopters a considerable advantage, whether adopting CAT tools was a voluntary act, whether the use of CAT tools improved freelance translators' image, whether the results of using CAT tools were witnessed by non-adopters, whether non-adopters

would have opportunities to try CAT tools before using them, and whether they would be capable of communicating the results of using CAT tools.

Comparison of adoption contexts

The main differences observed between the type of work undertaken by adopters and non-adopters of CAT tools were found in the type of client of the translators, in the subject areas they were working, and in the types of document they had to deal with. Adopters were mostly working for translation agencies (who seemed to be exerting a higher pressure to use CAT tools), while some non-adopters of CAT tools were mostly working for agencies and some other non-adopters were mostly working for direct clients. Most of the translators (whether adopters of CAT tools or not) were undertaking translation jobs in the area of business, commerce and marketing; however, in the case of adopters, translations in the technical field were also common, and, in the case of non-adopters, legal translations were common instead. Maybe for this reason the translation of HTML files (web page files) was more usual among adopters of CAT tools than among non-adopters.

After a first exploratory step of the cross-case analysis to see what the cases look like and how do they fit within each defined context of adoption, Miles and Huberman framework suggests to go beyond the description of multiple cases to generate explanations and to test them systematically, which is considered by the authors as “our best resource for advancing our theories about the way the world works” (Miles and Huberman, 1994:207).

9.4.2.2. Predictor-outcome matrices

The analysis moved from the initial matrices used for reducing, organising and describing the data, to a more detailed level of analysis which allowed to start inferring conclusions from the matrices. In order to achieve this, Miles and Huberman

recommend the use of *case-ordered predictor-outcome matrices*, which “get into a multivariate prediction mode, taking those predictor or antecedent variables that we have good reason to believe are contributing to outcomes, and assessing their separate and combined effects” (Miles and Huberman, 1994:213). Using this method, the adoption of CAT tools (i.e. whether the translator was an adopter or not) was used as the main criterion/outcome variable. Then, adopter and non-adopter cases of the descriptive matrices were arrayed in new matrices, one for each of the constructs that were considered predictors of the adoption of CAT tools (i.e. the main antecedent variables thought to be most important contributors to the outcome).

In order to apply this method to the present study, the analytical steps followed are explained in more detail in the following sections.

Asking prediction questions

From the initial part of the cross-case analysis, it seemed that a number of issues measured in the constructs could be affecting the adoption of CAT tools (such as being more aware of the benefits obtained from the use of CAT tools, the suitability of this type of software for certain types of translation work, or the difficulty of learning to use CAT tools). In this phase of the cross-case analysis more specific questions were formulated to account for the factors that were affecting the adoption of CAT tools:

- What characteristics of CAT tools were perceived as motivating their adoption?
- What characteristics of CAT tools were perceived as inhibiting their adoption?
- How were the characteristics of the translators and the type of work they undertake affecting the adoption of CAT tools?

Selecting the predictors

In this study, the predictors were obtained from the summarised variables measuring each of the constructs for the perceptions of adopting CAT tools, namely relative advantage (READ), compatibility (COMP), image (IMAG), ease of use (EASU), visibility (VISI), voluntariness (VOLU), trialability (TRIA), and result demonstrability (REDE). For example, if the increase in productivity due to the use of CAT tools (one of the issues investigated by the construct READ) was perceived as an important issue, it would be considered to be an indicator of the positive association of this issue (increased productivity) and the underlying construct (READ) with the adoption of CAT tools.

The analysis of individual cases could show contradictory findings among the responses obtained from the translators. For example, one translator who had adopted CAT tools (ad07) found his / her use of CAT tools advantageous, while these tools were not especially compatible with his / her type of work, the translator's use of CAT tools was entirely voluntary, and had plenty of chances to try the CAT tool before adopting it. However, another translator who had adopted CAT tools (ad03, for example) showed that his / her use of CAT tools was advantageous, and not especially compatible with his / her type of work, but that this translator's use of CAT tools was not voluntary and had very few chances to try the software before adopting it.

Therefore, it was necessary to observe what was going on in all the cases of each setting at the same time, using the summarised construct variables as predictors, and some of them (READ, COMP, EASU, TRIA and REDE) as criteria to display the ordered cases within each setting. The conceptual and empirical considerations for using these predictors as criteria to conduct the cross-case analysis stemmed from the issues arising from the existing literature, and from the findings of the first phase of the present research:

- The ambiguity in the benefits and problems derived from the use of CAT tools observed in the translators during the first phase of this research, along with the existing scepticism on the advantages provided by the use of CAT tools,

made the READ (Relative Advantage) construct an important criterion predictor to analyse the multiple cases of this phase of the research.

- The existing concern about the compatibility of CAT tools with translators' way of working, or about the suitability of these tools for certain types of translation jobs, made the COMP (Compatibility) construct an important criterion predictor to analyse the multiple cases of this phase of the research.
- The evidence of a concern about the need of previous experience with CAT tools before adopting them was related with the issues examined through the EASU (Ease of Use), TRIA (Trialability), and REDE (Result Demonstrability) constructs, which made them important criteria predictors to analyse the multiple cases of this phase of the research.

Scaling the outcome and the predictors

The degree of the outcome variable (CAT tool adoption) was fairly straightforward to determine by the two settings under study, i.e. adoption or non-adoption. However, the main interest of this part of the study was to determine the degree to which the predictors affected the adoption of CAT tools. The previous step in the data reducing stage of the analysis had helped to transform translators' responses to each of the items measuring the predictor variables into a numerical scale from '1' (strongly disagree) to '5' (strongly agree). This was useful to have standardised data from each case, which was required for ordering the cases in the case-ordered predictor-outcome matrix according to their degree of importance of the criteria predictors (READ, COMP, EASU, TRIA and REDE). As a result, the predictors' values represented three degrees of importance: "low" (values between 1 and 2.3 on the scale), "moderate" (values between 2.3 and 3.6 on the scale), and "high" (values over 3.6 on the scale). In addition, the relative importance of the items under the predictor variables could be calculated by finding out the percentage of respondents who agreed with each item (i.e. values 4 or 5 on the scales) under each variable.

Building the matrices and entering the data

With the scaled predictor variables and the cases from the previous two descriptive matrices (for adopters and non-adopters), the next step involved the construction of the predictor-outcome matrices. Five matrices were created, including both CAT tool adopter and non-adopter cases and ordering them by each of the predictor variables selected as criteria for examining the cases. The label identifying each case included the prefix “ad-” for adopters of CAT tools and “na-” for non-adopters, which allowed to distinguish cases from both settings easily. These labels also permitted to quickly refer back to the full-case data. All the cases were included in the matrices, except for “na28”, who did not replied to all the questions and was deemed invalid for drawing conclusions. The data from the scales were represented in their numeric value, showing the summarised value of each construct, placing the criteria predictor in first place, and identifying the three degrees of importance by different degrees of shading (dark grey for “high importance”, light grey for “moderate importance”, and white for “low importance”). In addition, values that were considered highly important (i.e. higher than 3.6) were shown in bold font face. Shading was also used in the “id labels” to mark adopter cases (light shading) and non-adopter cases (dark shading). This shading formatting of the matrices was helpful in spotting the different degrees of importance of the predictor variables across the cases, and in the process of drawing patterns aiding to draw conclusions.

Tables of the predictor-outcome matrices created are presented in Appendix E.

Drawing first conclusions

A look at the first column from each matrix revealed REDE and READ as the most important predictors overall, followed by COMP. In the matrices of these three predictors, there was a majority of cases showing a moderate and high degree of importance of the predictors, and most of the cases showing a high importance were adopters. With regard to the EASU and TRIA predictors, the overall impression was that there were a wider diversity of cases showing different degrees of importance,

and therefore, there were more cases showing a low importance of these predictors on the whole than in the first three matrices.

Looking down the columns of each of the matrices, more detailed conclusions could be initially drawn.

(1) Importance of READ for CAT tool adoption (Table E.1 in Appendix E)

- The construct showing a higher degree of importance among the perceptions of adopting CAT tools was READ. This meant that obtaining a number of advantages was being perceived as the most important asset of using CAT tools, in fact the vast majority of translators who had adopted them showed a high degree of importance, and the majority those who had not adopted CAT tools also showed moderate or high levels of importance. Having READ as the most important characteristic of CAT tools could indicate that obtaining benefits (i.e. using CAT tools successfully) was perceived as the main issue affecting CAT tool adoption.
- In this matrix it could also be observed that the adopters with high importance of READ were also showing high levels of importance of COMP (i.e. their use of CAT tools was compatible with their work style and type of translation jobs) and REDE (i.e. they were aware of the benefits and problems brought by CAT tools and felt capable of communicating them).

(2) Importance of COMP for CAT tool adoption (Table E.2 in Appendix E)

- The compatibility of CAT tools with translators' work was high for the vast majority of the adopters, while it was more moderate for most of the non-adopters, and some non-adopters did not consider CAT tools as compatible with their type of work or working style.

- This ordered display showed that all the translators with high levels of the compatibility with CAT tools were showing high importance of the READ gained from CAT tools. This evidenced that more benefits were obtained from the use of CAT tools if they are compatible with the type of work undertaken by the translators, and therefore that adoption within compatible settings would be correlated with higher benefits from the use of CAT tools.

(3) Importance of EASU for CAT tool adoption (Table E.3 in Appendix E)

- Many adopters of CAT tools found them easy to learn and use, however there a few cases (ad19, ad12, ad06, and ad03) that showed a moderate towards lower level of EASU, coinciding with low levels of TRIA (fewer opportunities to try CAT tools before adopting them). On the other hand, the importance of READ in these cases was high. This revealed that a number of translators had adopted CAT tools, despite not having many chances to try them out before adopting and finding it difficult to learn and use CAT tools.
- With regard to non-adopters, it could be observed that there was an overall tendency towards lower levels of EASU (i.e. finding more difficult to cope with learning and using CAT tools). Among those translators with higher levels of EASU (i.e. considered that it would be easy to learn and use CAT tools), there were a few translators who had not adopted CAT tools but whose level of VOLU was high (their clients were expecting them to use CAT tools).

(4) Importance of TRIA for CAT tool adoption (Table E.4 in Appendix E)

- The TRIA ordered predictor matrix showed that no other predictors were directly related to the opportunities to try CAT tools out before adopting

them. Adopters of CAT tools mostly had either plenty of opportunities (being more important for the adoption), or very few opportunities to try CAT tools before adopting them (therefore, being less important for the adoption since they adopted CAT tools anyway). Once again, adopters with low TRIA showed high importance of READ levels, which reinforced the overall importance of READ for the adoption of CAT tools.

- Expectancies of TRIA from non-adopters were moderately important, with a few of them expecting to have chances before adopting, and a few more not finding trialability really important.

(5) Importance of REDE for CAT tool adoption (Table E.5 in Appendix E)

- Most of the translators found they were or would be capable of transmitting the benefits and disadvantages obtained from the use of CAT tools. The adopters found their capacity of communicating the benefits and problems with CAT tools was very high, and for most of them the advantages gained from the use of CAT tools were also high, so the relationship between these two predictors was evidenced here.

Testing and strengthening the predictions

If the predictors above were the main factors affecting the adoption of CAT tools by translators, they should be related among them to some extent. The numeric scales used helped to identify if the progression observed in the criterion predictor (e.g. READ) was also happening in the rest of the predictors. This was not happening for all of them, but READ, COMP, REDE, and EASU (to a lesser extent) were showing a similar progression and variance in the importance of these predictors. These relationships helped to strengthen the prediction that these constructs were the ones affecting the adoption of CAT tools more positively. In order to understand how the specific perceptions of adopting CAT tools affected their adoption by translators, the

relative importance of the particular issues investigated under the main key constructs was analysed.

Taking the cases in the matrix ordered by READ, a linear progression of the perceived relative advantage generated from the use of CAT tools was obtained, adopters ranked from those who thought to be obtaining more benefits from CAT tool usage, to those who thought to be obtaining less gains from it. To assess the relative importance of the various perceived advantages gained through the use of CAT tools, the percentage of adopters who agreed with each item (i.e. 4 or 5 on the converted scale) was calculated. This was done because the interest was on discovering whether each item/factor within the READ construct was pervasive and significant, and thus, a frequency measure was used, instead of conventional averaging. As a result, the perceived advantages gained from CAT tool adoption were ranked according to their relative importance. The results are given in Table 9.7.

Table 9.7 Perceived relative advantages associated with CAT tool adoption

Rank	Score*	Relative advantage
1	94.7**	CAT tools are overall advantageous
2	94.7**	CAT tools enhance effectiveness
3	94.7**	CAT tools make job easier
4	94.7**	CAT tools improve job performance
5	89.5	CAT tools increase productivity
6	84.2	CAT tools improve the quality of the work
7	78.9	CAT tools enable to accomplish tasks more quickly
8	63.2	CAT tools give more control over work

* Score for a relative advantage represents the percentage of respondents who rated the advantage as either agreed or strongly agreed with the statement rating it.

** Four of the scores were equal to 94.7, so those with a higher percentage of respondents strongly agreeing (5) on the advantage were ranked first.

Table 9.7 showed that, first, most of the respondents found that using CAT tools was advantageous, since all eight relative advantages researched were found as important or very important by above 60% of the respondents. Moreover, the relative advantage ranking first, “CAT tools are overall advantageous in job”, strengthened the idea of obtaining overall important benefits from the use of CAT tools. Adoption of CAT tools meant, firstly, enhancing the translator’s effectiveness, making translator’s job easier, and improving translator’s performance. This first set of advantages seemed to deal with making translators’ life easier, rather than trying to obtain some direct benefits in return to their usage of CAT tools. In fact, such direct advantages ranked slightly after the previous set in the shape of increased productivity and improved quality of the translator’s work. Lastly, shortening time devoted to accomplish tasks and gaining more control over translation work were seen as less important advantages by the translators in the sample who had adopted CAT tools.

Taking the cases in the matrix showing compatibility of CAT tools, all the adopters of CAT tools would be included, from more to less compatible type and style of work. To assess the relative importance of the items measured under the COMP construct, the percentage of the adopters who agreed or strongly agreed with each of the items was calculated. The results that emerged are presented in Table 9.8.

Table 9.8 Technology attributes affecting the compatibility of CAT tools

Rank	Score ^a	Factor
1	89.5	CAT tools fit well with the way translators like to work
2	78.9	CAT tools are compatible with type of translation assignments undertaken

^a Score for a factor represents the percentage of adopters who either agreed or strongly agreed with the statement rating the factor.

The table shows that CAT tools for the vast majority of the translators who had adopted them, these tools were fitting well with translators’ working style, and that,

for a lower proportion, CAT tools were compatible with the type of assignments that translators undertake. This revealed that both issues (compatibility with type of assignment and with working style) were important, but the one that was more dominant was the compatibility with the translators’ way of working.

To assess the relative importance of the compatibility of CAT tools with these issues among those translators who had not adopted CAT tools, the percentages of the non-adopters who agreed or strongly agreed with each of the items were calculated. The results that emerged are presented in Table 9.9.

Table 9.9 Relative importance of compatibility of CAT tools for non-adopters

Rank	Score ^a	Factor
1	24.2	CAT tools are compatible with type of translation assignments undertaken
2	18.2	CAT tools fit well with the way translators like to work

^a Score for a factor represents the percentage of adopters who either agreed or strongly agreed with the statement rating the factor.

Among non-adopters, the perception of compatibility of CAT tools was rather low, with only around a fifth of the translators finding their work style and type of work compatible with the tools. The low compatibility of non-adopters with CAT tools revealed as a significant deterrent of CAT tool adoption and strengthened the prediction of CAT adoption for compatible styles of work and type of translation work.

Another way of strengthening predictions highlighted by Miles and Huberman (1994) was to find more predictors. In the present research, a number of variables were looking at the type of work undertaken by the translators, such as the subject area(s) in which they were working, and the type of clients.

In order to understand whether translators’ compatibility with CAT tools depended on the main subject areas these translators were working on, a cross-tabulation technique

was used to explore how degrees of compatibility were distributed along the different subject areas of those translators who had adopted CAT tools. To simplify the data, the responses for points ‘1’ and ‘2’ on the re-labelled five-point scale for measuring compatibility were combined into one category called ‘Not compatible’. Similarly, responses for points ‘4’ and ‘5’ were combined into a category called ‘Compatible’, and responses for point ‘3’ were kept as ‘Neutral’. Table 9.10 presents the results of this analysis, first ordered by the two compatibility items measured, and then by the degree of compatibility along the subject areas.

Table 9.10 Compatibility of CAT tools and translation subject areas

Compatibility by Subject area	Compatibility Score (ranked from highest compatibility to lowest)*		
	Not compatible	Neutral	Compatible
<i>CAT tools fit well with the way translators like to work</i>			
Scientific (3)	0	0	100
Technical/IT (11)	0	9.1	90.9
Business/commercial/marketing (16)	6.3	6.3	87.4
Arts/tourism/literature (5)	0	20	80
Medical (3)	0	33.3	66.7
Legal (3)	0	66.7	33.3
<i>CAT tools are compatible with type of translation assignments undertaken</i>			
Scientific (3)	0	0	100
Technical/IT (11)	0	9.1	90.9
Business/commercial/marketing (16)	0	25	75
Legal (3)	0	33.3	66.7
Medical (3)	0	33.3	66.7
Arts/tourism/literature (5)	0	40	60

* Score for a compatibility factor represents the percentage of respondents who either did not agree (1 or 2), were neutral (3) or agreed (4 or 5) with the statement rating the factor.

As Table 9.10 shows, the subject areas with a larger proportion of translators showing the highest degrees of compatibility of CAT tools with their working style and type of

assignments were 'Scientific' and 'Technical/IT'. The rest of the subject areas, except for 'Legal' translations, were also presenting a majority of translators whose style was highly compatible with the usage of CAT tools. More importantly, only 6.3% of the translators working in the 'Business/commercial/marketing' subject area found CAT tools incompatible with their working style. When focusing at the compatibility of CAT tools with the type of translation assignments undertaken, which is more tied to the subject area they worked with, differences in proportion of translators presenting high compatibility were even closer. After the vast majority of translators with highest compatibility working in the scientific and technical areas commented above, 'Business/commercial/marketing' subject area followed with three quarters of the respondents showing compatibility with their assignment type. The rest of the subject areas, i.e. 'Legal', 'Medical', and 'Arts/tourism/literature', presented at least a 60% of translators for whom CAT tools was compatible with their assignment types.

Table 9.11 presents the results of a similar analysis looking at the principal type of client the translators were working for.

Table 9.11 Compatibility of CAT tools and type of clients

Compatibility by type of client	Percentage of translators*					
	Not compatible		Neutral		Compatible	
	AD	NA	AD	NA	AD	NA
<i>CAT tools are compatible with type of translation assignments undertaken</i>						
Translation Agencies	0	43.8 (7)	12.5 (2)	31.3 (5)	87.5 (14)	25 (4)
Direct clients	0	53.8 (7)	50 (1)	15.4 (2)	50 (1)	30.8 (4)
<i>CAT tools fit well with the way translators like to work</i>						
Translation Agencies	0	43.8 (7)	12.5 (2)	37.5 (6)	87.5 (14)	18.8 (3)
Direct clients	0	23.1 (3)	0	53.8 (7)	100 (2)	23.1 (3)

AD = Adopters; NA = Non-adopters

* Percentages of translators among adopters and non-adopters for each type of client. Absolute number of translators is shown between brackets.

Table 9.11 shows that CAT tools were compatible with the type of translation assignments and with the translators' work style mostly when the type of client was translation agencies. This was particularly true for the adopters of CAT tools, while non-adopters shared their client types between agencies and direct clients, both those who found their translation work compatible with CAT tools and those who did not.

This approach allowed to observe how several factors contributing to CAT tool adoption functioned together in relation to different levels of a set of criterion measures (i.e. the constructs used as predictors of CAT tool adoption). The analysis was variable oriented, but kept the configuration of variables for each case, thus allowing cross-case analysis of the factors affecting CAT tool adoption by adopters and non-adopters of this technology. The relationships among the predictors and with the adoption of CAT tools were tested and strengthened by looking at more predictors related to the most important ones (READ, COMP).

9.4.3. Conclusion drawing and verification

After the data reduction and data display stages of the cross-case analysis, the last part of the analysis focused on verifying and validating the quality of the preliminary conclusions drawn during the analysis of the displays. Some tactics were employed to observe what was expressed by the data (e.g. *noting patterns, counting*), other tactics were used to achieve a deeper understanding of what was being observed (e.g. *making contrasts / comparisons*), and other tactics helped to see relationships more abstractly (e.g. *factoring, noting relations between variables*).

The identification of patterns across the cases for all the predictors was a tactic frequently used to see added evidence of recurring regularities, which is especially suitable when the number of cases and the data is large (Miles and Huberman, 1994:246). In the matrix displays of the present study different shadings were used to

identify the different degrees of importance of each of the predictors examined and to help to note patterns across the cases of each matrix.

Although a basic principle of qualitative research is to go beyond how much there is of something to find out what the essential qualities are, “a lot of counting goes in the background when judgements of qualities are being made” (Miles and Huberman, 1994:253). For example, during the identification of patterns, the consistency or recurrence of facts is, in part, estimated by making counts, comparisons, and weights. As Miles and Huberman explain (1994:253), numbers help to see rapidly what you have in a large batch of data; verifying a hunch or hypothesis; and keeping yourself analytically honest, protecting against bias. In the present study, scales had been converted to numerical scales which helped to use counts as a constant way of evaluating the real weight of patterns, and of ensuring that claims based on impressions were empirically grounded and not just personal intuitions.

Another useful tactic used in the cross-case analysis of this study was making contrasts / comparisons to test conclusions and assess the practical significance of the conclusions drawn. In the present study, comparisons and contrasts were especially useful to examine the two adoption settings (translators who had adopted, and translators who had not adopted CAT tools) against each of the predictor variables.

The following main conclusions were drawn from the cross-case analysis. The tactics used for generating them are indicated between squared brackets at the end of each conclusion.

- Relative Advantage (READ) was perceived as the most important characteristic of adopting CAT tools. In particular, enhancing translators’ effectiveness, making their job easier, and increasing their job performance and productivity were the most important advantages gained by adopters of CAT tools. [*noting patterns, counting, making contrasts / comparisons, noting relations between variables*].
- Compatibility (COMP) also proved to be an important characteristic of adopting CAT tools. The relative importance of the compatibility of

translators' way of working and the type of assignments they undertake was very high among those translators who had adopted CAT tools, with some prevalence of the compatibility with their working style over the type of assignments they deal with. The relative importance of COMP in the non-adoption setting was, on the other hand, quite negative, indicating that translators who had not adopted CAT tools did not perceive this software as compatible with their translation job [*noting patterns, counting, making contrasts / comparisons*].

- More predicting variables related to the translators' way of working and their type of translation work were examined to further explain compatibility of CAT tools, such as the subject areas in which they were working or the main type of client they were dealing with. Analysis showed that among adopters, the use of CAT tools was specially compatible with those translators working in the technical, scientific, and business/commerce subject areas, while CAT tools were not specially compatible with those working in legal translation. Among non-adopters of CAT tools, the most usual subject areas of work were legal, business/commercial, and arts/tourist/literary translation. With regard to the types of client, adopters of CAT tools were mostly working for translation agencies, while non-adopters worked in a similar proportion for agencies and for direct clients. For this reason, the compatibility predictor showed a relationship with translators whose type of client was mainly agencies [*counting, making contrasts / comparisons*].
- Ease of use (EASU) was presented as a positive perception of adopting CAT tools by adopters. However, there was a tendency towards a negative perception of adopting CAT tools due to the low EASU observed among non-adopters. This meant that not finding it easy to learn and use CAT tools could affect the adoption of CAT tools negatively [*noting patterns, counting, making contrasts / comparisons*].

- Having more or less opportunities to try CAT tools out before adopting them was not found to be a determinant characteristic of the tools for the adoption process [*noting patterns, counting, making contrasts / comparisons*].

Verification of conclusions

After making and interpreting findings at different levels of inference, the representativeness and reliability of the findings was checked. Although the assessment of the “goodness” of qualitative research does not have a strong tradition like in quantitative research, Miles and Huberman (1994:262) proposed a number of tactics to help researchers at the operating level to test and confirm findings.

The representativeness of the data used to draw the conclusions was assessed by checking its quality (i.e. whether a finding is an instance of a more general phenomenon). Miles and Huberman identified three common pitfalls and their associated sources of error in making sure that the data collected was valid (Miles and Huberman, 1994:264): “sampling nonrepresentative informants”, “generalising from nonrepresentative events or activities”, and “drawing inferences from nonrepresentative processes”. In the present study, the sampling process involved a number of translators who had previously participated in the earlier fieldwork of the research (based on a larger sampling frame of 1400 translators based in the UK). No selection process was undertaken to only address to a particular elite of informants (i.e. translators who might be responsive informants because they are experts in the field and thus, their opinions could be biased), on the contrary, the sample for this phase of the study included a relatively large number of individuals (151 translators) who were adopters or non-adopters of CAT tools. With regard to the other two common pitfalls, the use of a validated instrument to measure translators’ perceptions (Moore and Benbasat, 1991), helped to have a number of constructs and processes from which conclusions were drawn, thus avoiding generalisations or drawing inferences from nonrepresentative events or processes.

Conclusions were tested to check their reliability by using the tactic of looking at extreme cases. Given the negative situation of non-adoption (i.e. the translators who had not decided to adopt CAT tools to date), a small number of cases showed high levels of READ (relative advantage) scores (i.e. they were perceiving CAT tools as advantageous). However, despite believing that using CAT tools would bring them a number of benefits, none of these translators had adopted CAT tools. This example represented an extreme case of (non-) adoption, since READ had been found as the main determinant for adopting CAT tools. By examining this set of cases (see Table 9.6), it could be observed that their levels of COMP, EASU and REDE were lower (moderate to low) than in the case of translators with similar READ scores who had adopted CAT tools. This fact could explain the non-adoption of CAT tools by this small group of translators, who thought that CAT tools would be advantageous for them, however, they were not especially sure of being aware of the benefits and problems that they would have when using CAT tools, they did not find the type of work they undertake especially compatible with the use of CAT tools, and they found CAT tools difficult to learn and use.

Following Miles and Huberman's (1994) qualitative data analysis guidelines, a cross-case analysis of the data collected from adopters and non-adopters of CAT tools has been performed. The study followed a "stacking comparable cases" strategy to perform the cross-case analysis, gaining an understanding of the cases of translators who had adopted and who had not adopted CAT tools (within-case analysis), and then developing explanations drawing on a number of constructs (variable-oriented analysis) across the cases. The sections above highlight the steps followed in detail for each of the stages of the analysis conducted, namely data reduction, data display, and conclusion drawing and verification.

The main findings of this part of the study revealed a number of factors that were likely to motivate CAT tool adoption, such as gaining relative advantage from the use of CAT tools, the compatibility of CAT tools with the type of work undertaken by

adopters, and the communication of the advantages and disadvantages of using CAT tools by the adopters of these tools to others. On the other hand, the main factor found to be inhibiting CAT tool adoption was the fear to learn and use CAT tools among non-adopters. Also, some factors which were not found to be significant for the adoption of CAT tools were the voluntariness for using CAT tools, the chances to try the tools before deciding to adopt them, the consequences of CAT tool usage on the translator's image, and observing other translators using CAT tools.

These findings helped to answer research questions 5 (“What are the factors that motivate a freelance translator's decision to adopt CAT tools?”) and 6 (“What are the factors inhibiting the adoption of CAT tools by freelance translators?”).

9.5. Impacts of CAT tool adoption

In the previous sections of this chapter, the perceptions of adopting CAT tools have been investigated and a number of issues stood out as the most important perceived factors affecting the adoption of CAT tools (notably, the relative advantage offered by CAT tools, and the compatibility of the work undertaken by the translators with CAT tools). In the survey, translators were also asked about a number of specific impacts that CAT tools have, namely, their turnover, the size of their customer base, the quality of their translations, their productivity, the volume of work they undertake, their number of clients, the volume of work offered to them by their clients, and the prices they charge for their work. The survey completed by the adopters of CAT tools referred to the impacts that their *use* of the tools had on their work. On the other hand, the survey completed by non-adopters of CAT tools referred to the impacts that they believed *using* the tools *would* have on their work. In this section, the findings about the impacts of CAT tool adoption are discussed for adopters of CAT tools, and then compared and contrasted with the impacts that non-adopters thought the adoption of CAT tools would have on their businesses.

As indicated in section 9.3.2 of this chapter, translators were asked about the extent to which the use of CAT tools affected (adopters) / would affect (non-adopters) a

number of elements of the translators’ business. For this purpose, a 5-point scale ranging from “Large Decrease” to “Large Increase” was used for the items in Table 9.4. Therefore, the responses obtained were classified as *positive* effects of CAT tool adoption (e.g. a small / large increase in the translator’s turnover due to the use of CAT tools), as *neutral* (e.g. the translator’s productivity remained unchanged while using CAT tools), or as *negative* effects (e.g. the prices charged by the translator decreased due to the use of CAT tools).

9.5.1. Impacts of CAT tool adoption and adopters

In order to determine the relative importance of the impacts of CAT tools among adopters, the data from the cases in the matrix indicating positive and negative impacts of CAT tools on translators’ work were ranked according to the percentage of translators reporting positive impacts of CAT tools. Therefore, the percentage of adopters who stated they experienced a small or large increase in each of the impacts was calculated and the results of these positive impacts are given in Table 9.12.

Table 9.12 Positive impacts of adopting CAT tools (Adopters)

Rank	Score*	Impact on...
1	89.5%	Quality of translations
2	88.9%	Translator’s productivity
3	72.2%	Volume of work undertaken
4	66.7%	Volume of work offered to translators by clients
5	61.1%	Translator’s turnover
6	42.1%	Size of translator’s customer base
7	42.1%	Number of clients
8	5.6%	Prices translators charge for their work

* Score for an impact having a positive effect represents the percentage of respondents who rated CAT tools as causing some or a large increase of the impact in the statement.

Overall, the adoption of CAT tools had positive impacts. Only the prices charged by the translators showed a negative impact (a decrease), and it happened to a minority of

the participants (10.6% of the cases). All the items except for the impacts on the size of the translators' customer base, their number of clients, and the prices charged by translators showed positive impacts of CAT tools in more than half of the cases.

As observed in Table 9.12, the two major impacts of using CAT tools among adopters seemed to be an increase in the quality of the translations, and the productivity of the CAT tool users. As indicated in the previous section of this chapter, one of the main conclusions achieved in this phase of the study pointed towards the relative advantage gained by translators from the use of CAT tools, and in particular, towards a number of advantages (see Table 9.4) among which "an increase of the productivity" and "an increase of the quality of the translator work" were included. The findings reported above about the impacts of CAT tools confirmed that these particular advantages of adopting CAT tools were actually happening among adopters.

Other positive impacts of adopting CAT tools with above half of the respondents showing an increase were the volume of work undertaken (72%), the volume of work offered to translators by their clients (67%), and the translator's turnover (61%). These findings showed that the economic impact of CAT tool adoption was rather positive in terms of volume of work and revenue generated by the adoption of CAT tools.

Other positive impacts of CAT tool adoption shown by less than half of the respondents were a small increase in the size of the customer base (42%) and the number of clients (42%) due to CAT tool adoption. These findings showed that the impacts of CAT tool adoption on their clients were less prevalent than the performance or economic impacts highlighted above.

Although the third most important impact in Table 9.12 referred to the increase in the volume of work undertaken by the translators, findings confirmed that in many cases the increase of the volume of work undertaken was coming from the current translators' clients (fourth most important impact), and not from newer clients (shown by the increase of the translators' customer base). These findings showed that the adoption of CAT tools generated more work from existing clients, thus indicating that

the work undertaken by the translators who had adopted CAT tools was likely to be seen as satisfactory by their clients.

Finally, the prices charged for the work undertaken by the vast majority of the translators (83%) remained the same after starting to use CAT tools, except for 3 of them (representing 17%), whose prices decreased (2 translators) and in one case increased. This negative impact of CAT tools is related to one of the issues under debate in the sector with regard to the prices charged for undertaking translations using CAT tools when part of the segments have already been translated previously. It seems that the pricing of translations has been affected by the use of CAT tools, since some clients have decided to pay different (discounted) rates for texts containing high degrees of repetition (see for example Heyn, 1998; Bowker, 2002; Somers, 2003b). The findings reported in this section provided evidence of some cases where the use of CAT tools forced a reduction of the rates charged for translation work.

9.5.2. Impacts of CAT tool adoption and non-adopters

Non-adopters of CAT tools were also asked about the specific impacts that they believed CAT tools would have on their work for contrast and comparison purposes with adopters' findings.

The importance of the beliefs that non-adopters of CAT tools had with regard to the impacts of using CAT tools was examined in a similar way to how it was done with adopters. The data from the cases in the non-adopter matrix indicating the impacts that translators thought CAT tools would have on their work was ranked according to the percentage of translators reporting positive impacts of CAT tools. Therefore, the percentage of adopters who thought they would experience a small or large increase in each of the impacts was calculated and the results of these positive impacts are given in Table 9.13, and the results of negative impacts are presented in Table 9.14.

Table 9.13 Positive perceived impacts of adopting CAT tools (Non-adopters)

Rank	Score*	Impact on...
1	53.1%	Volume of work offered to translators by clients
2	51.5%	Translators' turnover
3	50%	Size of translators' customer base
4	50%	Volume of work undertaken
5	46.9%	Translators' productivity
6	43.8%	Number of clients
7	32.3%	Quality of translations
8	3.1%	Prices translators charge for their work

* Score for an impact having a positive effect represents the percentage of respondents who thought CAT tools would cause some or a large increase of the issue in the statement.

Table 9.14 Negative perceived impacts of adopting CAT tools (Non-adopters)

Rank	Score*	Impact on...
1	18.8%	Prices translators charge for their work
2	9.7%	Quality of translations
3	6.3%	Translators' productivity
4	6.1%	Translators' turnover
5	3.1%	Volume of work undertaken

* Score for an impact having a negative effect represents the percentage of respondents who thought CAT tools would cause some or a large decrease of the issue in the statement.

Overall, it was clear that non-adopters' impacts of adopting CAT tools were not as positive as the impacts claimed by the current adopters of these tools. Table 9.15 compares the rankings of non-adopters with that of adopters.

Table 9.15 **Impacts of adopting CAT tools (Adopters & Non-adopters)**

Impact on...	AD Rank	AD Score	NA Rank	NA Score
Quality of translations	1	89.5%	7	32.3%
Translator's productivity	2	88.9%	5	46.9%
Volume of work undertaken	3	72.2%	4	50%
Volume of work offered to translators by clients	4	66.7%	1	53.1%
Translator's turnover	5	61.1%	2	51.5%
Size of translator's customer base	6	42.1%	3	50%
Number of clients	7	42.1%	6	43.8%
Prices translators charge for their work	8	5.6%	8	3.1%

The major positive impacts highlighted by adopters of CAT tools (increased quality of translations and increased productivity) only ranked 7th and 5th respectively from non-adopters' views, and in both cases, with less than half of the respondents thinking that CAT tools would have a positive impact on these issues. In addition, the main positive impacts perceived by non-adopters were increasing the volume of work offered to translators by clients, increasing translators' turnover, and increasing the size of translators' customer base. All three cases were among the less important impacts detected by current adopters of CAT tools. The only common negative impact between adopters and non-adopters of CAT tools was that, in both cases, a very small proportion of respondents believed (non-adopters) / claimed (adopters) that the use of CAT tools would decrease (non-adopters) / decreased (adopters) the prices of the translations undertaken by them, and that it was the main negative impact for both groups of respondents.

These results reflected a higher degree of scepticism about the positive impacts of using CAT tools among those translators who had not adopted these tools. The analysis of the impacts among adopters and non-adopters, and the comparison of the results showed that the beliefs of non-adopters did not match with the impacts of CAT

tool adoption reported by the adopters of these tools. Actually, the main impacts highlighted by adopters (increased productivity, and quality of translations) were not considered as a potential impact by more than half of the non-adopters.

9.6. Summary of the chapter

This chapter has focused on examining the factors that affected the adoption of CAT tools by looking at the translators' perceptions of adopting these tools. These perceptions were analysed using a cross-case study approach following the qualitative data analysis framework developed by Miles and Huberman (1994), in the two settings of adoption of the study (CAT tool adoption and non-adoption).

The findings showed that the most important attribute of CAT tools affecting their adoption were the relative advantage conferred by the use of these tools to translators (such as increasing their productivity, enhancing their effectiveness as translators, or making their translation job easier). In addition, the findings revealed that there was a relationship between the translators finding the use of CAT tools advantageous and the compatibility of the type of work undertaken by these translators with the use of CAT tools. Another relationship was found between the translators capable of communicating the benefits and problems of using CAT tools and the adoption of the tools. On the negative side, the findings revealed a tendency among non-adopters towards perceiving it difficult or being sceptical with learning to use and use CAT tools efficiently.

Finally, a number of perceptions were not found significant in the adoption of CAT tools, namely, the degree of voluntariness in using CAT tools, the chances to try the tools before deciding to adopt them, the consequences of CAT tool usage on the translators' image, or observing other translators using CAT tools.

These findings helped to answer the research questions 5 and 6 of the present research, which were formulated to find out what factors motivate and inhibit the adoption of CAT tools by freelance translators.

This chapter also discussed the findings on the impacts that CAT tools have on adopters of CAT tools and the perceptions of non-adopters about the impacts that using these tools may have on their work. The most important impacts were found to be an increase in the quality of the translations undertaken by adopters of CAT tools and an increase on the productivity of those translators; while only the prices charged seemed to decrease to some extent because of the use of CAT tools. On the other hand, perceptions from non-adopters seemed to focus on the difficulty of learning to use CAT tools and the uncertainty of the compatibility of these tools with their type of work, which could be explained by the unawareness of the capabilities of CAT tools by those translators. It was also noticed that there was a big contrast between the claims of increased benefits made by CAT tool adopters (such as improved quality of translations and increased productivity), and the perceptions of the impacts of CAT tools expressed by non-adopters of these tools (such as limited improvement or decrease of the quality of the translations and limited increase or decrease in the translator's productivity). This reflects once again an underlying scepticism / unawareness of the capabilities of CAT tools among non-adopters, which according to the findings of the first phase of the study represented the majority of the freelance translators in the sector.

These findings helped to answer the research question 7 of the present research, formulated to find out if there is a relationship between the adoption of CAT tools by freelance translators and the performance of their business, showing that there was an overall positive impact of CAT tools on the performance of freelance translation businesses which had adopted the tools.

Chapter 10. Discussion and Conclusions

10.1. Introduction

This study set out to explore the adoption of CAT tools by freelance translators in the United Kingdom. The study was undertaken in two phases. In the first phase, a postal questionnaire survey was conducted of freelance translators based in the UK to determine their uptake of CAT tools, their general perceptions of CAT tools, and to explore the characteristics of CAT tool adopters. In the second phase, an in-depth cross-case analysis was undertaken, and adopters and non-adopters of CAT tools were compared.

In this chapter, the major findings of the study are summarised. The implications of these findings are discussed for both theory and practice. The limitations of the study are noted. Finally, some suggestions are made for possible areas of further research.

10.2. Discussion and contribution of research findings

The analysis conducted for the present study has focused on gaining an understanding of the adoption of CAT tools by freelance translators, and on addressing the research questions arising from the development of the research framework of the study. In the sub sections that follow, each of the issues investigated is discussed in relation to the findings obtained.

10.2.1. CAT tool adoption

Research Question 1 (RQ1)
What is the level of adoption of CAT tools by freelance translators?

According to the findings of this study, only 28% of the respondents in a sample of 391 freelance translators had adopted CAT tools, which indicates a key issue of this research: the level of adoption of CAT tools among freelancers is not very high. This finding of the study reveals that, contrary to what has been reported in the literature (see for example Somers, 2003a:6), the adoption of CAT tools does not seem to be widespread among freelancers in the UK.

The findings further reveal that 39% of the respondents were not familiar at all with CAT tools, which reveals a significant proportion of translators who were not familiar with the capabilities and benefits that they could obtain from their use of these tools. 25% of the respondents were familiar with CAT tools but had no experience with them, maybe due to a lack of opportunities to try them out, or other deterrents from adoption discussed in section 10.2.6 of this chapter. Finally, 36% of the freelancers had some or extensive experience with them, a slightly larger proportion of the 28% of the translators who had adopted a CAT tool, meaning that some of the translators in the sample were not currently using CAT tools in spite of having some degree of experience with them. This might reflect a voluntary non-adoption of CAT tools which might be due to a number of reasons (such as the incompatibility with the work translators undertake, or the high difficulty of learning to use these tools perceived by non-adopters). These reasons are discussed in section 10.2.6 of this chapter.

From the findings about the levels of familiarity and experience with CAT tools, it can be concluded that non-adoption of CAT tools was largely due to a lack of awareness of the capabilities of CAT tools for almost half of the translators in the sample, but there was also a significant proportion of freelancers whose levels of awareness of CAT tools were higher and yet they had not still adopted them. The determinants for the non-adoption of CAT tools are discussed in section 10.2.6 of this chapter.

From the findings, there is evidence of scepticism among freelancers about the value of CAT tools, and a lack of confidence in the benefits that might be gained from using them. Whilst the reasons for this are no doubt many and varied (e.g. the perceived

suitability of CAT tools to some freelance translators' type of work, and a fear of the difficulty of learning to use CAT tools among non-adopters of these technologies), institutions training translators, professional bodies of translators, and translation software developers have a role to play in raising awareness about CAT tools. If the awareness levels of CAT tools among the freelance translation community increase, it would be easier for freelancers to make an informed decision about the adoption of ICT supporting the core activity of a translation business (i.e. translation creation), such as CAT tools. One possible way to increase uptake might be for CAT tool developers and / or distributors to heed the advice given by Martin Kay in his report on computers and translation (Kay, 1980; reproduced 1997). In his report, Kay advocated a gradual, step-by-step approach to adding tools into the translator's workstation, thereby slowly increasing the software support introduced into the translator's workflow. He stressed the importance of accepting an individual tool only once there is a reasonable degree of confidence about its capabilities, and its reliability in performing the tasks it is designed to support. By contrast, the tendency with much software development today - and CAT tool development is no exception - is to produce integrated packages or 'bundles' of several tools. Typically, the entire package must be purchased in one go, giving little opportunity for the sort of incremental adoption that Kay advocated.

CAT tool adoption, other ICT adoption and freelance translators' activities

Related research question 1.1

What is the level of adoption of ICT by freelance translators in each of the activities in their workflow?

Related research question 1.2

Is there a relationship between the adoption of CAT tools and the adoption of other ICT?

The limited uptake of CAT tools reported above is related to the main activity in the translator's workflow, namely the production of translations. However, freelance translators today do not only have to produce translations, but there are also other activities in their workflow for which ICT support is available. As recognised by Austermühl, the ICT that translators use must encompass both the notion of "translation as a business" as well as translation "as a linguistic and cultural process" (Austermühl, 2001:11). For this reason, the uptake of ICT available for other activities was also investigated and compared with the adoption of CAT tools.

As shown in Chapter 5, this study has presented evidence of ICT adoption supporting all the activities in the translator's workflow, namely document production, information search and retrieval, business management, translation creation (including other ICT apart from CAT tools), communication, and marketing and work procurement. However, ICT support is not present with the same intensity in each of these activities.

The findings of the survey indicated that there has been widespread adoption of general-purpose software applications to support the activities involved in the freelance translator's workflow. There was, however, only limited uptake of other specialised translation-oriented software applications, such as terminology management systems, machine translation, localisation software, and, as discussed above, CAT tools. Likewise, there was only limited adoption of specialised software to support such business functions as financial management and accounting.

Overall, ICT uptake was more widespread among activities which were not exclusive to translation (i.e. communication, document production, and information search and retrieval) than it was among freelance translator-specific activities (i.e. translation marketing and work procurement, translation creation, and business management). A more detailed observation of ICT uptake within translators' activities also showed that the more specific a tool was to translation (e.g. terminology management systems), the lower the level of usage that could be observed. This broader range of ICT use for activities that were not specific to the translation context, and the limited uptake of

ICT specially designed for translators revealed that, although translators are using technologies to support their work, their use is geared towards undertaking general tasks which require ICT (e.g. using email to communicate with their clients, or using a word processor or spreadsheet software for producing electronic documents), rather than using ICT specifically designed for translators.

The findings discussed above provided an answer to related research question 1.1 about the level of adoption of ICT by freelance translators in each of the activities in their workflow.

Unlike some evidence was found of voluntary non-adoption of CAT tools by a small proportion of the translators in the sample, it seemed likely that non-adoption of ICT in general was more a function of translators' lack of awareness of, and familiarity with, the types of software than an active rejection decision based on thorough knowledge of the tools and their functionality. These unawareness levels seemed to foster scepticism about adopting new ICT and made translators follow a cautious approach towards incorporating technologies into their work. In addition, translators' familiarity with ICT showed that overall non-familiarity levels were increasing progressively within each group of activities as the type of ICT was becoming more specialised to the translation context. This could be explained by the fact that more general purpose ICT is part of the basic ICT knowledge that translators (and other users of ICT) have, and that existing efforts towards informing translators about ICT available to them should place more emphasis on the suitability and benefits of using ICT tailored to their needs.

With regard to the relationship between the adoption of CAT tools and the adoption of other ICT, the findings of the survey showed that CAT tool adopters were using a broader range of ICT and had more experience with general ICT than those who had not adopted CAT tools. This idea was reinforced by the results obtained from the logistic regression model used to analyse the relationship between the adoption of the range of ICT and the adoption of CAT tools. Stand-alone terminology management systems, both in terms of uptake and experience with them, were the type of ICT

which showed stronger links with the adoption of CAT tools. This made sense as most CAT tools include terminology management functions bundled in them, so translators who are familiar with these translation-specific tools are more likely to be familiar with CAT tools as well.

The main differences between the groups of adopters and non-adopters of CAT tools were observed in the experience with ICT that showed a more significant relationship with CAT tool adoption according to the Chi-Square tests conducted; for example with terminology management systems, online translation marketplaces, or online terminology databanks. Again, the relationship of CAT tool adoption with specialist purpose ICT reinforces the idea that freelance translators are more likely to embrace CAT tools once they have become familiar with general purpose ICT first, and then with other specialised ICT.

10.2.2. The characteristics of freelance translators adopting CAT tools

Research Question 2 (RQ2)

What are the characteristics of freelance translators who have adopted CAT tools?

Research sub question 2.1

How do the characteristics of CAT tool adopters differ from those of non-adopters?

Literature in the area of IS adoption by SMEs has shown CEO involvement and enthusiasm towards technology to be one of the most important determinants of the decision to adopt ICT (see for example Cragg and King, 1993), and of the success in the use of the systems (DeLone, 1988). In freelance translation businesses, the manager is also the end-user of the technology, and therefore freelance translators do not only decide on the adoption of CAT tools but also have to use these tools.

The findings of the present study showed that there was a statistical association between the adoption of CAT tools and some characteristics of the freelance translators, including the fact that adopters tended to be young translators, holding a university degree in translation studies (either undergraduate or postgraduate). In addition, no statistical association was found between ICT knowledge acquisition (most of the translators had acquired their ICT skills through private study) and CAT tool adoption.

These findings seemed to indicate that there was a likely connection between translators who have relatively recently undertaken translation studies at a higher education institution and the adoption of CAT tools. Since there was no link found between ICT knowledge acquisition and CAT tool adoption, the findings relating to the characteristics of freelance translators adopting CAT tools pointed towards formal training as a more significant determinant of CAT tool adoption, as opposed to self-taught learners. This can be understood as an indicator of the role that higher education institutions may have in providing translators with the appropriate knowledge to make them aware of the ICT available to them and how to use it.

These findings provided an answer to research question 2 and its sub research question, by providing a number of characteristics found to be typical of CAT tool adopters, and highlighting the main differences between the adopters and non-adopters of CAT tools, which were observed in those characteristics showing a more significant relationship with CAT tool adoption according to the Chi-Square and logistic regression analyses conducted, such as age or translation qualifications.

10.2.3. The characteristics of the freelance translation businesses adopting CAT tools

Research Question 3 (RQ3)

What are the characteristics of the freelance translation businesses in which CAT tools have been adopted?

Research sub question 3.1

How do the characteristics of CAT tool adopting translation businesses differ from those of non-adopting businesses?

As with other similar SMEs that need to use ICT – like accounting or consulting services SMEs –, freelance translators are advised by previous research and professional associations to plan and define their requirements for ICT (see for example Proudlock *et al.*, 1999). However, this advice is generally derived from the ICT success in large firms, which have a different hardware, software and support environment from the micro business context of freelance translators. Such advice needs to be tested in the translation micro business context to help determine, for example, whether a written document regarding ICT implementation is helpful; whether a particular level of ICT adoption is intended to be achieved directly, or a lower level of ICT should be adopted and then progressively move towards a higher level of ICT adoption; whether the resources available will be enough to adopt a particular level of ICT successfully; and whether the degree of sophistication needed to adopt a particular level of ICT adoption is going to be achieved.

These strategies depend on the characteristics of the translation business that affect the adoption of CAT tools. From the literature reviewed for this study, a number of factors affecting success of ICT in SMEs in the information systems domain based on a classification proposed by Yap *et al.* (1992) dealt with organisational characteristics, and have been discussed in Chapter 2, section 2.3.1.3. Characteristics such as the attitudes of the users of the ICT or the CEO support and attitude towards ICT adoption (the user of CAT tools and the CEO of the freelance translation business being the same person) have been investigated in the present study. Findings of the present study have provided evidence of characteristics of the freelance translation businesses that are likely to be associated with the adoption of CAT tools. Contrary to what has been claimed by authors like Heyn (1998:123), who states that “CAT tools are now used in almost every type of translation work: political, administrative, technical,

advertising and biographical”, the findings of this study only provided evidence of an association between freelance translation businesses and CAT tool adoption in which translators undertake technical translations. The type of translation jobs in this subject area usually includes documents with repetitive structures, and where frequent updates or revisions are required to be performed while maintaining terminological consistency. These document characteristics are among the ones that have been suggested as most suitable for CAT tools use (see for example Bowker, 2002:112). From these findings, it could be said that although there is significant evidence of CAT tool adoption among freelance translation businesses run by translators working in the technical subject area, the adoption of CAT tools is not common among translation businesses with translators working in the subject areas claimed by Heyn.

Another business characteristic which emerged as likely to be associated with CAT tool adoption was the language combination of freelance translation businesses working to or from English and EU official languages. According to Heyn (1998:136), CAT tool providers are seeking to support more languages, and especially those of East Asia; however, the findings of the present study only revealed a significant association with the use of CAT tools among those translation businesses working with European languages. As stated in the sample characteristics (see Chapter 5), 23% of the translators were working with languages from outside the European Union, however, no significant relationship was found among those translators and the adoption of CAT tools.

Translators running freelance translation businesses who were using CAT tools were found to be working more hours, and undertaking a larger volume of translation work per week than the average values obtained from the findings (the average being around 6000 translated words per week, and working 25 hours per week).

With regard to ICT adoption decisions, the findings indicated that the businesses run by freelance translators were typically concerned to invest in technology that would help improve their efficiency and productivity as translators. Although generally not guided by a formal ICT investment strategy, the translators were concerned to adopt

software applications that aligned with the needs of their translation business. This cautious approach to ICT investments, and to the adoption of ICT, among freelance translation businesses could also be inferred from the findings about translators' current adoption of ICT, discussed in an earlier section of this chapter.

These findings provided an answer to research question 3 and its sub research question, by providing a number of characteristics found to be typical of translation businesses using CAT tools, and highlighting the main differences between the those and the businesses which had not adopted the tools, namely those characteristics showing a more significant relationship with CAT tool adoption according to the Chi-Square and logistic regression analyses conducted, such as subject area or workload.

10.2.4. Perceptions of CAT tools

Research Question 4 (RQ4)

What perceptions do freelance translators have of CAT tools?

Research sub question 4.1

What perceptions do freelance translators have of ICT in general?

Research sub question 4.2

How do freelance translators' perceptions of CAT tools differ from those of other ICT?

Research sub question 4.3

How do perceptions of CAT tools differ between adopters and non-adopters?

Research sub question 4.4

How do perceptions of ICT differ between CAT tool adopters and non-adopters?

In trying to understand the factors that affected CAT tool adoption, translators' views on these tools and on other ICT were investigated. The existing scepticism about

CAT tools reported in the literature (see for example Heyn, 1998; Hutchins, 1999) and in informal discussions, was reflected in this study in the perceptions that translators had of these tools.

Translators' attitudes towards ICT in general were largely positive, and the factor analysis conducted differentiated three groups of perceptions: regarding benefits, regarding problems, and regarding limitations of using technologies. The main benefits of ICT perceived by translators were increasing the quality of their services, saving time, improving communications with their clients, and increasing their effectiveness. The main problem observed was the need for previous experience before adopting new applications, and the main limitation was that ICT would provide more benefits if applications were more integrated.

When asked more specifically about their opinions on CAT tools, translators in the sample seemed less convinced of the value of such facilities and the benefits to be derived from their use. Those who had already adopted CAT tools were generally more positive than those who had not. The differences between benefits and problems were not very clear and there were 'mixed attitudes' about these perceptions that factor analysis showed as one unique factor. Also, previous experience with CAT tools emerged as a separate issue (whereas it was grouped as a problem when considering ICT in general).

These findings seemed to indicate that there are important differences between the perceptions of the general use of ICT and the use of CAT tools. Although CAT tools are indeed one type of ICT that is used by translators, they were not seen as 'just another software package' by the respondents. Benefits and problems derived from the use of ICT in general seem to be clearer to translators than the benefits and problems derived from CAT tools. Translators did not express clear benefits and problems of CAT tools, maybe because they are less familiar with the benefits and problems of these tools than of other ICT. In addition, as indicated by the issue separated by factor analysis from the rest, there seems to be a major concern about

having previous experience with CAT tools among freelancers in the sample that might affect the adoption of CAT tools.

In trying to understand further the differences between the perceptions of CAT tools among adopters and non-adopters, findings revealed that adopters’ perceptions were overall much more positive than non-adopters. In particular, two issues emerged as important from the analysis of the perceptions of adopters and non-adopters: first, the former thought that CAT tools increase translators’ effectiveness, while the latter thought the opposite; and second, adopters did not consider their use of CAT tools a failure at all. These issues seem to point towards a low degree of awareness of the benefits of using CAT tools among non-adopters.

Also, the issue raised about the requirement of previous experience with CAT tools before adopting them, presented a significant difference between adopters and non-adopters of the tools. Only non-adopters perceived previous experience as a requirement for adopting CAT tools, which implies that inexperience with this type of technology and non-familiarity with these tools can represent a barrier towards adopting them.

10.2.5. Determinants of CAT tool adoption

Research Question 5 (RQ5)

What are the factors that motivate a freelance translator’s decision to adopt CAT tools?

As highlighted by the literature about small business management, a key area to understand the adoption of new ICT is the analysis of factors that may encourage and discourage the decision to adopt the technology (Cragg and Zinatelli, 1995). The investigation of adoption and non-adoption cases of CAT tools conducted in the second phase of this study highlighted a number of factors that positively affected the

adoption of these tools. In particular, the motivators revealed as significant were: gaining relative advantage from the adoption of CAT tools, compatibility with translators’ work style and type of work undertaken by them, communication of tool advantages and disadvantages among translators, and pressure from translators’ work clients.

The drivers of ICT adoption that were found to be highly significant in the literature about information systems adoption in small businesses were the search for increased productivity of office tasks (Easton *et al.*, 1982; Baker, 1987) and improvement of information management and processing (Easton *et al.*, 1982; Farhoomand and Hrycyk, 1985; Malone, 1985; Baker, 1987; Lefebvre and Lefebvre, 1988), and the effect of external information sources (Lefebvre and Lefebvre, 1988; King and McAulay, 1989). The findings of the present study also revealed these factors to be highly significant for CAT tool adoption. More specifically, within the motivator “Gaining relative advantage from adopting CAT tools”, the advantages perceived as most important were: increasing their productivity, enhancing their effectiveness as translators, and making the translation job easier.

10.2.6. Determinants inhibiting CAT tool adoption

Research Question 6 (RQ6)

What are the factors inhibiting the adoption of CAT tools by freelance translators?

A number of barriers to CAT tool adoption were identified among the freelance translators in the sample of this study. These included a lack of perceived compatibility of CAT tools with the type of work undertaken by translators; lack of opportunities to try CAT tools before adopting them; and the perceived difficulty of learning to use CAT tools. Such factors seem to present some sort of relationship with some of the main inhibitors discussed in the literature about information systems

adoption in small businesses, such as ‘acquisition of ICT knowledge’ (Baker, 1987; Cragg and King, 1993; Farhoomand and Hrycyk, 1985; King and McAulay, 1989; Lefebvre and Lefebvre, 1988), or ‘influence of external support’ on ICT adoption (Cragg and King, 1993; Farhoomand and Hrycyk, 1985). In particular, it seems that low levels of knowledge and non-familiarity with CAT tools negatively affected the decision to adopt them, maybe affecting the negative perception of perceived compatibility of the tools with the work undertaken by the translators, and the perceived difficulty of learning to use the tools. As discussed in a previous section of this chapter, these negative perceptions could also be related to the fact that those translators who have a lower level of literacy with other ICT are less likely to adopt CAT tools.

The most significant inhibitor revealed by the findings was the perceived difficulty of learning to use CAT tools. This might be related to the issues of non-adoption due to low levels of experience and lack of opportunities to try CAT tools before adopting them. Data from adopters did not show perceived difficulty of learning to use CAT tools as a negative factor for their decision to adopt the tools, thus, there might be a link between the non-adopters’ inexperience with the tools and their perception of the difficulty to learn them. It seems that increased levels of awareness of the capabilities of CAT tools and a higher familiarity with them among potential adopters could affect positively to the perceptions of incompatibility of CAT tools with the work undertaken by the translators, and of the perceived difficulty of learning to use the tools.

10.2.7. The relationship between CAT tool adoption and business performance

Research Question 7 (RQ7)

Is there a relationship between the adoption of CAT tools and the performance of a freelance translation business?

One of the concerns behind the scepticism among translators about CAT tools is whether the tools can really deliver what they promise, essentially higher productivity and improved quality of the translations (see for example Heyn, 1998; Somers, 2003b). In addition, the lack of research about CAT tool adoption by freelance translators also means that there is little or no evidence of the impacts that CAT tools have on freelance translators that can support the claims made about their benefits.

The findings of the present study provide empirical evidence of the impacts of CAT tool adoption. The effects of CAT tool adoption reported by the translators in the sample are largely positive. The most important impacts reported by adopters were found to be an increase in the quality of their translations undertaken and an increase in their productivity. The only negative impact detected, in only a few cases, was a slight decrease in the prices charged because clients might want to pay less for reutilising previous translations. The two main impacts found in this study confirm the two main benefits attributed to the use of CAT tools (see for example Heyn, 1998; Somers, 2003b): increased productivity and increased quality of work.

10.3. Implications for research

The outcomes of the present study have a number of implications for existing research, firstly for the translation domain, and secondly for the wider domain of ICT adoption by small businesses. The specific theoretical and methodological implications of this research are highlighted below.

10.3.1. Theoretical issues

The main contribution to existing knowledge of the present research is to provide the translation research community with a comprehensive study of CAT tool adoption in the context of freelance translation businesses in the UK. More specifically, a model and instruments for investigating this issue are provided. The research model proposed in this study sets a theoretical framework for the study of CAT tool

adoption, drawing on previous studies of ICT adoption in SMEs in the information systems field and on research conducted about translators and ICT available to them. The contribution of the instruments provided by this research is discussed in the next section of this chapter (i.e. 'Methodological issues').

Another theoretical contribution for the translation research area is that CAT tool adoption has been studied within the particular context of freelance translation businesses, which includes not only the production of translations, but also other activities that are part of the translators' work (e.g. business management, communication, marketing and work procurement). Previous research has focused on the automation of the translation process and on the tools available at each of the core stages of the translation process, namely pre-translation, translation and post-translation (see for example Holmes, 1988; Hatim and Mason, 1990; Austermühl, 2001). This research, has extended the models explaining the availability of ICT to translators, to incorporate CAT tools among the ICT supporting the different activities which are part of the translator's workflow (as pointed out by Locke, 2005:50 and Varona, 2002:202).

Hence, the present research contributes to the existing body of literature about translators and ICT by providing a conceptual framework that presents CAT tool adoption in the particular context of the activities undertaken by freelance translators. This framework can therefore be used to contextualise and support other research studies in this domain.

In terms of the findings obtained, this research contributes to the existing body of literature about translators and ICT by presenting evidence of the levels of CAT tool uptake by freelance translation businesses, the translators' perceptions of CAT tools, the determinants of the CAT tool adoption, and the impacts of using them.

This study also contributes to the area of IS adoption in small businesses. Previous research into the factors affecting the adoption of ICT was an important informant domain from which a number of issues have been studied and tested in the context of freelance translation businesses. Motivators identified as key to ICT adoption in

SMEs have been confirmed as important in this study as well. For example, CEO importance (Cragg and King, 1993; Irani and Love, 2001), search for increased productivity of office tasks (Easton et al., 1982; Baker, 1987), increase in the effectiveness (Cragg and King, 1993), or pressure from clients (Lefebvre and Lefebvre, 1988). Inhibiting factors such as a lack of ICT knowledge (Baker, 1987; Lefebvre and Lefebvre, 1988; King and McAulay, 1989) have also been shown to be important in the present study.

10.3.2. Methodological issues

In addition to the theoretical implications, there are also some methodological implications of this study.

For the purposes of fieldwork of this study, two new data collection instruments (a questionnaire survey and an online survey), based on ICT adoption studies undertaken in other business sectors, were developed and tested. These sets of new instruments, which have been designed and validated in the area of IS adoption by SMEs, represent a methodological contribution for investigating the adoption of CAT tools. In fact, it is envisaged that they could be employed for follow-up and replication studies among translator communities in other countries. This would enable further comparison and generalisation of the issues surrounding the adoption of CAT tools.

In addition, further validation and testing of the instruments used to investigate ICT uptake, the exploration of perceptions of ICT, and the perceptions of adopting ICT in the area of IS adoption in SMEs, has been provided in the context of businesses run by freelancers.

It is important to note that this research also confirms the benefits of using both quantitative and qualitative data analysis approaches. More importantly though, the research confirms that some conclusions drawn from the qualitative analysis in the second phase of the study supported findings from the statistical analysis undertaken for the first phase of the study.

Finally, another methodological contribution of this research was the development of two *perl* scripts to help automate the handling of the data collected through the online questionnaires for CAT tool adopters and non-adopters. These scripts are provided in full in Appendix E, and could be used by other researchers conducting online surveys.

10.4. Implications for practice

From the findings of the study, a number of important implications can be identified for the various stakeholders in the translation sector, including for the existing freelance translation community, for those responsible for training translators, for professional bodies for translators, and for those developing and / or distributing software applications for translators. Some specific implications for each of these stakeholders are discussed below.

10.4.1. Implications for freelance translators

The findings of this study provide a profile of CAT tool adopters, indications of the positive and negative determinants for the adoption of CAT tools, and of a number of impacts that CAT tools have on freelance translators' work. The implications of these outcomes for both freelance translators currently working in the sector, and for newly qualified translators embarking on a freelance career, are discussed below.

This study demonstrates that young freelance translators with a degree in translation studies, undertaking technical translations, working with EU languages, working a large number of hours, using a broad range of ICT, and experienced with general ICT are likely to adopt CAT tools. Therefore, these findings show a picture of freelance translators who have already adopted CAT tools and their characteristics, which can help existing freelance translators and newly qualified ones to take heed of what training has been followed, and the type of work undertaken by those who are likely to adopt CAT tools. Translators can then decide whether their own characteristics and the training they have followed might help them to adopt the tools, or if, on the

contrary, they should consider further training (such as follow postgraduate studies or professional development courses for translators including training on CAT tools), or gain more experience with general ICT before they decide to start using CAT tools.

Similarly, the findings of the study show that there are a number of perceptions of adopting CAT tools that are seen as determinants for the adoption of the tools, such as the fact that using CAT tools increases translators' productivity, enhances their effectiveness as translators, or makes their translation job easier. Moreover, these perceptions have been confirmed to have an impact on the business performance. On the other hand, the difficulty in learning to use CAT tools has been perceived as the main inhibitor for their adoption by non-adopters of the tools. These determinants of CAT tool adoption inform current freelance translators and newcomers to the profession about what the main reasons are for the current adoption of the tools, thereby also helping them to make a more informed decision about CAT tool adoption.

Two of the characteristics of CAT tool adopters, namely using a broad range of ICT and being experienced with general ICT, which have been highlighted above also showed the importance of broadening the adoption of ICT to support their activities as a freelance translation business. These findings and those about the levels of uptake of, and experience with, other ICT available to freelance translators can also be useful to provide newcomers to the profession with indications of the ICT they will need to support their activities and get themselves started in a career in freelance translation. As these newly qualified translators become more established translators, they may do well to note the ICT investment strategies employed by those in this study's sample, and consider adopting only those applications that meet the needs of their business. Having set up a workstation comprising general-purpose software, these translators may then usefully take heed of CAT tools, and consider the various findings relating to the scepticism of non-adopters and the more positive reports of adopters about productivity and efficiency gains highlighted above.

By the assessment of these findings, together with their own aspirations for their freelance translation business, both, current freelance translators and newly qualified translators, should be able to guide and inform their future plans for adoption, or non-adoption, of CAT tools.

10.4.2. Implications for trainers of translators

For those responsible for training translators, the study's findings highlight the value of encouraging students to develop proficiency skills in the use of general-purpose software applications, and even other translation tools (e.g. stand alone terminology management systems), before considering CAT tool adoption.

The existing scepticism among non-adopters about learning to use CAT tools indicated by the findings of this study highlights another important issue to be addressed by those who train translators. Trainers can play a critical role in making translators aware of the capabilities of CAT tools, as well as the potential difficulties of using them, in order to determine whether these tools can be suitable for the type of work undertaken by the translators. Exposure to a range of CAT tools (and their functions) and a thorough grounding in the concepts on which these technologies rely would also help raise awareness of the capabilities of such tools, increase familiarity with their functionality and key features, and enable trainees to make informed choices about the suitability of each tool for a particular translation task.

10.4.3. Implications for professional bodies for translators

As indicated in the previous section, providing translators with the appropriate training for using CAT tools should be considered as an important issue among the institutions responsible for the training of translators, such as professional bodies for translators. Beyond initial training and on into continuing professional development, these professional bodies for translators have an ongoing role to play in raising awareness among their members about technological developments within the

translation sector, including CAT tools, and in providing a forum for translators to learn about and discuss the issues surrounding the adoption of these technologies. Given the importance attributed to CAT tools for improving freelance translators' capacity of coping with a larger demand of translation services (see for example Heyn, 1998; Somers, 2003b), established translators arguably have a professional responsibility to take advantage of the continuing development opportunities offered by their professional bodies in order to help them keep abreast of technological advances in the translation sector, such as CAT tools, and in order to help them continue to achieve their goals of quality and productivity. Such opportunities might include attendance at relevant seminars and workshops about CAT tools, as well as participation in online discussion groups or networks, where ideas and user experiences can be informally exchanged. Participation in these sorts of activities should help to improve levels of awareness of CAT tools and other technological developments in the sector.

10.4.4. Implications for CAT software developers

This study demonstrates that the levels of uptake of CAT tools among the freelance translation community are rather low, which should raise considerable concern among those developing this type of tools. Also, there is evidence of scepticism among freelancers about the value of CAT tools, and a lack of confidence in the benefits that might be gained from using them. In fact, the perceived difficulty of learning to use CAT tools and the lack of opportunities to try these tools emerged as the main barriers perceived by freelance translators to adopt CAT tools.

If CAT tool developers are to increase the uptake of their tools among freelance translation businesses, they should pay attention to the outcomes of this research and realise that they might be able to improve their marketing strategies for the freelance translation market. As discussed earlier in the chapter, a possible solution could involve providing a gradual, step-by-step approach to adding tools into the translator's workstation, thereby slowly increasing the software support introduced into the

translator's workflow. A greater emphasis on decomposing packages of CAT tools into their constituent tools, and the promotion of such tools on a more modular basis, might usefully be explored for the freelance translation market. An incremental approach such as this might also fit better with the overall ICT adoption strategy findings identified in the present study, which indicated that freelancers in the sample tend to consider each ICT investment in turn and try to match it to the needs of their business.

In order to decrease the perceived difficulty of learning to use CAT tools, software developers also should be concerned about providing clear guidance and continuing support to freelancers about the tool adoption process, either for full CAT tool packages or for sequential modular approaches as the one suggested above.

Finally, given the lack of opportunities to try CAT tools before adopting them found among the freelance translators, software developers should also revise the diverse types of trial or evaluation versions offered by them to make sure that non-adopters are given the chance to fully explore the tools and to start realising their potential benefits.

10.5. Limitations of the study

In appraising the findings of this study, it is important to interpret the results in the light of the following limitations.

Firstly, it is important to note that the sample of this study was drawn from one sector, i.e. translation services, in the United Kingdom, and generalising the results to freelance translators in other countries, or sectors should be viewed with caution. Also, the sample bias might affect the generalisation of the findings. As discussed in Chapter 4, there is no official register of translation businesses in the UK, and although the sample was selected from the largest of the institutions to which many translators in the UK may belong, i.e. the Chartered Institute of Linguists (IoL), this sample may not represent all the freelance translators in the UK.

Secondly, this study is based on data collected in two surveys, which are cross-sectional in nature. This cross-sectional approach has its inherent shortcomings as it captures a situation or an event at a particular point in time. In this study, for example, the determinants for CAT tool adoption were investigated at a point in time by the perceptions of adopting CAT tools from adopters and non-adopters of these technologies. Translators' perceptions of adopting CAT tools might change over time, so there is the possibility that the same study conducted at another time could present different results. For this reason, other approaches such as conducting a longitudinal study could also be employed.

Thirdly, another limitation inherent to the survey approach followed in this study is that the data provided through the mail and online surveys was self reported. However, there is no data source such as annual reports or databases that would allow us to obtain secondary data from freelance translators. Although the approach followed permitted data collection from a large sample (as discussed in Chapter 4), other qualitative data collection approaches such as the use of interviews might be able to provide more detailed data to confirm the findings provided by the use of surveys.

Fourthly, in the absence of prior instruments to measure the adoption of CAT tools, this research has drawn on instruments used in the area of ICT adoption in small businesses. Although every effort is taken to test these instruments in the context of freelance translators, further testing and validation of the instruments would strengthen the reliability of these instruments. For example, by undertaking similar research in other geographical areas, or following a more qualitative approach of data collection such as the use of interviews which confirmed the findings obtained.

Fifthly, whilst the results of factor analysis helped to investigate the perceptions of CAT tools and ICT in general, a number of limitations should be noted. First, the scarcity of items that measured the 'limitations' factor was identified as a limitation of this research, as discussed in Chapter 8. More items need to be added to the instrument on perceptions of ICT, so that this aspect of translators thinking can be

more fully studied. Second, there was only one item loading on the 'experience' factor which measured whether previous experience was necessary for using CAT tools. This item arose as a separate factor with a very significant loading (.908). Despite this being the only item loading very highly on this factor, one of the items loading on the benefits/problems factor (use of CAT had been a failure so far) also loaded significantly on the experience factor (0.556). Although this suggests that experience needed to use CAT tools was a clear area of concern among the translators in the sample, and thus an important factor, only one item loaded on the factor. Therefore, more items might need to be added to the instrument on perceptions of CAT tools to further understand how previous experience is viewed by translators. In this study, the findings about the 'limitations' and 'experience' factors were interpreted in the light of the limitations discussed above.

Sixthly, this study focused on subjective performance measures, where respondents were asked to assess the impact of CAT tools on their business performance. However, freelance translators' perception may not fully capture the actual performance of their businesses. Therefore, objective measures of translators' performance could also help indicate the impact of CAT tools, and both approaches could be compared.

A final limitation relates to the cause and effect relationship between CAT tool adoption and the translators' business performance. In this empirically-based study, the research model developed provides a way of viewing the world, but at the same time makes the research feasible by simplifying things somewhat. In the complex real world of business, there are potentially other factors that could influence CAT tool adoption and translators' business performance. A cross-sectional study such as this cannot prove cause and effect relationships.

10.6. Suggestions for future research

As indicated in the previous section, where possible, future research could address some of the limitations of the present study.

Whilst this study has focussed on UK-based translators, comparative studies about the levels of CAT tool uptake across different countries and longitudinal studies examining different periods of adoption within the same geographical area would represent an interesting avenue for research.

Although this study found a number of positive impacts of CAT tool adoption on business performance, such as an increase in productivity, further research could focus on investigating these impacts in more detail. For instance, impacts such as productivity could be further investigated by looking at objective measures of business performance among freelancers using CAT tools (as indicated in the limitations of the research), or by conducting longitudinal studies looking at the impacts before and after the adoption of CAT tools (using subjective and objective measures for comparison purposes).

Because of the strong links found between CAT tool adoption and terminology management systems, it would be interesting to extend the present analysis to focus on, for example, the links between terminology management systems and ICT usage. Similarly, the current study could be extended to incorporate a logistic regression analysis which would exclude the variable representing the use of terminology management systems. Bearing in mind that terminology management is a function integrated within most CAT tools, the studies suggested above would permit a comparison of the results of those with the ones from the present study, and then consider whether the adoption of terminology management systems can be used as a stepping-stone towards the adoption of CAT tools.

One of the limitations of the research emerged from the factor analysis results for the perceptions of CAT tools, which are discussed in Chapter 8. Clearly, the factor structure apparent with general ICT does not simply carry over to this specific application (CAT tools). Further research, including qualitative research, is needed to identify underlying dimensions (types of perceptions) in translators' thinking about CAT tools.

Similarly, the factor analysis revealed that benefits and problems of ICT in general were perceived as two different factors; however, when translators gave their views on CAT tools, items looking at benefits (or positive effects) and problems (or negative effects) were combined into the same factor. This suggests that the benefits perceived from the use of ICT in general are clearly differentiated in the minds of translators from the problems they cause. All the benefits are loaded together as a first factor since they are seen to be strongly linked to each other, while all the perceived problems are loaded together as a second factor. On the other hand, the benefits from CAT tools are not differentiated in the minds of translators from the problems they cause. This might be because translators are less familiar with the benefits and problems of CAT tools. Alternatively, the difference might be inherent in the difference between asking about ICT in general and a specific type of ICT (CAT tools), and this offers scope for further research.

10.7. Concluding remarks

Technological developments in the translation sector over the last two decades have provided freelance translators with ICT, such as CAT tools, to improve their productivity and the quality of their work. The literature has claimed that the benefits of using these tools should help translators to meet an increased demand for translation services. Nevertheless, little or no research has been conducted about the adoption of CAT tools by freelance translators.

Drawing on previous research conducted in the area of ICT adoption in small businesses, the present study has examined the level of uptake of CAT tools by freelancers, their perceptions of CAT tools, the factors affecting their adoption, and the impacts these tools have on translators' working practice. The findings of this study provide a timely and relevant contribution to the understanding of CAT tool adoption among freelance translators in the UK, by providing a model and instruments for investigating CAT tool adoption in the context of freelance translation businesses. In addition, the findings of the study benefits various key stakeholders in the

translation sector, notably the freelance translator community, translator trainers, professional bodies for translators, and the developers and distributors of CAT tools by providing evidence regarding CAT tool uptake, characteristics of adopters, adoption determinants and impacts of adoption.

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**Appendix A: Letter of Endorsement and Cover Letter
(survey phase 1)**



INSTITUTE OF LINGUISTS

Founded in 1910

Royal Patron: HRH Prince Michael of Kent KCVO

LETTER OF ENDORSEMENT

September 2003

Dear Colleague

Translation Tools Research Project

The enclosed questionnaire is being sent to members of the Translating Division because we believe that the three-year research project is relevant to many of you and that you will benefit from its results – information on these resources will help with translation tool choice, and tool designers will learn what the users regard as effective.

As I am sure you know, Dr Heather Fulford, whose name you will see on the accompanying explanatory letter, also chairs the management committee of the Institute's Translating Division and sits on the Institute's Council. We are extremely fortunate that this research is being undertaken and that Heather is supervising it.

Do please take the time to complete the questionnaire.

With thanks,

Yours sincerely,

Henry Pavlovich
Director & Chief Executive



Direct Line: 01509 222435

Fax: 01509 223960

E-mail: h.Fulford@lboro.ac.uk

info.lboro.ac.uk/departments/bs/index.html

23 September 2003

Dear Translator,

Translators in the 21st Century: a study of skills, software & strategies

As you will appreciate, over the past few years there have been many new resources developed for translators, ranging from dictionaries on CD ROM, terminology management tools, to translation memory systems. We are currently conducting a three-year research project to explore the use UK-based translators are making of these various resources, and to learn from their experiences and practical insights. The findings of the project will provide useful feedback to translators to guide them in their choice of resources, and also help designers and developers to create more effective translation resources in the future.

To assist us with this project, we would be grateful if you could spare some time to complete the questionnaire enclosed with this letter. A pre-paid envelope is provided for your use. All responses to the questionnaire will be treated in the strictest confidence, and no record will be kept to link a specific set of responses to the responding translator. No individual or organisation will be identifiable in the summary reports produced from the survey. A summary of the survey findings will be made available to respondents. It is also envisaged that the summarised results will be published in relevant journals.

As a 'thank you' for participating in the survey, we will enter all of the responses in a prize draw in autumn 2003. The four prizes are gift tokens for Grant and Cutler, the language booksellers, of £100, £50, £30 and £20.

If you require any clarification, or have any comments or suggestions with regard to this research, then please do not hesitate to contact us.

Many thanks for your help. We look forward to receiving your completed questionnaire.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Heather Fulford'.

Dr. Heather Fulford
Director: Translation and IT Research Group

A handwritten signature in black ink, appearing to read 'Joaquín Granell-Zafra'.

Mr. Joaquín Granell-Zafra
Project Researcher

Appendix B: Questionnaire (survey phase 1)

Translators in the 21st century: a study of skills, software and strategies

Approximate time for completion: 10-15 mins.

If you wish to make comments on any question, please use the space provided on the back cover

ALL RESPONSES WILL BE TREATED IN THE STRICTEST CONFIDENCE

Your answers are very important to the accuracy of this study. Please return this questionnaire at your earliest convenience using the self-addressed envelope provided.

Thank you for your cooperation.

Please circle an appropriate number, or tick ☒ the relevant boxes, or write your answer as appropriate

SECTION A: TRANSLATOR PROFILE

Please provide some background information. (Please tick the appropriate box or fill in the required data)

1. Please indicate your age range

- ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60+

2. Please indicate your gender

- ☐ Male ☐ Female

3. Please indicate your highest educational level

- ☐ University – bachelor ☐ University – masters ☐ University – doctorate
☐ Other (please specify):

4. Please tell us which of the following translation qualifications you hold (tick all that apply)

- ☐ University (bachelor) in translation / translation studies
☐ Postgraduate degree in translation / translation studies
☐ Translation diploma (e.g. DipTrans IoL)
☐ Other (please specify):

5. Please indicate your role (tick all that apply)

- ☐ Freelance translator
☐ In-house translator
☐ Manager of a translation company
☐ Other (please specify):

PLEASE NOTE:

If you are **not actively involved** in translation work at present, please tick here ☐, do not proceed with the rest of the questionnaire, but **return** it in the self-addressed envelope. **Thank you for your time.**

6. In which year did you start working as a translator

7. Please indicate your membership status (if any) in the following professional institutes (tick all that apply)

- IoL (Institute of Linguists): ☐ FIL ☐ MIL ☐ AIL ☐ Student
ITI (Institute of Translation & Interpreting): ☐ Member ☐ Associate ☐ Student Associate
ATC (Association of Translation Companies): ☐ Full member ☐ Associate ☐ Overseas membership
Other (please specify):

8. Please indicate the approximate average number of words that you translate each week

 words per week

9. Please indicate the approximate average number of hours that you dedicate to translation-related tasks each week

 hours per week

10. Please indicate how often you employ the services of:

	Never	For a few translation assignments	For some translation assignments	For most translation assignments	For all translation assignments
Proof-readers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Revisers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other translators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clerical/Administrative personnel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Please indicate any additional services that you provide (*tick all that apply*)

- | | |
|---|--|
| <input type="checkbox"/> Translation project management | <input type="checkbox"/> Language training courses/tutorials |
| <input type="checkbox"/> Software localisation | <input type="checkbox"/> Linguistic consultancy |
| <input type="checkbox"/> Website localisation | <input type="checkbox"/> Subtitling/Dubbing |
| <input type="checkbox"/> Other (please specify): | |

12. Please tell us which language pairs you translate (*your 'top three' only*)

FROM TO

FROM TO

FROM TO

13. Please indicate the subject areas you translate (*tick all that apply*)

- | | | |
|--|---|--|
| <input type="checkbox"/> Financial translation | <input type="checkbox"/> Technical translation | <input type="checkbox"/> Business/Commerce translation |
| <input type="checkbox"/> Legal translation | <input type="checkbox"/> Scientific translation | <input type="checkbox"/> Literary translation |
| Other (please specify): | | |

SECTION B: INFORMATION TECHNOLOGY (IT) USAGE

14. Please indicate how you acquired your IT skills (*tick all that apply*)

- ☐ Self taught
- ☐ Professional training courses
- ☐ Attending workshops and seminars run by professional institutes
- ☐ University/College course
- ☐ Attending IT modules on University degree programme
- ☐ Other (please specify):

15. Do you have any formal IT qualifications?

- ☐ Yes ☐ No

If YES, please indicate the type of qualification

- ☐ University degree in computing/IT
- ☐ Individual IT modules on University degree programme
- ☐ School/College qualification (e.g. GCSE, A-Level)
- ☐ Professional certificate (e.g. European Computer Driving Licence)
- ☐ Other (please specify):

16. Which type of network do you use?

- ☐ Internet dial-up connection ☐ Local Area Network (LAN)
- ☐ Internet broadband connection (please, specify speed: KB)
- ☐ Other (please specify):

17. Please provide an indication of your familiarity and experience with each of the following SOFTWARE APPLICATIONS and then indicate which ones you are currently using (please tick all the boxes that apply and circle only one number per line)

Type of software application	FAMILIARITY AND WORKING KNOWLEDGE				USAGE
	Not familiar	Familiar, but with no working knowledge	Familiar, with some working knowledge	Familiar, with extensive working knowledge	Currently using
Word processing package (e.g. Microsoft Word, Wordperfect)	1	2	3	4	<input type="checkbox"/>
Spreadsheet package (e.g. Microsoft Excel, Lotus 1-2-3)	1	2	3	4	<input type="checkbox"/>
Database package (e.g. Microsoft Access, FileMaker, FoxPro)	1	2	3	4	<input type="checkbox"/>
Computer-based accounting application (e.g. Sage, Ms Money, Lotus Organizer)	1	2	3	4	<input type="checkbox"/>
Desktop Publishing application (e.g. QuarkXpress, PageMaker, Publisher)	1	2	3	4	<input type="checkbox"/>
Web publishing application (e.g. Dreamweaver, FrontPage, GoLive)	1	2	3	4	<input type="checkbox"/>
Graphics applications (e.g. Photoshop, Paint Shop Pro, Fireworks)	1	2	3	4	<input type="checkbox"/>
Information retrieval and Optical Character Recognition (OCR) tools (e.g. Search & Replace, ht://Dig, Omnipage)	1	2	3	4	<input type="checkbox"/>
Groupware applications (e.g. Lotus Notes, Novell Groupwise)	1	2	3	4	<input type="checkbox"/>
Project and Workflow Management software (e.g. Ms Project, STAR Proactive GMS)	1	2	3	4	<input type="checkbox"/>
Terminology management applications (e.g. MultiTerm, Lingo, Déjà Vu TermWatch)	1	2	3	4	<input type="checkbox"/>
Machine Translation (MT) applications (e.g. Reverso Pro, Systran, Telegraph)	1	2	3	4	<input type="checkbox"/>
Computer-Assisted Translation (CAT) (e.g. Trados Workbench, Déjà Vu, SDLX)	1	2	3	4	<input type="checkbox"/>
Localisation applications (e.g. Alchemy Catalyst, Passolo)	1	2	3	4	<input type="checkbox"/>
Other:	1	2	3	4	<input type="checkbox"/>

SECTION C: YOUR INTERNET USAGE AND YOUR TRANSLATION ACTIVITIES

18. Do you have your own web site to promote your translation services?

☐ Yes

☐ No

19. Please provide an indication of your familiarity and experience with each of the following **INTERNET-BASED RESOURCES** and then indicate which ones you are currently using in your translation activities (*please tick all the boxes that apply and circle only one number per line*)

Internet-based resources	FAMILIARITY AND WORKING KNOWLEDGE				USAGE
	Not familiar	Familiar, but with no working knowledge	Familiar, with some working knowledge	Familiar, with extensive working knowledge	Currently using
Online dictionaries & glossaries	1	2	3	4	<input type="checkbox"/>
Multilingual terminology databases	1	2	3	4	<input type="checkbox"/>
Discussion mailing lists	1	2	3	4	<input type="checkbox"/>
Online discussion groups	1	2	3	4	<input type="checkbox"/>
Online translation marketplaces (e.g. Proz)	1	2	3	4	<input type="checkbox"/>
Online machine translation (MT) systems	1	2	3	4	<input type="checkbox"/>
Online encyclopaedia	1	2	3	4	<input type="checkbox"/>
Newspapers & magazines archives	1	2	3	4	<input type="checkbox"/>
Academic journals	1	2	3	4	<input type="checkbox"/>
Electronic databases	1	2	3	4	<input type="checkbox"/>
Online search engines	1	2	3	4	<input type="checkbox"/>
Electronic libraries	1	2	3	4	<input type="checkbox"/>
E-mail	1	2	3	4	<input type="checkbox"/>
FTP (File Transfer Protocol)	1	2	3	4	<input type="checkbox"/>
IRC (Internet Relay Chat)	1	2	3	4	<input type="checkbox"/>
Usenet newsgroups	1	2	3	4	<input type="checkbox"/>
Specialist gateways	1	2	3	4	<input type="checkbox"/>
Other:	1	2	3	4	<input type="checkbox"/>

SECTION D: YOUR IT STRATEGY

Please provide some information about your business strategy and your perceptions towards the use of information technology (IT).

20. Do you have a written business plan?

(A document which contains an analysis of your business' current position, where you would like it to be in the future, and how you plan to get it there)

☐ Yes

☐ No

21. Please consider the tasks listed below, and indicate first, how **IMPORTANT** you believe IT to be to each one, and second, the **USE** you currently make of IT to support each one
(please circle the numbers that apply)

Importance				IT support for...	Use			
Not important	Less important	Important	Very important		None	Little	Moderate	Extensive
1	2	3	4	Administrative tasks	1	2	3	4
1	2	3	4	Project and document management tasks	1	2	3	4
1	2	3	4	Information retrieval (documentation) tasks	1	2	3	4
1	2	3	4	Translation tasks	1	2	3	4
1	2	3	4	Communication tasks	1	2	3	4

22. The following statements help us understand your opinions about **INFORMATION TECHNOLOGY (IT)**. Please indicate, *by circling the most appropriate number on the scale*, the extent to which you agree with each of the following statements

	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
Previous experience with computers is necessary for adopting new applications	1	2	3	4	5
Computerisation helps provide higher quality services	1	2	3	4	5
Computerisation brings time saving benefits	1	2	3	4	5
Computerisation would bring more benefits for me if there were a greater level of integration between the various software applications I use	1	2	3	4	5
Computerisation significantly improves my effectiveness as a translator	1	2	3	4	5
Computerisation helps to increase revenue	1	2	3	4	5
Computerisation significantly improves my communication with customers	1	2	3	4	5
Computer applications have failed to meet some of my requirements	1	2	3	4	5
Computerisation creates many problems	1	2	3	4	5
So far, my use of computer applications has been a failure	1	2	3	4	5
I have gained fewer benefits than expected from computerisation	1	2	3	4	5

23. The following statements help us understand your opinions about COMPUTER-ASSISTED TRANSLATION (CAT) TOOLS (e.g. Trados Workbench, Atril Déjà Vu, SDLX). Please indicate, *by circling the most appropriate number on the scale*, the extent to which you agree with each of the following statements

	Strongly Disagree	Disagree	Don't Know	Agree	Strongly Agree
Previous experience with CAT tools is necessary for adopting a new CAT tool	1	2	3	4	5
CAT tools help provide higher quality services	1	2	3	4	5
CAT tools bring time saving benefits	1	2	3	4	5
CAT tools are well worth their cost	1	2	3	4	5
CAT tools help to increase revenue	1	2	3	4	5
CAT tools significantly improve my effectiveness as a translator	1	2	3	4	5
CAT tools would improve my effectiveness as a translator if they were integrated with other software applications	1	2	3	4	5
CAT tools have failed to meet some of my requirements	1	2	3	4	5
CAT tools create many problems	1	2	3	4	5
So far, my use of CAT tools has been a failure	1	2	3	4	5
I have gained fewer benefits than expected from CAT tools	1	2	3	4	5

24. Below are some pairs of statements about IT STRATEGY. Please indicate for each pair, using the scale below, which statement most closely matches your current position
(please circle only one number per line)

A						B
I treat each decision about a new IT investment independently	1	2	3	4	5	My decisions about IT investments are guided by a formal IT strategy
I am concerned with using IT to solve short-term problems	1	2	3	4	5	I am concerned with using IT to solve medium to longer-term problems
I am concerned with matching technology to my business needs	1	2	3	4	5	I am concerned with getting the most up-to-date technology
I am concerned with how to better manage my IT resources	1	2	3	4	5	Managing IT is not as critical as managing other non-translation related resources
I am concerned with achieving a greater level of integration of my computer systems	1	2	3	4	5	I am concerned that the majority of my computer systems remain as standalone applications
The primary benefits I seek from IT are improved productivity and efficiency	1	2	3	4	5	Computer systems bring a wide range of benefits including competitive advantage

Please use this space for any comments you wish to make related to this study

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Would you like a copy of the summary of the findings?

- ☐ Yes
- ☐ No

Would you like to participate in other stages of our research?
(e.g. questionnaire, interview)

- ☐ Yes
- ☐ No

If you answered **YES** to either of the above questions, please supply your name, address and e-mail below (or attach a business card).

Alternatively, if you would prefer your responses to remain completely anonymous, you can email Joaquin Granell-Zafra [j.granell-zafra@lboro.ac.uk] stating ‘Copy of questionnaire findings’ as subject, to request a copy of the findings.

Name	
Address	
E-mail	

ALL RESPONSES WILL BE TREATED IN THE STRICTEST CONFIDENCE

Your answers are very important to the accuracy of this study. Please return this questionnaire at your earliest convenience using the self-addressed envelope provided.

Thank you for your cooperation

**Appendix C: Mann-Whitney test between early and late
respondents (survey phase 1)**

Result of Mann-Whitney test between early and late respondents

Variables tested	Mann-Whitney U	2-tailed significance	Are they significant at 95% level?
Age range	319.0	.045	Significant
Gender	435.0	.792	Not significant
Educational level	400.5	.740	Not significant
Combinations of translation quals	390.0	.305	Not significant
Length of translation experience	422.5	.827	Not significant
Software apps FAM+KNOW: Word processing	375.5	.950	Not significant
Software apps USAGE: Word processing	435.0	.317	Not significant
Software apps FAM+KNOW: Spreadsheet	336.5	.441	Not significant
Software apps USAGE: Spreadsheet	381.5	.615	Not significant
Software apps FAM+KNOW: Database	270.5	.711	Not significant
Software apps USAGE: Database	287.0	.767	Not significant
Software apps FAM+KNOW: Accounting	254.0	.775	Not significant
Software apps USAGE: Accounting	263.5	.530	Not significant
Software apps FAM+KNOW: Desktop publishing	264.5	.318	Not significant
Software apps USAGE: Desktop publishing	314.0	.728	Not significant
Software apps FAM+KNOW: Web publishing	269.5	.860	Not significant
Software apps USAGE: Web publishing	288.0	1.000	Not significant
Software apps FAM+KNOW: Graphics	268.5	.863	Not significant
Software apps USAGE: Graphics	267.5	.523	Not significant
Software apps FAM+KNOW: Info retrieval+OCR	265.5	.791	Not significant
Software apps USAGE: Info retrieval + OCR	270.5	.430	Not significant
Software apps FAM+KNOW: Groupware	209.5	.064	Not significant
Software apps USAGE: Groupware	264.5	.328	Not significant
Software apps FAM+KNOW: Project mgment	255.0	.440	Not significant
Software apps USAGE: Project mgment	276.0	1.000	Not significant
Software apps FAM+KNOW: Terminology	232.0	.090	Not significant
Software apps USAGE: Terminology	275.0	.338	Not significant
Software apps FAM+KNOW: MT	246.0	.580	Not significant
Software apps USAGE: MT	253.0	.338	Not significant
Software apps FAM+KNOW: CAT	277.0	.476	Not significant

Software apps USAGE: CAT	270.5	.184	Not significant
Software apps FAM+KNOW: Localisation	231.5	.322	Not significant
Software apps USAGE: Localisation	253.0	.338	Not significant
IT opinion: prev. exp. necessary	430.5	.742	Not significant
IT opinion: computerisation = higher quality services	420.0	.623	Not significant
IT opinion: computerisation = time saving benefits	395.5	.371	Not significant
IT opinion: + benefits IF integrated apps	385.5	.313	Not significant
IT opinion: computerisation = + effectiveness as translator	357.5	.132	Not significant
IT opinion: computerisation = + revenue	347.0	.103	Not significant
IT opinion: computerisation = + comms with customers	361.5	.154	Not significant
IT opinion: apps failed to meet requirements	353.5	.191	Not significant
IT opinion: computerisation = many problems	407.5	.504	Not significant
IT opinion: use of apps = failure so far	421.0	.808	Not significant
IT opinion: computerisation = - benefits than expected	354.0	.191	Not significant

**Appendix D: Invitation Letter for Participation in Online
Study (survey phase 2)**

17 September 2004

Dear [name of translator]

Translators in the 21st century: a study of skills, software and strategies

As you may recall, you recently took part in a questionnaire survey exploring the use translators are making of IT. We would like to thank you very much for participating in that survey and for agreeing to collaborate in the next stage of our research. As promised, a summary report of the survey findings is being posted to you.

The purpose of the next stage of our research is to learn more about your views on, and experiences with, some of the IT systems designed specifically for translators, such as terminology management tools and translation memory managers. We are exploring the views of users and non-users of these various systems.

In order to help us with this part of the research, please could you complete our online survey?

If you are currently using terminology management and / or a translation memory system, please complete the survey available at:

www-staff.lboro.ac.uk/~bsjg7/survey_adopters

If you are not currently using terminology management or translation memory systems, please complete the survey available at:

www-staff.lboro.ac.uk/~bsjg7/survey_nonadopters

A summary of the findings of this aspect of our research will be made available on request. As with the earlier part of our study, all responses will be treated in the strictest confidence.

As a 'thank you' for your help, a £10 book token will be sent to each participant.

If you require further clarification, or have any comments or suggestions with regard to this research, then please do not hesitate to contact us (j.granell-zafra@lboro.ac.uk). Many thanks for your assistance in this matter.

Yours sincerely,

Dr. Heather Fulford
Director of Translation & IT Research Group

Mr Joaquín Granell-Zafra
Project researcher

**Appendix E: Online Questionnaires for CAT tool adopters
and CAT tool non-adopters (survey phase 2)**

Translation Tools in the 21st century

Part A: Terminology management tools

This section contains questions about terminology management tools, i.e. software packages used for creating and managing your own terminology collections. Examples include MultiTerm, Lingo, TermWatch, and StarTerm.

Question 1: Using terminology management tools

Which terminology management tool(s) do you use?

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements about terminology management tools.

Terminology management tools...	Strongly Disagree		Neutral		Strongly Agree
1. Enable me to accomplish tasks more quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Improve the quality of work I do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Make it easier for me to do my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Improve my job performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Are overall advantageous in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Enhance my effectiveness in my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Give me greater control over my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Increase my productivity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Are compatible with the type of translation assignments I undertake.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Fit well with the way I like to work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Are cumbersome to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Require a lot of mental effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Are often frustrating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Do what I want to do easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Are easy for me to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Were easy for me to learn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 2: Terminology management tools and the translation sector

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Terminology management tools...	Strongly Disagree		Neutral		Strongly Agree
1. My clients expect me to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My use of them is voluntary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Using them improves my image within the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Clients prefer to work with translators who use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Translators who use them have a high profile in the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Having them is a status symbol among translators.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3: Learning about terminology management tools

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Terminology management tools...	Strongly Disagree		Neutral		Strongly Agree
1. I have seen how other translators use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Many freelance translators use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Before deciding whether to use them, I was able to try them out fully.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I was permitted to use them on a trial basis long enough to see what they could do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I would have no difficulty telling others about what they can do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I believe I could communicate to others the advantages and disadvantages of using them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The benefits of using them are apparent to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I had ample opportunity to try them out before buying.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I need training in using them more effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I taught myself to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I feel confident enough to teach myself to use new ones.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 4: Impacts of terminology management tools

On the scale provided, please indicate the impact that your use of terminology management tools has had on your work.

Impacts of terminology management tools on...	Large Decrease	Small Decrease	Unchanged	Small Increase	Large Increase
1. My turnover	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Size of my customer base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Quality of my translations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. My productivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Volume of work I undertake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Number of clients I have	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Volume of work offered to me by clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Prices I charge for work I undertake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 5: Online tools and online linguistic/reference resources

On the scale provided, please indicate the usefulness of the following online search tools and online linguistic/reference resources.

Usefulness of online terminology tools and resources	Not useful at all	Not very useful	Neutral	Useful	Very useful
1. Monolingual dictionaries & glossaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Multilingual dictionaries & glossaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Multilingual terminology databases	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Encyclopaedia	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Document archives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Corpora	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Reference databases (e.g. for subject specialism data)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Search engines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Specialists gateways (e.g. Internet portals with reference resources)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Other: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For me, the **advantages** of using online tools and linguistic/reference resources

are:

For me, the **disadvantages** of using online tools and linguistic/reference resources are:

Some online resources are available only upon payment of a subscription or access charge. Do you use any of these services?

- ☐ Yes
- ☐ No

Question 6: Sharing your terminology resources

Terminology collections stored in electronic formats can be made available to others. Using the scale below, please indicate your level of involvement in terminology sharing.

How often do you...	Never	Rarely	Occasionally	Frequently	Almost always
1. Share your terminology collections with colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Exchange your terminology collections with colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Buy terminology collections from colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Sell your terminology collections to colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part B: Translation memory

This section contains questions about translation memory systems, such as Trados, Déjà Vu, SDLX, and StarTransit.

If you do not use translation memory, please go to [Part C](#).

Question 1: Using translation memory

Which translation memory system(s) do you use?

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements about translation memory.

Translation memory...	Strongly Disagree		Neutral		Strongly Agree
1. Enables me to accomplish tasks more quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Improves the quality of work I do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Makes it easier for me to do my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Improve my job performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Is overall advantageous in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Enhances my effectiveness in my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Gives me greater control over my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Increases my productivity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Is compatible with the type of translation assignments I undertake.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Fits well with the way I like to work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Is cumbersome to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Requires a lot of mental effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Is often frustrating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Does what I want to do easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Is easy for me to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Was easy for me to learn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 2: Translation memory and the translation sector

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Translation memory...	Strongly Disagree		Neutral		Strongly Agree
1. My clients expect me to use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My use of it is voluntary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Using it improves my image within the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Clients prefer to work with translators who use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Translators who use it have a high profile in the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Having it is a status symbol among translators.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3: Learning about translation memory

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Translation memory...	Strongly Disagree		Neutral		Strongly Agree
1. I have seen how other translators use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Many freelance translators use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Before deciding whether to use it, I was able to try it out fully.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I was permitted to use it on a trial basis long enough to see what it could do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I would have no difficulty telling others about what it can do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I believe I could communicate to others the advantages and disadvantages of using it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The benefits of using it are apparent to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I had ample opportunity to try it out before buying.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I need training in using them more effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I taught myself to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I feel confident enough to teach myself to use another new one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 4: Impacts of translation memory

On the scale provided, please indicate the impact that your use of translation memory has had on your work.

Impacts of translation memory on...	Large Decrease	Small Decrease	Unchanged	Small Increase	Large Increase
1. My turnover	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Size of my customer base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Quality of my translations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. My productivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Volume of work I undertake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Number of clients I have	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Volume of work offered to me by clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Prices I charge for work I undertake

☐ ☐ ☐ ☐ ☐

Question 5: Sharing your translation memories

Translation memories can be shared with others. Using the scale below, please indicate your level of involvement in translation memory sharing.

How often do you...	Never	Rarely	Occasionally	Frequently	Almost always
1. Share your translation memories with colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Exchange your translation memories with colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Buy translation memories from colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Sell your translation memories to colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part C: Your ‘translation toolkit’

Question 1: Your tools

Using the table below, please indicate the software tools you use in your translation work.

Task	Tools
Translation production and editing (e.g. MS Word)	<div></div>
Terminology searches (e.g. search engines, online glossaries)	<div></div>
Glossary creation (e.g. MultiTerm, Excel)	<div></div>
Word count	<div></div>
File management	<div></div>
Project management	<div></div>
Text alignment	<div></div>
Communicating with clients	<div></div>
File transfer	<div></div>
Invoice generation	<div></div>
Book keeping / accounts	<div></div>
Other task: <div></div>	<div></div>

Question 2: External influences

Using the scale below, please indicate the factors that influence your adoption of software tools into your 'translation toolkit'.

It is my perception that pressure to adopt new software tools comes from...	No pressure at all				Total pressure
1. Direct clients / Translation agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Software vendors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Other translators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Translation associations / professional bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3. Websites, marketplaces, and discussion groups

Do you have your own web site to promote your translation services?

☐ Yes ☐ No

If no, please [click here](#) to continue.

Please tell us about your web site	Me	Other people (please specify)
My web site was created by	<input type="radio"/>	<input type="text"/>
My web site content is updated by	<input type="radio"/>	<input type="text"/>
My web site design is updated by	<input type="radio"/>	<input type="text"/>

In which year was your website created?

The benefits I have gained from having my own website are:

The problems I have encountered with having my own website are:

Do you use online marketplaces/auctions to bid for translation assignments?

☐ Yes ☐ No

If no, please [click here](#) to continue.

For me, the advantages of using online marketplaces/auctions are:

For me, the disadvantages of using online marketplaces/auctions are:

Which electronic **mailing lists** and/or **discussion groups** are you subscribed to?

If you do not participate in mailing lists or discussion groups, please [click here](#) to go to next section.

For me, the advantages of being involved in electronic mailing lists/discussion groups are:

The disadvantages for me of being involved in electronic mailing lists/discussion groups are:

Part D: Your profile

Question 1: The translation assignments you undertake

Please provide us with some details about the translation assignments you undertake.

Which language pairs do you translate?

FROM	TO
<div></div>	<div></div>
<div></div>	<div></div>
<div></div>	<div></div>
<div></div>	<div></div>
<div></div>	<div></div>

Which subject areas do you translate?

Which document types do you translate (e.g. manuals, technical reports, contracts, patents)?

Approximately what proportion of your workload is delivered to you by e-mail?

- ☐ 0% ☐ 1%-25% ☐ 25%-50% ☐ 50%-75% ☐ 75%-99% ☐ 100%

Approximately what proportion of your translation assignments do you submit by e-mail?

- ☐ 0% ☐ 1%-25% ☐ 25%-50% ☐ 50%-75% ☐ 75%-99% ☐ 100%

Which document formats do you usually work with? Please tick all that apply:

- ☐ Rich Text Format (RTF)

☐ Adobe PDF

☐ Web page files (HTML/ASP)

☐ Word documents (DOC)

☐ FrameMaker

☐ Resource files (RC)

☐ Plain text (TXT)

☐ QuarkXPress

☐ Source code files (C/C++/Java/VB)

☐ Wordperfect (WPD)

☐ PageMaker

☐ Excel spreadsheets (XLS)

☐ PowerPoint presentations

☐ SGML / XML

☐ Other:

What proportion of your work do you undertake for:

direct clients %

translation agencies %

What is the approximate average size of the translation assignments you undertake?

- ☐ under 1000 words
- ☐ 1000-5000 words
- ☐ 5000-10000 words
- ☐ over 10000 words

Approximately, how many words do you translate per week?

- ☐ under 1000 words
- ☐ 1000-5000 words
- ☐ 5000-10000 words
- ☐ over 10000 words

Question 2: Being a freelancer

Relative to the rest of the freelance translation sector in the UK, how do you rate your performance in the following areas?

	Very weak	Weak	Same level	Strong	Very Strong
1. Long term profitability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Amount of translation work undertaken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Financial resources (liquidity and investment capacity)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Client base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Professional image and client loyalty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3: Learning to use new software tools

Using the scale below, please indicate your preferences for learning to use new software tools to support you in your translation work.

I would like to learn to use software tools through...	Strongly Disagree		Neutral		Strongly Agree
1. teaching myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. taught courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. workshops for translators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. e-learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. training provided by software vendors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Additional comments

Please use this space for any comments you wish to make related to this study. Also, could you include any comments on translation tools and resources that you find have not been fully covered in the study.

Thank you for your help.
To receive your £10 book token, please provide your name and address.

Submit



Translation Tools in the 21st century

Part A: Terminology management tools

This section contains questions about terminology management tools, i.e. software packages used for creating and managing your own terminology collections. Examples include MultiTerm, Lingo, TermWatch, and StarTerm.

Question 1: Terminology management tools

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements about terminology management tools.

Terminology management tools...	Strongly Disagree		Neutral		Strongly Agree
1. Would enable me to accomplish tasks more quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Would improve the quality of work I do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Would make it easier for me to do my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Would improve my job performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Would overall be advantageous in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Would enhance my effectiveness in my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Would give me greater control over my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Would increase my productivity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Would be compatible with the type of translation assignments I undertake.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Would fit well with the way I like to work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Would be cumbersome to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Would require a lot of mental effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Would often be frustrating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Would do what I want to do easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Would be easy for me to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Would be easy for me to learn. ○ ○ ○ ○ ○

Question 2: Terminology management tools and the translation sector

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Terminology management tools...	Strongly Disagree		Neutral		Strongly Agree
1. My clients expect me to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Using them would improve my image within the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Clients prefer to work with translators who use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Translators who use them have a high profile in the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Having them is a status symbol among translators.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3: Learning about terminology management tools

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Terminology management tools...	Strongly Disagree		Neutral		Strongly Agree
1. I have seen how other translators use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Many freelance translators use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Before deciding whether to use them, I would be able to try them out fully.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I would be able to use them on a trial basis long enough to see what they could do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I would have no difficulty telling others about what they can do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I believe I could communicate to others the advantages and disadvantages of using them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The benefits of using them are apparent to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I would have ample opportunity to try them out before deciding to adopt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. I know where I can go to try out several of them.
10. I would feel confident enough to teach myself to use them.

Question 4: Impacts of terminology management tools

On the scale provided, please indicate the impact that you believe using terminology management tools would have on your work.

Impacts of terminology management tools on...	Large Decrease	Small Decrease	Unchanged	Small Increase	Large Increase
1. My turnover	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
2. Size of my customer base	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
3. Quality of my translations	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
4. My productivity	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
5. Volume of work I undertake	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
6. Number of clients I have	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
7. Volume of work offered to me by clients	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
8. Prices I charge for work I undertake	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

Question 5: Online tools and online linguistic/reference resources

On the scale provided, please indicate the usefulness of the following online search tools and online linguistic/reference resources.

Usefulness of online terminology tools and resources	Not useful at all	Not very useful	Neutral	Useful	Very useful
1. Monolingual dictionaries & glossaries	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
2. Multilingual dictionaries & glossaries	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
3. Multilingual terminology databases	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
4. Encyclopaedia	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
5. Document archives	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
6. Corpora	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>

7. Reference databases (e.g. for subject specialism data)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Search engines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Specialists gateways (e.g. Internet portals with reference resources)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Other: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For me, the **advantages** of using online tools and linguistic/reference resources are:

For me, the **disadvantages** of using online tools and linguistic/reference resources are:

Some online resources are available only upon payment of a subscription or access charge. Do you use any of these services?

☐ Yes

☐ No

Question 6: Sharing your terminology resources

Terminology collections stored in electronic formats can be made available to others. Using the scale below, please indicate your level of involvement in terminology sharing.

How often do you...	Never	Rarely	Occasionally	Frequently	Almost always
1. Share your terminology collections with colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Exchange your terminology collections with colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Buy terminology collections from colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Sell your terminology collections to colleagues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part B: Translation memory

This section contains questions about translation memory tools, such as Trados, Déjà Vu, SDLX, and StarTransit.

Question 1: Using translation memory

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements about translation memory.

Translation memory...	Strongly Disagree		Neutral		Strongly Agree
1. Would enable me to accomplish tasks more quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Would improve the quality of work I do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Would make it easier for me to do my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Would improve my job performance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Would be overall advantageous in my job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Would enhance my effectiveness in my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Would give me greater control over my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Would increase my productivity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Would be compatible with the type of translation assignments I undertake.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Would fit well with the way I like to work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Would be cumbersome to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Would require a lot of mental effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Would often be frustrating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. Would do what I want to do easily.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. Would be easy for me to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. Would be easy for me to learn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 2: Translation memory and the translation sector

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Translation memory...	Strongly Disagree		Neutral		Strongly Agree
1. My clients expect me to use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Using it would improve my image within the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Clients prefer to work with translators who use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Translators who use it have a high profile in the translation sector.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Having it is a status symbol among translators.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3: Learning about translation memory

Using the scale provided, please indicate the extent to which you agree or disagree with each of the following statements.

Translation memory...	Strongly Disagree		Neutral		Strongly Agree
1. I have seen how other translators use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Many freelance translators use it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Before deciding whether to use it, I would be able to try it out fully.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I would be permitted to use it on a trial basis long enough to see what it could do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I would have no difficulty telling others about what it can do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. I believe I could communicate to others the advantages and disadvantages of using it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. The benefits of using it are apparent to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I would have ample opportunity to try it out before deciding to adopt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I know where I can go to try out various translation memory systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I would feel confident enough to teach myself to use them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 4: Impacts of translation memory

On the scale provided, please indicate the impact that you believe using translation memory would have on your work.

Impacts of translation memory on...	Large Decrease	Small Decrease	Unchanged	Small Increase	Large Increase
1. My turnover	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Size of my customer base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Quality of my translations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. My productivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Volume of work I undertake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Number of clients I have	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Volume of work offered to me by clients	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Prices I charge for work I undertake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part C: Your ‘translation toolkit’

Question 1: Your tools

Using the table below, please indicate the software tools you use in your translation work.

Task	Tools
Translation production and editing (e.g. MS Word)	<div></div>
Terminology searches (e.g. search engines, online glossaries)	<div></div>
Glossary creation (e.g. MultiTerm, Excel)	<div></div>
Word count	<div></div>
File management	<div></div>
Project management	<div></div>
Text alignment	<div></div>
Communicating with clients	<div></div>
File transfer	<div></div>
Invoice generation	<div></div>
Book keeping / accounts	<div></div>
Other task: <div></div>	<div></div>

Question 2: External influences

Using the scale below, please indicate the factors that influence your adoption of software tools into your 'translation toolkit'.

It is my perception that pressure to adopt new software tools comes from...	No pressure at all				Total pressure
1. Direct clients / Translation agencies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Software vendors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Other translators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Translation associations / professional bodies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3. Websites, marketplaces, and discussion groups

Do you have your own web site to promote your translation services?

☐ Yes ☐ No

If no, please [click here](#) to continue.

Please tell us about your web site	Me	Other people (please specify)
My web site was created by	<input type="radio"/>	<input type="text"/>
My web site content is updated by	<input type="radio"/>	<input type="text"/>
My web site design is updated by	<input type="radio"/>	<input type="text"/>

In which year was your website created?

The benefits I have gained from having my own website are:

The problems I have encountered with having my own website are:

Do you use online marketplaces/auctions to bid for translation assignments?

☐ Yes ☐ No

If no, please [click here](#) to continue.

For me, the advantages of using online marketplaces/auctions are:

For me, the disadvantages of using online marketplaces/auctions are:

Which electronic **mailing lists** and/or **discussion groups** are you subscribed to?

If you do not participate in mailing lists or discussion groups, please [click here](#) to go to next section.

For me, the advantages of being involved in electronic mailing lists/discussion groups are:

The disadvantages for me of being involved in electronic mailing lists/discussion groups are:

Part D: Your profile

Question 1: The translation assignments you undertake

Please provide us with some details about the translation assignments you

undertake.

Which language pairs do you translate?

FROM	TO
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

Which subject areas do you translate?

<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>
<input type="text"/>

Which document types do you translate (e.g. manuals, technical reports, contracts, patents)?

<input type="text"/>

Approximately what proportion of your workload is delivered to you by e-mail?

- ☐ 0% ☐ 1%-25% ☐ 25%-50% ☐ 50%-75% ☐ 75%-99% ☐ 100%

Approximately what proportion of your translation assignments do you submit by e-mail?

- ☐ 0% ☐ 1%-25% ☐ 25%-50% ☐ 50%-75% ☐ 75%-99% ☐ 100%

Which document formats do you usually work with? Please tick all that apply:

- | | | |
|---|--------------------------------------|--|
| <input type="checkbox"/> Rich Text Format (RTF) | <input type="checkbox"/> Adobe PDF | <input type="checkbox"/> Web page files (HTML/ASP) |
| <input type="checkbox"/> Word documents (DOC) | <input type="checkbox"/> FrameMaker | <input type="checkbox"/> Resource files (RC) |
| <input type="checkbox"/> Plain text (TXT) | <input type="checkbox"/> QuarkXPress | <input type="checkbox"/> Source code files (C/C++/Java/VB) |
| <input type="checkbox"/> Wordperfect (WPD) | <input type="checkbox"/> PageMaker | <input type="checkbox"/> Excel spreadsheets (XLS) |

☐ PowerPoint presentations

☐ SGML / XML

☐ Other:

What proportion of your work do you undertake for:

direct clients %

translation agencies %

What is the approximate average size of the translation assignments you undertake?

☐ under 1000 words

☐ 1000-5000 words

☐ 5000-10000 words

☐ over 10000 words

Approximately, how many words do you translate per week?

☐ under 1000 words

☐ 1000-5000 words

☐ 5000-10000 words

☐ over 10000 words

Question 2: Being a freelancer

Relative to the rest of the freelance translation sector in the UK, how do you rate your performance in the following areas?

	Very weak	Weak	Same level	Strong	Very Strong
1. Long term profitability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Amount of translation work undertaken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Financial resources (liquidity and investment capacity)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Client base	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Professional image and client loyalty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 3: Learning to use new software tools

Using the scale below, please indicate your preferences for learning to use new software tools to support you in your translation work.

I would like to learn to use software tools through...	Strongly Disagree		Neutral		Strongly Agree
1. teaching myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. taught courses	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. workshops for translators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. e-learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. training provided by software vendors ☐ ☐ ☐ ☐ ☐

Additional comments

Please use this space for any comments you wish to make related to this study. Also, could you include any comments on translation tools and resources that you find have not been fully covered in the study.

Thank you for your help.
To receive your £10 book token, please provide your name and address.

Submit

**Appendix F: *Perl* Scripts for Processing Responses
(online survey phase 2)**

Perl script used for processing adopters' responses to the online questionnaire

```
#!/usr/bin/perl -w

use strict;

my %valid_keys = (A01 => 0,A01terminologytool => 1,A02 => 2,A03 =>
3,A04 => 4,A05 => 5,A06 => 6,A07 => 7,A08 => 8,A09 => 9,A10 => 10,A11
=> 11,A12 => 12,A13 => 13,A14 => 14,A15 => 15,A16 => 16,A17 => 17,A18
=> 18,A19 => 19,A20 => 20,A21 => 21,A22 => 22,A23 => 23,A24 => 24,A25
=> 25,A26 => 26,A27 => 27,A28 => 28,A29 => 29,A30 => 30,A31 => 31,A32
=> 32,A33 => 33,A34 => 34,A35 => 35,A36 => 36,A37 => 37,A38 => 38,A39
=> 39,A40 => 40,A41 => 41,A42 => 42,A43 => 43,A44 => 44,A45 => 45,A46
=> 46,A47 => 47,A48 => 48,A49 => 49,A50 => 50,A51 => 51,A51other =>
52,A52advantages => 53,A53disadvantages => 54,A54 => 55,A55 => 56,A56
=> 57,A57 => 58,A58 => 59,B01 => 60,B01TMSsystem => 61,B02 => 62,B03
=> 63,B04 => 64,B05 => 65,B06 => 66,B07 => 67,B08 => 68,B09 => 69,B10
=> 70,B11 => 71,B12 => 72,B13 => 73,B14 => 74,B15 => 75,B16 => 76,B17
=> 77,B18 => 78,B19 => 79,B20 => 80,B21 => 81,B22 => 82,B23 => 83,B24
=> 84,B25 => 85,B26 => 86,B27 => 87,B28 => 88,B29 => 89,B30 => 90,B31
=> 91,B32 => 92,B33 => 93,B34 => 94,B35 => 95,B36 => 96,B37 => 97,B38
=> 98,B39 => 99,B40 => 100,B41 => 101,B42 => 102,B43 => 103,B44 =>
104,B45 => 105,C01 => 106,C02 => 107,C04 => 108,C05 => 109,C06 =>
110,C07 => 111,C08 => 112,C08b => 113,C09 => 114,C10 => 115,C11 =>
116,C11othername => 117,C12 => 118,C13 => 119,C14 => 120,C15 =>
121,C16 => 122,C17webcontent1 => 123,C17webcontent2 =>
124,C17webcreated1 => 125,C17webcreated2 => 126,C17webdesign1 =>
127,C17webdesign2 => 128,C17yearweb => 129,C18benefitsweb =>
130,C19problemsweb => 131,C20 => 132,C21 => 133,C21advantages =>
134,C22disadvantages => 135,C23mailinglists => 136,C24advantages =>
137,C25disadvantages => 139,C03 => 140,D01langA => 141,D01langB =>
142,D02langA => 143,D02langB => 144,D03langA => 145,D03langB =>
146,D04langA => 147,D04langB => 148,D05langA => 149,D05langB =>
150,D06subject1 => 151,D06subject2 => 152,D06subject3 =>
153,D06subject4 => 154,D06subject5 => 155,D07doctype => 156,D08 =>
157,D09 => 158,D10 => 159,D11 => 160,D12 => 161,D13 => 162,D14 =>
163,D15 => 164,D16 => 165,D17 => 166,D18 => 167,D19 => 168,D20 =>
169,D21 => 170,D22 => 171,D23 => 172,D23other => 173,D23otherdoctype
=> 174,D24agencies => 175,D24directclient => 176,D25 => 177,D26 =>
178,D27 => 179,D28 => 180,D29 => 181,D30 => 182,D31 => 183,D32 =>
184,D33 => 185,D34 => 186,D35 => 187,D36 => 188,comments => 189,name
=> 190,address => 191);

sub do_dir {
    my $return_string = "";
    my $dir = shift;
    opendir(D, $dir);
    my @f = readdir(D);
    closedir(D);
    foreach my $file (@f) {
        my $filename = $dir . '/' . $file;
        if ($file eq '.' || $file eq '..') {
        } elsif (-d $filename) {
            # depending on your needs you can do subdirs
        }
    }
}
```

```

        $return_string .= do_dir($filename);
    } else {
        # do something with $filename, like ...
        $return_string .= "$filename\n";
    }
}
return ($return_string);
}

sub format_file {
    my ($filename) = @_;

    my $file_handle;

    open ($file_handle, $filename) or die;

    my @contents = ();
    my $new_file;

    while (<$file_handle>) {
        $contents[scalar(@contents)] = $_;
    }

    for (my $count = 0; $count < scalar(@contents); $count++) {
        $contents[$count] =~ s/\n//g;
        if ($contents[$count] =~ /:/) {
            $new_file .= "\n$contents[$count]";
        } else {
            next if ($contents[$count] =~ /^s*$/);
            $new_file .= "|$contents[$count]";
        }
    }
    close $file_handle;
    open $file_handle, '>', $filename;
    print $file_handle "$new_file\n";
    close $file_handle;
}

sub do_eml_file {
    my ($filename) = @_;

    my $file_handle;

    open ($file_handle, $filename) or die;

    my $file_line;
    my ($key, $value);
    my @data_row;
    while (<$file_handle>) {
        $file_line = $_;
        if ( ($key, $value) = $file_line =~ /^([0-9A-Za-
z|]+):(.*?)$/ ) {
            print "Ignoring $key\n" and next if (not exists
($valid_keys{$key}));
            $value =~ s/[\s,]+/ /g;
            if ("name" ne $key) {
                $data_row[$valid_keys{$key}] = $value;
            } else {
                my ($name, $address) = $value =~
/^([^\|]+)\|(.*?)$/;
                if (defined ($name)) {
                    $data_row[$valid_keys{name}] = $name;

```



```

        $data_row[$valid_keys] = $address;
    } else {
        $data_row[$valid_keys{name}] = $value;
    }
}
}
}
print "\n";
close ($file_handle);

return \@data_row;
}

my $files = do_dir(".");

my $current_file_name;
my $result;
my $output = "id, ";

{
    my @array = ();

    foreach (sort keys %valid_keys) {
        $array[$valid_keys{$_}] = $_;
    }

    foreach (@array) {
        $output .= "$_, ";
    }
}

$output =~ s/,,$/\n/;

foreach $current_file_name (split "\n", $files) {
    next if ($current_file_name !~ /\.eml$/i);
    format_file($current_file_name);
    $result = do_eml_file ($current_file_name);

    $current_file_name =~ s/^\.\///;
    $current_file_name =~ s/\.eml$/;
    $output .= "$current_file_name, ";

    foreach (@$result) {
        $output .= $_ if (defined ($_));
        $output .= ",";
    }
    $output =~ s/,,$/\n/;
}

my $csv_file;

open ($csv_file, '>', "adopters.csv");
print $csv_file $output;
close $csv_file;

```

Perl script used for processing non-adopters' responses to the online questionnaire

```
#!/usr/bin/perl -w

use strict;

my %valid_keys = (
A01 => 0, A02 => 2, A03 => 3, A04 => 4, A05 => 5, A06 => 6, A07 => 7,
A08 => 8, A09 => 9, A10 => 10, A11 => 11, A12 => 12, A13 => 13, A14
=> 14, A15 => 15, A16 => 16, A17 => 17, A19 => 19, A20 => 20, A21 =>
21, A22 => 22, A23 => 23, A24 => 24, A25 => 25, A26 => 26, A27 => 27,
A28 => 28, A29 => 29, A30 => 30, A31 => 31, A33 => 33, A34 => 34,
A35 => 35, A36 => 36, A37 => 37, A38 => 38, A39 => 39, A40 => 40, A41
=> 41, A42 => 42, A43 => 43, A44 => 44, A45 => 45, A46 => 46, A47 =>
47, A48 => 48, A49 => 49, A50 => 50, A51 => 51, A51other => 52,
A52advantages => 53, A53disadvantages => 54, A54 => 55, A55 => 56,
A56 => 57, A57 => 58, A58 => 59, B01 => 60, B01TMSsystem => 61, B02 =>
62, B03 => 63, B04 => 64, B05 => 65, B06 => 66, B07 => 67, B08 => 68,
B09 => 69, B10 => 70, B11 => 71, B12 => 72, B13 => 73, B14 => 74, B15
=> 75, B16 => 76, B17 => 77, B18 => 78, B19 => 79, B20 => 80, B21 =>
81, B22 => 82, B23 => 83, B24 => 84, B25 => 85, B26 => 86, B27 => 87,
B28 => 88, B29 => 89, B30 => 90, B31 => 91, B32 => 92, B33 => 93, B34
=> 94, B35 => 95, B36 => 96, B37 => 97, B38 => 98, B39 => 99, B40 =>
100, B41 => 101, B42 => 102, B43 => 103, B44 => 104, B45 => 105, C01
=> 106, C02 => 107, C04 => 108, C05 => 109, C06 => 110, C07 => 111,
C08 => 112, C08b => 113, C09 => 114, C10 => 115, C11 => 116,
C11othername => 117, C12 => 118, C13 => 119, C14 => 120, C15 => 121,
C16 => 122, C17webcontent1 => 123, C17webcontent2 => 124,
C17webcreated1 => 125, C17webcreated2 => 126, C17webdesign1 => 127,
C17webdesign2 => 128, C17yearweb => 129, C18benefitsweb => 130,
C19problemsweb => 131, C20 => 132, C21 => 133, C21advantages => 134,
C22disadvantages => 135, C23mailinglists => 136, C24advantages =>
137, TBD => 138, # TBD and reduce all following by 1 C25disadvantages
=> 139, C03 => 140, D01langA => 141, D01langB => 142, D02langA =>
143, D02langB => 144, D03langA => 145, D03langB => 146, D04langA =>
147, D04langB => 148, D05langA => 149, D05langB => 150, D06subject1
=> 151, D06subject2 => 152, D06subject3 => 153, D06subject4 => 154,
D06subject5 => 155, D07doctype => 156, D08 => 157, D09 => 158, D10 =>
159, D11 => 160, D12 => 161, D13 => 162, D14 => 163, D15 => 164, D16
=> 165, D17 => 166, D18 => 167, D19 => 168, D20 => 169, D21 => 170,
D22 => 171, D23 => 172, D23other => 173, D23otherdoctype => 174,
D24agencies => 175, D24directclient => 176, D25 => 177, D26 => 178,
D27 => 179, D28 => 180, D29 => 181, D30 => 182, D31 => 183, D32 =>
184, D33 => 185, D34 => 186, D35 => 187, D36 => 188, comments => 189,
name => 190, address => 191 );

sub do_dir {
    my $return_string = "";
    my $dir = shift;
    opendir(D, $dir);
    my @f = readdir(D);
    closedir(D);
    foreach my $file (@f) {
        my $filename = $dir . '/' . $file;
    }
}
```



```

        if ($file eq '.' || $file eq '..') {
        } elsif (-d $filename) {
            # depending on your needs you can do subdirs
            $return_string .= do_dir($filename);
        } else {
            # do something with $filename, like ...
            $return_string .= "$filename\n";
        }
    }
    return ($return_string);
}

sub format_file {
    my ($filename) = @_;

    my $file_handle;

    open ($file_handle, $filename) or die;

    my @contents = ();
    my $new_file;

    while (<$file_handle>) {
        $contents[scalar(@contents)] = $_;
    }

    for (my $count = 0; $count < scalar(@contents); $count++) {
        $contents[$count] =~ s/\n//g;
        if ($contents[$count] =~ /:/) {
            $new_file .= "\n$contents[$count]";
        } else {
            next if ($contents[$count] =~ /^s*/);
            $new_file .= "|$contents[$count]";
        }
    }
    close $file_handle;
    open $file_handle, '>', $filename;
    print $file_handle "$new_file\n";
    close $file_handle;
}

sub do_eml_file {
    my ($filename) = @_;

    my $file_handle;

    open ($file_handle, $filename) or die;

    my $file_line;
    my ($key, $value);
    my @data_row;
    while (<$file_handle>) {
        $file_line = $_;
        if ( ($key, $value) = $file_line =~ /^([0-9A-Za-
z|]+):(.*)$/ ) {
            print "Ignoring $key\n" and next if (not exists
($valid_keys{$key}));
            $value =~ s/[s,]+//g;
            if ("name" ne $key) {
                $data_row[$valid_keys{$key}] = $value;
            } else {

```

```

my ($name, $address) = $value =~
/^(([^\|]+)\|(.*)$)/;
    if (defined ($name)) {
        $data_row[$valid_keys{name}] = $name;
        $data_row[$valid_keys{address}] =
$address;
    } else {
        $data_row[$valid_keys{name}] = $value;
    }
}
}
print "\n";
close ($file_handle);

return \@data_row;
}

my $files = do_dir(".");

my $current_file_name;
my $result;
my $output = "id, ";

{
    my @array = ();

    foreach (sort keys %valid_keys) {
        $array[$valid_keys{$_}] = $_;
    }

    foreach (@array) {
        $output .= "$_, ";
    }
}

$output =~ s/,,$/\n/;

foreach $current_file_name (split "\n", $files) {
    next if ($current_file_name !~ /\.eml$/i);
    format_file($current_file_name);
    $result = do_eml_file ($current_file_name);

    $current_file_name =~ s/^\.\.\/;
    $current_file_name =~ s/\.eml$/;
    $output .= "$current_file_name, ";

    foreach (@$result) {
        $output .= $_ if (defined ($_));
        $output .= ",";
    }
    $output =~ s/,,$/\n/;
}

my $csv_file;

open ($csv_file, '>', "nonadopters.csv");
print $csv_file $output;
close $csv_file;

```


Appendix G: Predictor-outcome matrices of CAT tool adoption

Predictor-outcome matrices of CAT tool adoption

Table E.1 Predictor-outcome matrix of relevance of “Relative Advantages” (READ) for CAT tool adoption

READ	CASE ID	COMP	EASU	VOLU	IMAG	VISI	TRIA	REDE
5.0	ad01	5.0	4.3	4.5	3.0	3.0	2.0	4.3
5.0	ad11	5.0	3.8	1.5	2.8	4.0	4.0	4.0
5.0	ad15	5.0	5.0	4.0	2.5	4.0	5.0	5.0
5.0	ad17	4.0	3.8	1.5	3.0	3.0	1.0	3.7
5.0	ad18	4.5	3.5	4.5	2.0	4.5	4.3	5.0
5.0	ad19	4.5	3.0	3.0	3.8	2.5	1.0	4.0
4.5	ad07	3.0	3.5	5.0	2.8	3.5	5.0	4.0
4.3	ad03	3.0	2.5	2.0	4.0	3.5	1.3	4.0
4.3	ad14	4.0	4.0	3.5	3.3	4.0	4.0	4.3
4.3	na02	3.5	4.3	5.0	3.5	3.5	3.3	4.3
4.0	ad02	4.0	3.5	4.0	3.0	2.5	1.7	4.0
4.0	ad10	4.0	3.2	3.0	4.0	4.0	3.3	4.0
4.0	ad16	4.0	4.0	2.5	3.8	3.5	2.0	4.0
4.0	na05	4.0	4.5	5.0	1.0	2.0	3.0	4.0
4.0	na21	4.5	2.7	4.0	2.0	1.5	3.8	3.0
4.0	na24	3.0	2.5	4.0	4.0	4.0	1.8	3.0
4.0	na26	3.0	3.0	2.0	4.5	3.0	3.3	3.7
4.0	na30	4.0	3.7	2.0	4.5	4.0	2.0	3.3
4.0	na33	4.0	2.3	4.0	1.5	2.5	1.0	3.7
3.9	ad04	4.5	4.2	2.5	3.3	3.0	1.3	2.7
3.9	ad05	4.0	3.7	3.0	4.0	1.5	1.0	4.0
3.9	ad06	4.0	2.5	3.5	3.8	2.5	1.0	3.7
3.9	na11	2.5	3.0	2.0	2.0	4.0	4.0	3.3
3.9	na15	3.0	2.3	3.0	3.8	3.5	2.5	2.3
3.9	na18	3.0	2.2	3.0	3.8	2.5	3.8	2.3
3.8	ad12	4.0	3.0	2.5	3.0	3.0	2.0	4.0
3.8	ad13	4.0	3.8	4.0	2.3	3.0	4.0	4.0
3.6	na16	3.0	2.0	3.0	4.0	2.5	2.5	3.7
3.6	na20	3.5	2.8	4.0	3.0	1.5	2.3	3.7
3.5	na14	3.5	3.0	4.0	3.8	2.0	3.3	3.0
3.5	na19	2.5	1.2	5.0	2.0	2.5	3.0	3.0
3.4	ad09	3.5	3.8	3.0	4.8	3.0	2.7	4.0
3.4	na03	2.0	2.2	2.0	3.0	3.0	3.5	2.3
3.4	na13	2.5	3.3	4.0	2.8	3.5	2.0	2.7
3.4	na32	3.0	3.3	5.0	3.3	3.5	3.0	3.3
3.3	ad08	3.5	3.8	4.5	3.8	3.0	4.0	4.0
3.3	na10	3.0	4.0	3.0	2.3	4.0	3.0	4.0
3.3	na29	2.0	2.0	3.0	3.8	3.5	4.0	3.7
3.1	na01	2.0	3.0	5.0	3.0	2.0	3.0	3.0
3.0	na04	1.0	1.8	4.0	3.3	3.5	3.5	3.7
3.0	na12	2.5	3.2	3.0	3.3	3.5	2.8	5.0
3.0	na17	1.5	2.8	3.0	3.0	3.5	3.3	4.3
3.0	na25	4.0	2.2	4.0	3.8	2.5	3.0	3.3
3.0	na31	3.5	3.5	4.0	3.5	2.0	2.8	3.3
2.6	na07	2.5	2.3	3.0	3.0	2.0	2.5	1.7
2.5	na06	2.0	2.7	5.0	2.5	3.5	4.0	2.7
2.5	na23	2.0	1.7	1.0	4.0	2.0	2.0	1.7
2.3	na34	2.0	2.3	4.0	2.8	5.0	4.5	4.5
2.0	na22	1.5	3.3	3.0	3.0	3.5	3.5	4.0
1.9	na27	1.0	1.8	5.0	1.8	4.0	2.3	2.7
1.1	na08	2.5	2.8	1.0	5.0	5.0	3.3	2.3
1.0	na09	1.0	2.3	1.0	4.0	4.0	3.0	3.7

Table E.2 Predictor-outcome matrix of relevance of “Compatibility” (COMP) for
CAT tool adoption

COMP	CASE ID	READ	EASU	VOLU	IMAG	VISI	TRIA	REDE
5.0	ad01	5.0	4.3	4.5	3.0	3.0	2.0	4.3
5.0	ad11	5.0	3.8	1.5	2.8	4.0	4.0	4.0
5.0	ad15	5.0	5.0	4.0	2.5	4.0	5.0	5.0
4.5	ad18	5.0	3.5	4.5	2.0	4.5	4.3	5.0
4.5	ad19	5.0	3.0	3.0	3.8	2.5	1.0	4.0
4.5	na21	4.0	2.7	4.0	2.0	1.5	3.8	3.0
4.5	ad04	3.9	4.2	2.5	3.3	3.0	1.3	2.7
4.0	ad17	5.0	3.8	1.5	3.0	3.0	1.0	3.7
4.0	ad14	4.3	4.0	3.5	3.3	4.0	4.0	4.3
4.0	ad02	4.0	3.5	4.0	3.0	2.5	1.7	4.0
4.0	ad10	4.0	3.2	3.0	4.0	4.0	3.3	4.0
4.0	ad16	4.0	4.0	2.5	3.8	3.5	2.0	4.0
4.0	na05	4.0	4.5	5.0	1.0	2.0	3.0	4.0
4.0	na30	4.0	3.7	2.0	4.5	4.0	2.0	3.3
4.0	na33	4.0	2.3	4.0	1.5	2.5	1.0	3.7
4.0	ad05	3.9	3.7	3.0	4.0	1.5	1.0	4.0
4.0	ad06	3.9	2.5	3.5	3.8	2.5	1.0	3.7
4.0	ad12	3.8	3.0	2.5	3.0	3.0	2.0	4.0
4.0	ad13	3.8	3.8	4.0	2.3	3.0	4.0	4.0
4.0	na25	3.0	2.2	4.0	3.8	2.5	3.0	3.3
3.5	na02	4.3	4.3	5.0	3.5	3.5	3.3	4.3
3.5	na20	3.6	2.8	4.0	3.0	1.5	2.3	3.7
3.5	na14	3.5	3.0	4.0	3.8	2.0	3.3	3.0
3.5	ad09	3.4	3.8	3.0	4.8	3.0	2.7	4.0
3.5	ad08	3.3	3.8	4.5	3.8	3.0	4.0	4.0
3.5	na31	3.0	3.5	4.0	3.5	2.0	2.8	3.3
3.0	ad07	4.5	3.5	5.0	2.8	3.5	5.0	4.0
3.0	ad03	4.3	2.5	2.0	4.0	3.5	1.3	4.0
3.0	na24	4.0	2.5	4.0	4.0	4.0	1.8	3.0
3.0	na26	4.0	3.0	2.0	4.5	3.0	3.3	3.7
3.0	na15	3.9	2.3	3.0	3.8	3.5	2.5	2.3
3.0	na18	3.9	2.2	3.0	3.8	2.5	3.8	2.3
3.0	na16	3.6	2.0	3.0	4.0	2.5	2.5	3.7
3.0	na32	3.4	3.3	5.0	3.3	3.5	3.0	3.3
3.0	na10	3.3	4.0	3.0	2.3	4.0	3.0	4.0
2.5	na11	3.9	3.0	2.0	2.0	4.0	4.0	3.3
2.5	na19	3.5	1.2	5.0	2.0	2.5	3.0	3.0
2.5	na13	3.4	3.3	4.0	2.8	3.5	2.0	2.7
2.5	na12	3.0	3.2	3.0	3.3	3.5	2.8	5.0
2.5	na07	2.6	2.3	3.0	3.0	2.0	2.5	1.7
2.5	na08	1.1	2.8	1.0	5.0	5.0	3.3	2.3
2.0	na03	3.4	2.2	2.0	3.0	3.0	3.5	2.3
2.0	na29	3.3	2.0	3.0	3.8	3.5	4.0	3.7
2.0	na01	3.1	3.0	5.0	3.0	2.0	3.0	3.0
2.0	na06	2.5	2.7	5.0	2.5	3.5	4.0	2.7
2.0	na23	2.5	1.7	1.0	4.0	2.0	2.0	1.7
2.0	na34	2.3	2.3	4.0	2.8	5.0	4.5	4.5
1.5	na17	3.0	2.8	3.0	3.0	3.5	3.3	4.3
1.5	na22	2.0	3.3	3.0	3.0	3.5	3.5	4.0
1.0	na04	3.0	1.8	4.0	3.3	3.5	3.5	3.7
1.0	na27	1.9	1.8	5.0	1.8	4.0	2.3	2.7
1.0	na09	1.0	2.3	1.0	4.0	4.0	3.0	3.7

Table E.3 Predictor-outcome matrix of relevance of “Ease of Use” (EASU) for CAT tool adoption

EASU	CASE ID	TRIA	REDE	READ	COMP	VOLU	IMAG	VISI
5.0	ad15	5.0	5.0	5.0	5.0	4.0	2.5	4.0
4.5	na05	3.0	4.0	4.0	4.0	5.0	1.0	2.0
4.3	ad01	2.0	4.3	5.0	5.0	4.5	3.0	3.0
4.3	na02	3.3	4.3	4.3	3.5	5.0	3.5	3.5
4.2	ad04	1.3	2.7	3.9	4.5	2.5	3.3	3.0
4.0	ad14	4.0	4.3	4.3	4.0	3.5	3.3	4.0
4.0	ad16	2.0	4.0	4.0	4.0	2.5	3.8	3.5
4.0	na10	3.0	4.0	3.3	3.0	3.0	2.3	4.0
3.8	ad11	4.0	4.0	5.0	5.0	1.5	2.8	4.0
3.8	ad17	1.0	3.7	5.0	4.0	1.5	3.0	3.0
3.8	ad13	4.0	4.0	3.8	4.0	4.0	2.3	3.0
3.8	ad09	2.7	4.0	3.4	3.5	3.0	4.8	3.0
3.8	ad08	4.0	4.0	3.3	3.5	4.5	3.8	3.0
3.7	na30	2.0	3.3	4.0	4.0	2.0	4.5	4.0
3.7	ad05	1.0	4.0	3.9	4.0	3.0	4.0	1.5
3.5	ad18	4.3	5.0	5.0	4.5	4.5	2.0	4.5
3.5	ad02	1.7	4.0	4.0	4.0	4.0	3.0	2.5
3.5	na31	2.8	3.3	3.0	3.5	4.0	3.5	2.0
3.5	ad07	5.0	4.0	4.5	3.0	5.0	2.8	3.5
3.3	na32	3.0	3.3	3.4	3.0	5.0	3.3	3.5
3.3	na13	2.0	2.7	3.4	2.5	4.0	2.8	3.5
3.3	na22	3.5	4.0	2.0	1.5	3.0	3.0	3.5
3.2	ad10	3.3	4.0	4.0	4.0	3.0	4.0	4.0
3.2	na12	2.8	5.0	3.0	2.5	3.0	3.3	3.5
3.0	ad19	1.0	4.0	5.0	4.5	3.0	3.8	2.5
3.0	ad12	2.0	4.0	3.8	4.0	2.5	3.0	3.0
3.0	na14	3.3	3.0	3.5	3.5	4.0	3.8	2.0
3.0	na26	3.3	3.7	4.0	3.0	2.0	4.5	3.0
3.0	na11	4.0	3.3	3.9	2.5	2.0	2.0	4.0
3.0	na01	3.0	3.0	3.1	2.0	5.0	3.0	2.0
2.8	na20	2.3	3.7	3.6	3.5	4.0	3.0	1.5
2.8	na08	3.3	2.3	1.1	2.5	1.0	5.0	5.0
2.8	na17	3.3	4.3	3.0	1.5	3.0	3.0	3.5
2.7	na21	3.8	3.0	4.0	4.5	4.0	2.0	1.5
2.7	na06	4.0	2.7	2.5	2.0	5.0	2.5	3.5
2.5	ad06	1.0	3.7	3.9	4.0	3.5	3.8	2.5
2.5	ad03	1.3	4.0	4.3	3.0	2.0	4.0	3.5
2.5	na24	1.8	3.0	4.0	3.0	4.0	4.0	4.0
2.3	na33	1.0	3.7	4.0	4.0	4.0	1.5	2.5
2.3	na15	2.5	2.3	3.9	3.0	3.0	3.8	3.5
2.3	na07	2.5	1.7	2.6	2.5	3.0	3.0	2.0
2.3	na34	4.5	4.5	2.3	2.0	4.0	2.8	5.0
2.3	na09	3.0	3.7	1.0	1.0	1.0	4.0	4.0
2.2	na25	3.0	3.3	3.0	4.0	4.0	3.8	2.5
2.2	na18	3.8	2.3	3.9	3.0	3.0	3.8	2.5
2.2	na03	3.5	2.3	3.4	2.0	2.0	3.0	3.0
2.0	na16	2.5	3.7	3.6	3.0	3.0	4.0	2.5
2.0	na29	4.0	3.7	3.3	2.0	3.0	3.8	3.5
1.8	na04	3.5	3.7	3.0	1.0	4.0	3.3	3.5
1.8	na27	2.3	2.7	1.9	1.0	5.0	1.8	4.0
1.7	na23	2.0	1.7	2.5	2.0	1.0	4.0	2.0
1.2	na19	3.0	3.0	3.5	2.5	5.0	2.0	2.5

Table E.4 Predictor-outcome matrix of relevance of “Trialability” (TRIA) for CAT tool adoption

TRIA	CASE ID	EASU	REDE	READ	COMP	VOLU	IMAG	VISI
5.0	ad15	5.0	5.0	5.0	5.0	4.0	2.5	4.0
5.0	ad07	3.5	4.0	4.5	3.0	5.0	2.8	3.5
4.5	na34	2.3	4.5	2.3	2.0	4.0	2.8	5.0
4.3	ad18	3.5	5.0	5.0	4.5	4.5	2.0	4.5
4.0	ad14	4.0	4.3	4.3	4.0	3.5	3.3	4.0
4.0	ad11	3.8	4.0	5.0	5.0	1.5	2.8	4.0
4.0	ad13	3.8	4.0	3.8	4.0	4.0	2.3	3.0
4.0	ad08	3.8	4.0	3.3	3.5	4.5	3.8	3.0
4.0	na11	3.0	3.3	3.9	2.5	2.0	2.0	4.0
4.0	na06	2.7	2.7	2.5	2.0	5.0	2.5	3.5
4.0	na29	2.0	3.7	3.3	2.0	3.0	3.8	3.5
3.8	na21	2.7	3.0	4.0	4.5	4.0	2.0	1.5
3.8	na18	2.2	2.3	3.9	3.0	3.0	3.8	2.5
3.5	na22	3.3	4.0	2.0	1.5	3.0	3.0	3.5
3.5	na03	2.2	2.3	3.4	2.0	2.0	3.0	3.0
3.5	na04	1.8	3.7	3.0	1.0	4.0	3.3	3.5
3.3	ad10	3.2	4.0	4.0	4.0	3.0	4.0	4.0
3.3	na02	4.3	4.3	4.3	3.5	5.0	3.5	3.5
3.3	na14	3.0	3.0	3.5	3.5	4.0	3.8	2.0
3.3	na26	3.0	3.7	4.0	3.0	2.0	4.5	3.0
3.3	na08	2.8	2.3	1.1	2.5	1.0	5.0	5.0
3.3	na17	2.8	4.3	3.0	1.5	3.0	3.0	3.5
3.0	na05	4.5	4.0	4.0	4.0	5.0	1.0	2.0
3.0	na10	4.0	4.0	3.3	3.0	3.0	2.3	4.0
3.0	na32	3.3	3.3	3.4	3.0	5.0	3.3	3.5
3.0	na01	3.0	3.0	3.1	2.0	5.0	3.0	2.0
3.0	na09	2.3	3.7	1.0	1.0	1.0	4.0	4.0
3.0	na25	2.2	3.3	3.0	4.0	4.0	3.8	2.5
3.0	na19	1.2	3.0	3.5	2.5	5.0	2.0	2.5
2.8	na31	3.5	3.3	3.0	3.5	4.0	3.5	2.0
2.8	na12	3.2	5.0	3.0	2.5	3.0	3.3	3.5
2.7	ad09	3.8	4.0	3.4	3.5	3.0	4.8	3.0
2.5	na15	2.3	2.3	3.9	3.0	3.0	3.8	3.5
2.5	na07	2.3	1.7	2.6	2.5	3.0	3.0	2.0
2.5	na16	2.0	3.7	3.6	3.0	3.0	4.0	2.5
2.3	na27	1.8	2.7	1.9	1.0	5.0	1.8	4.0
2.3	na20	2.8	3.7	3.6	3.5	4.0	3.0	1.5
2.0	ad01	4.3	4.3	5.0	5.0	4.5	3.0	3.0
2.0	ad16	4.0	4.0	4.0	4.0	2.5	3.8	3.5
2.0	na30	3.7	3.3	4.0	4.0	2.0	4.5	4.0
2.0	na13	3.3	2.7	3.4	2.5	4.0	2.8	3.5
2.0	ad12	3.0	4.0	3.8	4.0	2.5	3.0	3.0
2.0	na23	1.7	1.7	2.5	2.0	1.0	4.0	2.0
1.8	na24	2.5	3.0	4.0	3.0	4.0	4.0	4.0
1.7	ad02	3.5	4.0	4.0	4.0	4.0	3.0	2.5
1.3	ad04	4.2	2.7	3.9	4.5	2.5	3.3	3.0
1.3	ad03	2.5	4.0	4.3	3.0	2.0	4.0	3.5
1.0	ad17	3.8	3.7	5.0	4.0	1.5	3.0	3.0
1.0	ad05	3.7	4.0	3.9	4.0	3.0	4.0	1.5
1.0	ad19	3.0	4.0	5.0	4.5	3.0	3.8	2.5
1.0	ad06	2.5	3.7	3.9	4.0	3.5	3.8	2.5
1.0	na33	2.3	3.7	4.0	4.0	4.0	1.5	2.5

Table E.5 Predictor-outcome matrix of relevance of “Result Demonstrability” (REDE) for CAT tool adoption

REDE	CASE ID	TRIA	EASU	READ	COMP	VOLU	IMAG	VISI
5.0	ad15	5.0	5.0	5.0	5.0	4.0	2.5	4.0
5.0	ad18	4.3	3.5	5.0	4.5	4.5	2.0	4.5
5.0	na12	2.8	3.2	3.0	2.5	3.0	3.3	3.5
4.5	na34	4.5	2.3	2.3	2.0	4.0	2.8	5.0
4.3	ad14	4.0	4.0	4.3	4.0	3.5	3.3	4.0
4.3	na02	3.3	4.3	4.3	3.5	5.0	3.5	3.5
4.3	na17	3.3	2.8	3.0	1.5	3.0	3.0	3.5
4.3	ad01	2.0	4.3	5.0	5.0	4.5	3.0	3.0
4.0	ad07	5.0	3.5	4.5	3.0	5.0	2.8	3.5
4.0	ad11	4.0	3.8	5.0	5.0	1.5	2.8	4.0
4.0	ad13	4.0	3.8	3.8	4.0	4.0	2.3	3.0
4.0	ad08	4.0	3.8	3.3	3.5	4.5	3.8	3.0
4.0	na22	3.5	3.3	2.0	1.5	3.0	3.0	3.5
4.0	ad10	3.3	3.2	4.0	4.0	3.0	4.0	4.0
4.0	na05	3.0	4.5	4.0	4.0	5.0	1.0	2.0
4.0	na10	3.0	4.0	3.3	3.0	3.0	2.3	4.0
4.0	ad09	2.7	3.8	3.4	3.5	3.0	4.8	3.0
4.0	ad16	2.0	4.0	4.0	4.0	2.5	3.8	3.5
4.0	ad12	2.0	3.0	3.8	4.0	2.5	3.0	3.0
4.0	ad02	1.7	3.5	4.0	4.0	4.0	3.0	2.5
4.0	ad03	1.3	2.5	4.3	3.0	2.0	4.0	3.5
4.0	ad05	1.0	3.7	3.9	4.0	3.0	4.0	1.5
4.0	ad19	1.0	3.0	5.0	4.5	3.0	3.8	2.5
3.7	na29	4.0	2.0	3.3	2.0	3.0	3.8	3.5
3.7	na04	3.5	1.8	3.0	1.0	4.0	3.3	3.5
3.7	na26	3.3	3.0	4.0	3.0	2.0	4.5	3.0
3.7	na09	3.0	2.3	1.0	1.0	1.0	4.0	4.0
3.7	na16	2.5	2.0	3.6	3.0	3.0	4.0	2.5
3.7	na20	2.3	2.8	3.6	3.5	4.0	3.0	1.5
3.7	ad17	1.0	3.8	5.0	4.0	1.5	3.0	3.0
3.7	ad06	1.0	2.5	3.9	4.0	3.5	3.8	2.5
3.7	na33	1.0	2.3	4.0	4.0	4.0	1.5	2.5
3.3	na11	4.0	3.0	3.9	2.5	2.0	2.0	4.0
3.3	na32	3.0	3.3	3.4	3.0	5.0	3.3	3.5
3.3	na25	3.0	2.2	3.0	4.0	4.0	3.8	2.5
3.3	na31	2.8	3.5	3.0	3.5	4.0	3.5	2.0
3.3	na30	2.0	3.7	4.0	4.0	2.0	4.5	4.0
3.0	na21	3.8	2.7	4.0	4.5	4.0	2.0	1.5
3.0	na14	3.3	3.0	3.5	3.5	4.0	3.8	2.0
3.0	na01	3.0	3.0	3.1	2.0	5.0	3.0	2.0
3.0	na19	3.0	1.2	3.5	2.5	5.0	2.0	2.5
3.0	na24	1.8	2.5	4.0	3.0	4.0	4.0	4.0
2.7	na06	4.0	2.7	2.5	2.0	5.0	2.5	3.5
2.7	na27	2.3	1.8	1.9	1.0	5.0	1.8	4.0
2.7	na13	2.0	3.3	3.4	2.5	4.0	2.8	3.5
2.7	ad04	1.3	4.2	3.9	4.5	2.5	3.3	3.0
2.3	na18	3.8	2.2	3.9	3.0	3.0	3.8	2.5
2.3	na03	3.5	2.2	3.4	2.0	2.0	3.0	3.0
2.3	na08	3.3	2.8	1.1	2.5	1.0	5.0	5.0
2.3	na15	2.5	2.3	3.9	3.0	3.0	3.8	3.5
1.7	na07	2.5	2.3	2.6	2.5	3.0	3.0	2.0
1.7	na23	2.0	1.7	2.5	2.0	1.0	4.0	2.0