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**AN ASSESSMENT OF ACCEPTABILITY AND USE OF COMPUTER  
AIDED TRANSLATION SYSTEMS: A CASE OF MACAO  
GOVERNMENT**

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**ABSTRACT**

The factors that may lead to Macao Government translators' acceptance of Computer Aided Translation (CAT) systems is studied in this research. Macao, known as the Eastern Las Vegas, has become a special executive region after returning to China from Portugal in 1999. Since then, translation has been implicit to the administrative procedures of the Macao Government due to the two-formal-languages (Chinese and Portuguese) policy. Based on the successes of technological translation solutions utilized by other multilingual regions (EU and HK), CAT systems should be introduced in the Governance of Macao to guarantee the effectiveness of translation. By analyzing the Macao Government translators' acceptance and perception of CAT systems, Macao Government translators' efficiency and quality can be improved. As a result, the laws and the related documents could be translated into more precise and unambiguous documents, contributing to the stability of the local laws, saving administrative costs for the whole society and promoting the development of the local economy.

**Keywords:** Translation Memory, Macao Government Translators, Repetition Rate, Efficiency Requirements, Terminology Database

**INTRODUCTION**

As an important bridge for cross-cultural activities, translation is responsible for the dialogues,

exchanges, and mutual understanding between the peoples of the world [61]. For a region that has two formal languages such as the Macao Special Administrative Region (Chinese and Portuguese), translation is very important in maintaining the stability of

the laws and reducing the administrative costs of the whole society. However, due to translation's inherent problems such as: the quality-speed conflict, difficulties with the consistency of terms and cooperation between translators, etc., the traditional translators cannot easily cope with the specified requirements that are necessary for the development of society and the economy.

Similar issues were already realized by experts in other bilingual (multilingual) regions, such as the European Union (EU), the translation problems caused by so many official languages are very prominent [45]. In the previous twenty to thirty years, the EU invested about 60 million Euros in developing their translation tools. In Hong Kong, a bilingual Special Administrative Region like Macao, experts realized the importance of translation tools 30 years ago and started to study machine translation in the 1970s, they established the first Computer Aided Translation (CAT) Master's courses in the world in 2002 [45]. According to Bowker [6], CAT is the process adopted by human translators utilizing computerized tools to finish translation-related tasks.

### **Historical Translation Issues in Macao**

As one of the first Western settlements in the East, Macao made significant contributions in translation in its early days: the first Chinese English dictionary [65], the first Portuguese Chinese Dictionary [62], and the first Chinese Bible [65] were all created in Macao. However, the Portuguese Colonial Government in Macao overlooked the importance of translation and did not cultivate the bi-lingualist activities. The majority of Macao citizens do not know the Portuguese language; mainly because Portuguese is not a compulsory course in the primary and secondary schools [24].

### **New Translation Demand in Macao Government**

The contracts of the translation teams in the Macao Government were extended at the end of the 1980s in order to address the issues emanating from the Handover of Macao to China in 1999. After the due to the language policy of Macao SAR (two formal languages: Chinese and Portuguese), the increase of the manpower could never meet the increasing demand of the translation workload for the Macao Government. Although the hastily-organized translation teams managed to convert most Portuguese laws into Chinese, the Portuguese-style Chinese is still common in the legal system and the public administrative documents and the society is still plagued by the problems caused by the ambiguity and resulting confusion in the translated laws and public administrative documents [8]. Since the

Handover, there are 26 Portuguese versions of the term "Macao people governing Macao" that have appeared in the Macao Government Press.

In addition, due to the liberalization of the gaming industry in 2002, a number of worldwide hospitality corporations have successfully extended their businesses into Macao. Therefore, many English documents have required translation for the Macao Government. Currently, the Macao Government is in need of efficient translations between Chinese (both Traditional and Simplified), English and Portuguese to meet the demands of the worldwide hospitality corporations in the gaming industry, as well as the Macao citizens because precise and unambiguous translations will enable people to communicate well and avoid misunderstandings.

### **A Translation Solution for Macao Government**

In Macao, the Government departments have employed a great deal of translators to deal with the huge translation demands, such as the legal translation, administrative translation and daily translation/interpreting work. Legal translation is different from literary translation [42]. Legal translators do not have much freedom or creativity in choosing terms, styles or syntactic structures to achieve an aesthetic effect in translation. The rule of law requires rigorous and grammatically correct translations which are in full compliance with the original language to maintain the stability of the law. Since CAT tools can help human translators memorize repeated segments and present them when similar or the same segments appear again, they are very suitable for the legal translation on these kinds of repetitive, inflexible, and direct translation work.

This research is mainly focused on the Macao Government translators' adoption of Computer Aided Translation (CAT) systems. It aims to i) identify their perceptions and practices on CAT systems, ii) identify the relationship between perceived efficiency requirements and perceived usefulness of adopting CAT systems, iii) identify the relationship between perceived repetition rate and perceived usefulness of adopting CAT systems, iv) identify the impact of perceived usefulness and perceived ease of use on the behavioral intention of adopting CAT systems.

## **LITERATURE REVIEW**

Long before personal computers were applied in the translation work, the human translators made use of pen and paper to do translation; this is regarded as Traditional Translation.

Before we stepped into the Information Technology Era, traditional translators could still manage to meet the requirements of the translation tasks presented to them. However, the emergence of the Internet has resulted in an endless volume of communication between people from different language groups, which requires translation to be fast, cheap and accurate. However, when instant translations are needed, human translators cannot finish their tasks as required [7]. As a result, translation quality is usually inversely proportional to translation speed. In addition to the quality-speed contradiction, there are several limitations of traditional translation: i) translation consistency is usually inversely proportional to translation quantity and ii) translation unity is usually inversely proportional to the number of translators. These limitations result from the characteristics of natural language, such as: ambiguity, polysemy and multi-meaning [64], which form the decisive factors that traditional translation can hardly resolve. The following problems need to be resolved:

**Repetition:** According to Zhang et al. [66], the averaged repetition rate of translation in different industries and sectors could reach 20% -70%. However, it is difficult for the traditional translator to make use of the repeated terms and sentences, because traditional translators usually do not keep archives of previous translations [6].

**Consistency:** Due to the multi-meaning characteristics of natural language, it is very difficult for a traditional translator to keep the consistency of his/her terms and translation styles. When there is staff turnover, the commonly used terms can hardly be passed to the new translators, and the new translators will seldom follow the previous translation styles or maintain the consistency of the translation.

**Cooperation:** In the Macao Government, the translators are usually involved in large team projects. Since every translator has his/her own translation style and frequently used terms, they can hardly adopt a unified translation style in projects.

**File Management:** The traditional translators often keep hard copies of translated documents in a form that cannot be searched easily [6].

In order to solve the problems, researchers and engineers firstly tried the solution of "Automatic Translation" (Also called "Machine Translation"). Soon after the first computer appeared in 1946, the idea of using computers in automatic translation was proposed. Machine translation is a process that involves a computer as the primary component for the text translation [6]. Unlike humans, computers produce an actual draft of the translation. Currently, machine translation tools are mainly Statistics-based, Rule-based and Example-based -

all of which can convert from the source language to the target language [64].

According to a report released by the Automatic Language Processing Advisory Committee [1], machine translation (MT) was not successful at all. One of the most important reasons why MT was not successful is the nature of MT. Machine Translation (MT) is a sub-field of Natural Language Processing (NLP) that is very closely related to Computational Linguistics and Natural Language Understanding (NLU), which is a branch of Artificial Intelligence (AI). Hence, MT can be thought of as an application of AI [37]. As a result, machine translation can hardly make dramatic progress before AI makes some breakthroughs.

### **Computer-Aided Translation (CAT)**

After the ALPAC report broke the dream of Automatic Translation, researchers turned to study the feasibility of Computer Aided Translation (CAT). In the 1970s, the concept of Translation Memory (TM) was proposed to enable translators to reuse the previously translated results efficiently. Melby [41] proposed the idea of designing a multi-level Computer Aided Translation (CAT) system as follows:

The first level is the basic word processing and terminology management, which can manage the commonly used terms in the terminology database during translation;

The second level is the term retrieval and offering reference translations;

The third level is a more sophisticated translation system, including automatic machine translation and an interactive computer-assisted translation mode, with human translators giving feedback to the system.

Based on the above concepts, in the early 1990s, the first commercial CAT platforms were developed. After 20 years of development, CAT tools are now more mature and diversified. At present, three kinds of CAT tools have been commercialized [14]:

**Inserted CAT tools:** Visual Basic Macro programs, which are inserted into Microsoft Word, allowing the translators to work in the Microsoft Word environment;

**Independent CAT tools:** tailor-made tools that allow translators to work with independent text editors, with sophisticated functions of terminology management, alignment and project management;

**Online CAT tools:** online systems that allow translators to work by opening browsers.

Based on the successful commercialization of CAT tools, the quality of translation is also relied upon as an effective control of the translation process in addition

to the professional level of the translators and reviewers [63]. More importantly, CAT systems are external tools to assist human translators to effectively control the translation process. Although there are varieties of CAT tools in the market, they share the common concept of reusing the previously translated or prepared translation resources and have similar core functions: Translation Memory function and Terminology Management function to solve the problems of traditional translation. By recycling/reusing the repetitive translated segments, including the Translation Memory and terminology database, the CAT system can save the translators' time. As a result, the human translator can focus on the creative translation work, which can improve the quality of the translation.

The fast development of CAT systems has attracted the attention of some researchers and organizations internationally, thus several publicly-known formal CAT surveys have been conducted: Ecolore Translation Memory Survey [25]; LISA Translation Memory Survey [39], Translation Memories Survey [54]; Taiwan-Based Translators Survey [52]; China's Translation Industry CAT survey [45]. The surveys have several limitations summarized as follows:

Some surveys covered wider and more varied sample units, yet almost all of them were conducted online and only focused on the respondents who are internet users, this may cause a biased selection of samples.

Basically, all surveys have investigated similar important issues related to CAT systems, such as translation volume, TM system adoption, Period of usage, and Reasons for the usage etc. but none of them have adopted any conceptual model or developed any hypothesis in conducting the survey.

All survey results showed simple statistical information in tables or figures. Although some of them stated that CAT usage might be related to its usefulness, none of them proved the reasons behind the adoption of CAT systems in a methodical statistical manner.

## **TAM Theory**

The Technology Acceptance Model (TAM) is an information system theory developed by Fred Davis and Richard Bagozzi [4, 11] who explained and predicted people's acceptance and usage of the new technology. It was then expanded to several new versions: TAM 2 [57, 58], the Unified Theory of Acceptance and Use of Technology [59], and TAM 3 [60]. The UTAUT model was criticized for involving a variety of disparate items at the study of technology adoption to form a single psychometric construct, leading to a stage of chaos [5,

The TAM 3 model is mainly used in the adoption of Internet information technologies. The TAM model was designed to predict information technology acceptance and use on the job, in which perceived usefulness and perceived ease of use are the main determinants of users' attitudes [11].

Based on the nature of our study and the limitations of the UTAUT model, the TAM model is used in this research to analyze the Macao Government translators' adoption of CAT systems. TAM indicates that two factors may influence people's decision about using a new technology: Perceived Usefulness (PU) and Perceived Ease-of-use (PEOU). If users don't perceive a new technology as useful, they're unlikely to use it [11]. In the translation context, PU and PEOU of the TAM Model may be some of the factors to be used in CAT studies, and the users' subjective perceptions of the usefulness and the ease-of-use on CAT systems would decide whether they will adopt the CAT systems [2, 28].

## **RESEARCH MODEL**

### **Perceived Competitive Advantage**

Translators are becoming more and more dependent on information technology and, if translators cannot adapt to changes in technology, they may be uncompetitive [49]. Therefore, the Perceived Competitive Advantage (PCA) might be one factor that crystalizes translators' PU of CAT systems. However, this research is only focused on those Macao government translators, who are not in the competitive market and do not have competition in securing the translation jobs. Then PCA might not be a suitable factor for this research due to the special characteristics of the samples.

### **Perceived Efficiency Requirements**

Perceived Efficiency Requirement (PER) is defined as the degree to which a person believes that translation efficiency is required by their manager, including terminology consistency, linguistic quality, turn-around times, and time-to-delivery. The increase in translation volume enforced by the manager has been accompanied by an increase of pressure on translators to work quickly, while maintaining high-quality output [6]. Samuelsson-Brown [49] also believes that translators who can work quickly while delivering high-quality work are in high demand. With the help of terminology tools, translators can ensure higher consistency in the use of terminology, while saving time on searching specific terms needed to complete translation tasks [22]. Government translators can make use of the terminology

functions to regulate the multi-lingual terms, such as the names of streets, places, organizations, events and activities. Furthermore, the multi-lingual terms in the contracts could also be improved. Thus, the terminology management function of CAT tools can enhance translation efficiency of Macao Government translators, who may perceive CAT tools as useful. Hence, the hypothesis can be stated as follows:

H1: Perceived efficiency requirements has a significant positive impact on Macao Government translators' Perceived Usefulness of CAT systems.

### Perceived Repetition Rate

Perceived repetition rate is defined as the degree to which a translator believes that sentence and term repetitions can be found among previously translated segments. In order to achieve a balance between high quality and high speed, recycling/reusing the previously translated segments is also important. Translators often use similar expressions for similar ideas on different occasions [6]. On average, the repetition rate of translation in different industries could reach 20% -70% [66]. When a CAT system is developed, the first function is usually the Translation Memory (TM) function. With the help of Translation Memory tools, the duplication of translators' efforts can be eliminated [15], which can be perceived as useful. Christensen and Schjoldager [10] suggested that more research was needed to understand how translators interact with TM technology. Hence, the hypothesis can be stated as follows:

H2: Perceived repetition rate has a significant positive impact on Macao Government translators' Perceived Usefulness of CAT systems.

### Perceived usefulness

In the context of translation, perceived usefulness (PU) is the degree to which translation technologies would help the translator to achieve job outcomes with better quality, higher efficiency and even better quality of life [28]. Jeyaraj et al. [30] found that perceived usefulness is one of the five most important predictors of consumer decisions to adopt an IT technology. Perceived usefulness plays an important role in determining consumer adoption decisions on m-commerce or mobile internet activities [9]. Hence, the hypothesis can be stated as follows:

H3: Perceived usefulness has a significant positive impact on Macao Government translators' behavior intention of adopting CAT systems.

### Perceived ease of use

Perceived ease of use (PEOU) is the degree to which the translation tools are easy to work with in order for the translator to invest in such a technology, use it and accept to change his or her translation behavior. For any emerging information system, PEOU is an important determinant of users' intention of acceptance and usage behavior [57]. Meanwhile, quite a few empirical studies have already confirmed that the ease of use of a system has positive effects on technology adoption [18, 21, 48]. Hence, the hypotheses can be stated as follows:

H4: Perceived Ease of Use of CAT systems has a significant positive impact on the Macao Government translators' Behavioral Intention to use.

Based on the action identification theory [55], people's action identities can be divided into high-level action identities and low-level action identities, while high-level identities are related to individuals' goals and plans, and low-level identities refer to the means to achieve these goals and plans [60]. In the context of the translation industry, the high-level identity can be delivering a high quality translation job (Perceived Usefulness) and the low level identity can be operating the CAT tools or use of a specific feature of the software (Perceived Ease of Use). The impact of PEOU (a low-level identity) on PU (a high-level identity) will be stronger when the CAT users are capable of forming their assessment on the likelihood of attaining high-level goals (i.e., perceived usefulness) based on the information gained from their low-level actions (i.e., perceived ease of use). Meanwhile, a few studies examined the effect of perceived ease of use on perceived usefulness of users' adoption of information technology [26, 36]. Hence, the hypotheses can be stated as follows:

H5: Perceived Ease of Use of CAT systems has a significant positive impact on Macao Government translators' Perceived Usefulness of CAT systems.

### Behavioral Intention

The higher behavioral intention means the higher the likelihood that a user will adopt CAT systems. The high behavioral intention can indicate low adoption of CAT systems currently in the Macao Government, due to the fact that CAT systems are still not mature in Macao Government. It is expected that behavioral intention will have a significant negative influence on use behavior of CAT systems in the Macao Government. Hence, we can postulate that:

H6: Behavioral Intention has a significant negative impact on the Macao Government translators' Use behavior of CAT systems.

**Demographics and Experience**

Demographic variables have been important in the adoption of media or technologies such as computer bulletin boards [16, 29, 46] and digital television application services [33]. According to China’s Translation Industry CAT survey [45], young translators are more frequent Internet users. According to O’Reilly and Associates [43], there was a gender gap among the early users of online services. Several famous studies of communication technology adoption found that age is negatively related to adoption [32, 38, 40]. Several studies also reported a positive relationship between education and adoption [34, 38, 47, 50]. Experience has a significant positive impact on behavior intention to adopt Internet communication technology such as Internet Banking [35].

According to Gefen [17], a translator's experience with translation work may directly affect the translator's intention to adopt CAT systems in the Macao Government. Thus, the following hypotheses are proposed:

H7: Age influences behavioral intention to adopt CAT systems in the Macao Government.

H8: Gender influences behavioral intention to adopt CAT systems in the Macao Government.

H9: Education influences behavioral intention to adopt CAT systems in the Macao Government.

H10: Experience influences behavioral intention to adopt CAT systems in the Macao Government.

From these ten hypotheses, the conceptual model shown in Figure 1 emerges.

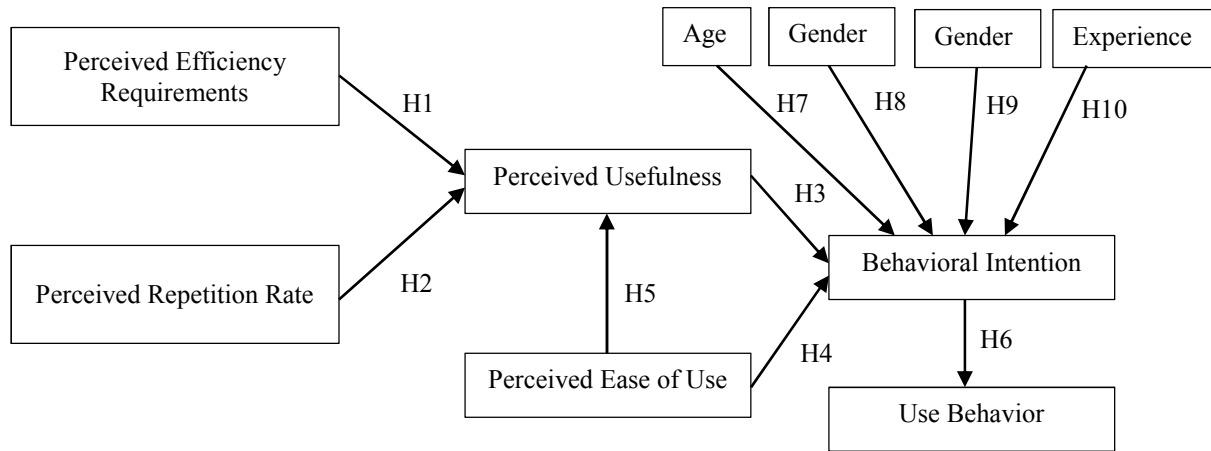


Figure 1: Conceptual Model.

**RESEARCH METHODS**

**Measurement Instruments**

In this study, most measurement items employed were, with slight modifications, taken from the TAM study. Perceived Ease of Use, Perceived Usefulness and Behavioral Intention were adopted from Venkatesh et al. [59] and Davis [11]; Use Behavior was taken from Im et al. [27]; while the items for PER and PRR are summarized as follows:

**PER** -- Based on the definition of PER, the following items have been included:

- My superior usually has high requirements on the terminology consistency of my translation.

- My superior usually gives me a short period of time to do the translation.
- My superior usually has challenging requirements on my translation quality.
- My superior usually has challenging requirements on the punctual delivery of the translation.

**PRR** -- Since PRR includes internal and external repetitions. Internal repetitions are those repetitions of sentences and terms within a single text; for external repetitions, they include those previously translated texts translated by his/her colleagues. Therefore, the items of PRR were developed as follows:

- In my translation work, the repetition rate of sentences is high.

- In my translation work, the repetition rate of terms is high.
- I often need to refer to the documents translated by other translators.

**Data Collection**

The questionnaire has two versions: one in English and the other in Chinese. The target samples of the Questionnaire are the translators who work in the Macao Government departments. In order to get random respondents, a simple random sampling method was used in the sampling process. Most items were measured using seven-point Likert scales, ranging from totally disagree (1) to totally agree (7). A total of 305 questionnaire copies were distributed to all Government departments in November of 2013 and 130 responses were validated (42.5% response rate). Descriptive statistics related to the sample are presented in Table 1.

Table 1: Profile of Questionnaire Respondents

Demographics	Number	Percent
Gender		
Female	51	39.2
Male	79	60.8
Age		
<= 24	8	6.2%
25-34	63	48.5%
35-44	35	26.9%
45-54	18	13.8%
>= 55	6	4.6%
Education level		
Primary school or below	3	2.3%
High school degree	18	13.9%
Bachelor degree	82	63.1%
Master degree or above	25	19.2%
PhD degree or above	2	1.5%

**DATA ANALYSIS AND RESULTS**

In order to test the hypotheses, Structural Equation Modeling (SEM) was used to validate the proposed research model. The AMOS software package was used to conduct the analysis procedures of the SEM. A two-phased approach to SEM analysis is adopted in this

study [20]. First, a confirmatory factor analysis (CFA) is performed to examine the overall fit, validity, and reliability of the measurement model. The hypotheses are then examined using the structural model.

**Reliability and validity**

Firstly, Cronbach’s alpha values are examined in order to evaluate the constructs’ reliability [23]. As shown in Table 2, all Cronbach’s alpha values for each construct are above or very close to the expected threshold of 0.7, showing evidence of internal consistency. Exploratory factor analysis was then conducted to improve the instrument by removing items that did not load on an appropriate high-level construct [12, 44, 53]. A principal components factor analysis was then conducted. At the beginning, any items with commonality less than 0.3 were removed [19]. Next, the absolute values of rotated factor loading greater than 0.4 were retained only [31]. Then, factors with eigenvalues larger than one were extracted, resulting in six factors and 20 items. The six factors accumulatively accounted for 71.88% of the total variance. Table 2 presents the factor structure of the principal components analysis for the acceptance of the CAT systems in the Macao Government.

Secondly, the CFA procedure was conducted to assess the measurement model in terms of goodness-of-fit, convergent validity and discriminant validity. The overall fit of the measurement model was assessed using the following common measures: the ratio of chi-square to the degrees of freedom, CFI, SRMR, GFI and AGFI. The results of the analysis indicated that the goodness-of-fit indices for the hypothesized measurement model were reasonable ( $\chi^2 /d.f. = 3.74$ , CFI = 0.973, SRMR=0.088, GFI = 0.981, AGFI = 0.805). All the index values met their corresponding acceptance levels [19, 51].

The reliability and convergent validity of the measurement scale was also tested. Results are shown in Table 3. The standardized factor loadings reached a significant level while the composite reliability (CR) values were all higher than 0.6, which showed good reliability on all measures [3, 19]. In addition, the convergent validity was also evaluated and the average variance extracted (AVE) values of all constructs exceeded 0.5 [13]. Overall, the measurement model exhibit adequate reliability and convergent validity.

Finally, to grant discriminant validity, the square root of AVE should be greater than the correlations between the construct [23]. This is also reported in Table 4 for all constructs. We conclude that all the constructs show evidence of discrimination.

Table 2: Factor analysis results and Cronbach's alpha coefficient

	Factor						Cronbach's
Item code	1	2	3	4	5	6	Alpha
Perceived Efficiency Requirements							0.868
PER1	0.706						
PER2	0.660						
PER3	0.933						
PER4	0.851						
Perceived Repetition Requirements							0.849
PRR1		0.809					
PRR2		0.922					
PRR3		0.742					
Perceived Usefulness							0.925
PU1			0.836				
PU2			0.654				
PU3			0.954				
PU4			0.890				
PU5			0.735				
Perceived Ease of Use							0.884
PEOU2				0.593			
PEOU3				0.974			
PEOU4				0.883			
PEOU5				0.745			
Behavior Intention							0.937
BI1					1.013		
BI2					0.797		
Actual Use							0.690
USE1						0.677	
USE2						0.781	
Eigen value	7.296	2.768	1.827	1.681	1.401	1.005	
Cumulative variance explained (%)	18.845	40.738	53.190	60.121	66.581	71.876	



Table 3: Convergent validity for the measurement model

Construct	Indicator	Factor Loading	Composite Reliability	AVE
Perceived Efficiency Requirements	PER1	0.76	0.87	0.64
	PER2	0.66		
	PER3	0.93		
	PER4	0.82		
Perceived Repetition Rate	PRR1	0.75	0.86	0.67
	PRR2	0.91		
	PRR3	0.79		
Perceived Usefulness	PU1	0.83	0.93	0.72
	PU2	0.76		
	PU3	0.89		
	PU4	0.89		
	PU5	0.87		
Perceived Ease of Use	PEOU2	0.68	0.89	0.68
	PEOU3	0.95		
	PEOU4	0.88		
	PEOU5	0.76		
Behavioral Intention	BI1	0.99	0.94	0.89
	BI2	0.89		
Use Behavior	USE1	0.93	0.73	0.59
	USE2	0.57		

Table 4: Discriminant validity

Construct	1	2	3	4	5	6
1. Behavioral Intention	<b>0.942</b>					
2. Perceived Usefulness	0.571	<b>0.850</b>				
3. Perceived Ease of Use	0.369	0.586	<b>0.825</b>			
4. Perceived Efficiency Requirements	0.258	0.257	0.172	<b>0.797</b>		
5. Perceived Repetition Rate	0.464	0.341	0.263	0.384	<b>0.818</b>	
6. Use Behavior	0.063	0.320	0.322	0.202	0.221	<b>0.770</b>

Note: Diagonals represent the square root values of the average variance extracted, and the other matrix entries represent the squared factor correlations.

### Hypotheses Test

**Structured paths** -- Before hypotheses testing, the goodness-of-fit of the structured model was examined by using the same indices that were used for the reliability and validity of the constructs. Since all of the model fit indices indicate the adequacy of the structural model, it is concluded that the model exhibits a good fit [20].

Once the structural model is determined as adequate, the hypotheses are examined. Figure 2 presents the standardized path coefficients ( $\beta$ ), their significance for the structural model, and the coefficients of

determinant (R2) for each endogenous construct. Results of the hypotheses testing are summarized in Table 5. The results are discussed below:

1. Perceived Repetition Rate had a significant and positive impact on perceived usefulness ( $\beta=0.169, t = 2.268$ ), indicating support for H2.
2. Perceived Usefulness had a significant and positive impact on behavioral intention ( $\beta=0.497, t = 5.745$ ), indicating support for H3.
3. Perceived Ease of use had a significant and positive impact on perceived usefulness ( $\beta=0.564, t = 8.083$ ), indicating support for H5.

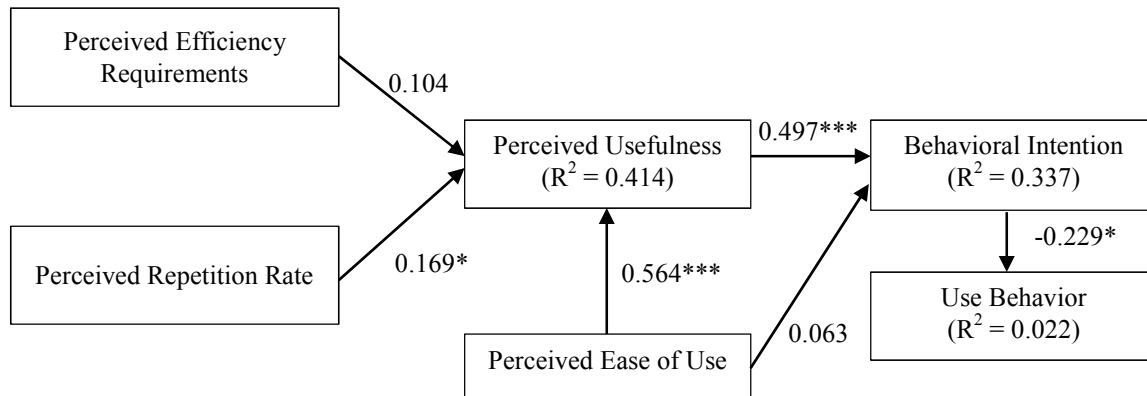


Figure 2: The results of the structured model

**Multiple Regressions** -- The second section of the discussion investigates the effects of age, gender, education and experience on behavioral intention to adopt CAT shown in Table 6. The results indicated that only

experience had a significant negative impact on behavioral intention to adopt CAT systems (H10), while age, gender and education had no impact.

Table 5: Results of the structured model and hypothesis tests

Hypothesis	Path Coefficient	t value	Support
H1: PER → PU	0.104	1.433	No
H2: PRR → PU	0.169	2.268*	Yes
H3: PU → BI	0.497	5.745***	Yes
H4: PEOU → BI	0.063	0.788	No
H5: PEOU → PU	0.564	8.083***	Yes
H6: BI → USE	-0.229	-2.398*	Yes
H7: Age → BI			No
H8: Gender → BI			No
H9: Education → BI			No
H10: Experience → BI			Yes

Note. \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

Table 6: Multiple Regressions

Regression test	B	Result
Behavioral intention to adopt CAT systems (R=0.268, R <sup>2</sup> =0.072)		
Age	0.088	H7: Rejected
Gender	0.08	H8: Rejected
Education	0.027	H9: Rejected
Experience	-0.318*	H10: Accepted

Note. \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ .

## CONCLUSIONS

This research empirically analyzed the Macao Government translators' perceptions of the adoption of CAT systems based on a TAM model, with two antecedents: Perceived Efficiency Requirements (PER) and Perceived Repetition Rate (PRR).

According to the results shown in the previous section, PRR has a significant positive impact on perceived usefulness of the adoption of CAT systems in the Macao Government. CAT systems are tailor-made solutions for repetition. Where the translator realizes that there is repetition in his/her translation work, he/she is very likely to think CAT systems are useful. If there is less or no repetition in one's translation work, then it is difficult for the translator to appreciate the usefulness of CAT systems. On the other hand, if there is repetition but the translator just does not realize it, the translator needs to be educated to recognize the significance of the CAT systems.

PER does not have a significant positive impact on perceived usefulness. It shows that the Macao Government translators think that the usefulness of a CAT system is not related to the efficiency requirements enforced by their managers.

The results also showed that perceived ease of use of CAT systems has a significant positive impact on translators' Perceived Usefulness of CAT systems. If the CAT system is not easy to use, it will negatively influence the Macao Government translators' perception of its usefulness.

In addition, the Macao Government translators' perceived usefulness has a significant positive impact on their behavioral intention to adopt CAT systems. If they think a CAT system is useful, they will have the intention to adopt the system. However, their perceived ease of use does not have a significant impact on their behavioral intention to adopt CAT systems, indicating that ease of use is not one of their primary motivations to adopt the CAT systems.

Furthermore, their behavioral intention of adopting the CAT systems has significant negative impact on their actual use of the CAT systems. According to the survey data, more than 80% of the respondents have neutral to strong intention of adopting CAT systems, while more than 80% of the respondents make little use of CAT systems in Macao Government. The results indicated that they have a high intention to adopt CAT systems, even though they make little use of CAT systems in Macao Government.

Finally, regarding the translators' experience and their demographic variables such as age, gender and

education, none of them have a significant relationship with their behavioral intention of adopting CAT systems in Macao Government except experience, which has a significant negative impact. The results indicated that Macao Government translators with higher experience do not need CAT Systems as they can handle the jobs due to their experience.

The most important managerial implication of this study is that it provides a comprehensive set of factors that contribute to the successful deployment of CAT systems in the Macao Government. This can be used as a practical guideline for the Macao Government. After the appropriate CAT tools are adopted, the laws and the public administrative documents can be translated into more accurate, precise, unambiguous, grammatically correct versions, then the Macao residents can fully understand the legal and administrative constraints of their daily lives, and the stability of the laws can be maintained, thus the rule of law and the stability of the society can be consolidated.

This study has some limitations as perceived competitive advantage (PCA) was not included in this research as the target users of CAT systems are the Macao Government translators. For the future research, which focuses on translators' acceptance of CAT systems in a particular region, PCA should be included so that the causality between PCA and PU should be tested.

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