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THE TRANSLATION PROCESS AS A MATRIX MODEL FOR THE TRANSLATOR'S TECHNOLOGICAL REALITY

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Abstract

The synergetic unity of the translator and translation technologies creates a new multi-faceted translation reality, in which the elements of translation activity are distributed in a particular way, elements that are complemented by artefacts of the translation industry and translation competences in a new format of interactivity. In this study we examine the modern tendency of convergence in the translation industry, which determines the need to revise the essential core of the translation space and the need to factor in distributed cognition when engaging with translation tools and technologies in the translation process. The development of the concept of extended consciousness creates additional grounds for revisiting the substance of the translator's 'black box' in that the translator's cognitive system moves beyond the limits of individual consciousness and, as a result, the translation process is viewed as a totality of thought processes inside and outside the bounds of translation thinking, processes that are subject to the impact of artefacts that are joined together in a single matrix cognitive space. In the context of the translator's technological reality today, a new model can be constructed which reflects the possibility of integrating the cognitive and supra-cognitive spheres of the translation consciousness. A central component of the model is 'reframing', which lies at the root of the reconstruction of reality through rethinking and interpretation with due consideration given to the context and the situation.

Keywords: Artefacts, cognitive, interaction, translation model, translation tools

1. Introduction

Interest in unlocking the fundamental nature of the translation process has developed intensively over the last few decades, resulting in modern investigations of an interdisciplinary nature that are distinguished by the integrative substance of their activity-based and eco-systemic approaches. The anthropocentric aspect is complemented by a multi-faceted and enriched cognitive reality rooted in the principles of dynamism, interconnectivity and the dialectical unity of external and internal factors that form the cognitive system of the translator's mind. The contents of the translator's 'black box' is opened up piece by piece based on models of the translation process, whose diversity and heterogeneity are emphasized by the complexity of the phenomenon under consideration, and the researcher's desire to unlock the secrets of the translation space reinforces the necessity for the practical verification of projected hypotheses.

1.1. From integration to convergence: synergizing the translator and technical innovations

In the course of a discussion of the evolutionary movement of the translation industry at the TAUS Translation Summit in 2017 in Amsterdam, it was noted that the current state of the development of translation technologies is at a turning point, whereby integration is giving way to convergence. Previously the integration stage actively engaged with isolated translation applications, which enabled companies to increase the volume of work, and translated predominantly documents, instructions, leaflets and software. However, the modern era where processing large volumes of information with increasingly compressed deadlines requires both convergence tools as well as original solutions.

If by 'convergence' we understand the classical meaning of that term (from the Latin 'convergo': 'I bring together'), that is, the process of the mutual bonding of entities through interpenetration, then with automation convergence can be defined as a higher stage of integrating systems and technologies. We can highlight two interconnected forms of convergence: technological and functional. The former presupposes the merging of two or more technologies with the aim of creating a new attractive product or service; the latter is the merging of functions to create a new solution.

The integration of heterogenous technologies entails convergence, in other words the emergence of fundamentally new solutions which drastically change man's habitat. This is manifest in the use of translation applications pre-installed on each computer, the use of individual machine translation tools in real time, search engines and also the development of the internet of things. The afore-mentioned convergence tendency is confirmed by the new term 'Augmented Translation Reality' (DePalma, 2017)

The centre of this process is taken up by the so-called 'augmented translator', in other words the professional translator who works in a hi-tec reality and effectively managing its components. 'Just as within the augmented reality artificial intelligence allows variants to be proposed which relate to the individual and his/her spheres of activity, this transformational model helps to provide linguists with a broad context and support for projects reaching maturation.' As developers insist, the choice of machine systems proposed will enable professional translators to more productively and consistently deal with the translation task, focusing on working with language and not the mechanical performance of technical procedures.

The harmonious combination and integration of man-built artefacts into cognitive processes has long been the subject of research by foreign cognitive linguists, who work with the acronym DEEDS (Dynamical, Embodied, Extended, Distributed, Situated).

Our findings show that translation activity constitutes the synergetic union of the individual working in a team and technical innovations, resulting in the new term 'distributed team cognition' (McNeese, 2020). The field of translation activity develops the 'connected translation' concept that implies teamwork with the use of connected human and technical resources based on a single platform, such as, for instance, CAT.

1.2. How the 'black box' acquired colour

The question arises: how does the concept of the 'black box' become transformed as the fundamental basis for describing the internal translation processes occurring in the translator's consciousness?

When answering this question, it would be pertinent to refer to the monograph by Prunch titled 'The Paths of Development of Western Translation Studies', published in 2015 and translated from the German original. The book contains a section 'How the Black Box Acquired Colour', which describes research into translation and the specifics of constructing translation models through an eco-systemic approach. 'Colouring in' the black box, in the sense of grasping the essentials of the cognitive processes occurring during a translation activity has been going on for quite some time. Here it is germane to note Rosch's theory of prototypes, the frame semantics of Fillmore and his successors Snell-Hornby and Vannerem, and the 'Thinking Aloud' research reproducing the cognitive process (S. Tirkkonen-Condit, H. P. Krings, W. Lörscher, R. Jääskeläinen, P. Kußmaul et al.). Cognitive process modelling variants for written translation and oral interpreting include the Constructive Translation Model of Hönig, the Effort Model of Gile, the Relevance Model of Sperber and Wilson, and the concept of 'situationally conditioned cognition' of Risku (Prunch, 2015).

A chronological analysis of academic work in Translation Studies that posit cognition as a situationally conditioned process for processing, storing and activating information a reality models enables us to note the integral interconnection between cognitive and translation processes. This interconnection exists within the translator's cognitive system in the broad sense of this concept as the totality of internal and external factors that organize the single network of interdependences.

Following the concept of extended awareness, we can argue that the translator's cognitive system actually goes beyond the bounds of individual awareness. With this in mind, the physical, social and cultural conditions of an agent's existence may be a part of the cognitive system of that agent (Shapiro & Spaulding, 2021). As applied to translation activity, the external ambient may include the social sphere, artefacts and other physical environments that impact on the formation of the translator's consciousness. That said, from the point of view of the situational approach when considering translation activity, engagement with situations in a dynamically changing environment in real time must be factored in, as they affect the cognitive processes and are reflected in the translated text.

In keeping with Risku's logic, what we purposefully reflect in language is not a representation of subjective reality. Our behaviour, our thoughts and perceptions are all rooted in the acknowledged or

unacknowledged reliance on artefacts of the surrounding world. This important statement concerns not only the concept of culture as the result of joint cognition and social behaviour formed through artefacts, but also of professional translation as multifaceted cognitive activity. A significant aspect of this activity is coordinated by external structures, including translation memory systems, rules and regulations of translation procedures and a specific choice of translation strategies (Risku, 2010).

Consideration of the translation process as the totality of the workings of the human mind inside and outside the translation mentality can also be observed in the work of Hutchins, who considers that the performance of cognitive functions may occur, inter alia, on account of artefacts that lie beyond human consciousness. These may include joint activity, various disparate artefacts, manifestations of the ambient reality and popular beliefs drawn into cognitive processes. The author emphasizes the interconnection between internal and external components (tools) that comprise a single cognitive ecology (Hutchins, 1995).

In the words of Serebryakova and Milostivaya (2021), according to the findings of retrospective interviews with agency employees, information supply, communications and computer software and other tools do not constitute the only examples of artefacts used in cooperative translation activity. The list of artefacts is much longer and includes also 'all material and non-material items that should limit the storage and processing of the gamut of information required to perform a translation exclusively in the brain. These could include a mobile telephone, computer monitors and keyboards, a printer, files and folders, various manuals (for instance, on the stylistics of the original and target languages, or parallel texts), together with dictionaries and computer spelling, grammar and style checks which are chosen consistently on the basis of an automated interactive translation content processing model. Formal artefacts, in particular text layout, are deemed to be important aspects of situational and cognitive translation integration'.

Thus, among the basic attributes of the translator's cognitive processes we can include the following: intellectual agility, engagement with the ambient external resources while maintaining the desire to categorize and systematize the accumulation of data.

1.3. Reframing

When translating a text the translator transforms the information he/she has received in the process of its reinterpretation in a different system of coordinates. In this instance an interpretation switching effect comes into play, on the basis of an integrated analysis of the original text, abstraction, synthesis and systematization, comparison and classification by means of translation from one set of frames and frame scenarios into analogues, in the language of the receiver. These processes can come within the scope of translation reframing.

Reframing as a means (technology) for understanding the effect our speech has on consciousness is actively used in the sphere of neuro-linguistic programming (NLP). In the opinion of Hall (2001), reframing differs from means of abstraction and conceptualization exactly because it urges the talk partner to move up to a higher level of information representation that is based not only on sensory signals, but also on language that enables us to construct new 'realities', to set new designations, augment new referential systems, and to create new worlds.

The topicality of the problem of using the concept of reframing in translation research is confirmed by the active discussion of this term in translation conferences. In particular, at the international 'Translation as Reframing' conference, held in 2019 in the University of Lisbon, delegates noted the substantive use of reframing as a cognitive tool for the construction of meaning based on representation from the source context by transferring it within the translation text. Delegates also noted a number of areas of translation research in terms of the reframing concept, including "translation agents and their role in reframing texts, paratextual choices as reframing, representations of Otherness through reframing, reframing as a collective, collaborative process of translation, digital challenges to reframing, Translation and its Reframing of World Literature (http://cec.letras.ulisboa.pt/en).

Within Translation Studies publications by Russian scholars we can observe an interest in using the reframing transfer process in describing mediated bilingual communication. For instance, Gusarova (2014) uses the terms 'transframing' and 'reframing'. In the context of translation analysis, as Gusarova puts it, the translator is forced 'to create a different symbol of thought which, however, has already been symbolized by the original utterance. Here by necessity 'reframing' occurs, which we call 'transframing': the transformation between frames that consists in "the transition from one data group to another", with reference to the work of Minskii'.

Thus, the term 'reframing' may have several interpretations and functional possibilities to be used for the study of linguistic phenomena from a cognitive point of view, *inter alia* the reframing of consciousness as the technology of rethinking and restructuring mechanisms of perception, thought and behaviour in neurolinguistic theory, and reframing in translation as a means of reconstructing a previously constructed reality in the original language when transferring that reality in the language of the translation. Within the scale of the matrix translation model (Remkhe et al., 2016) reframing comprises the fundamental basis of the meta-cognitive level which are accountable both for the deliberate choice of strategy and the controllability of cognitive processes.

2. Problem Statement

The problem of describing the translation process from the perspective of reconstructing the translation space has substantial academic potential, in that no single concept has hitherto been drawn up that could provide as full a picture as possible of the modern status of translation activity by virtue of the comprehensive and multifaceted nature of this phenomenon, as well as through the dynamism of the changes taking place against the backdrop of the translator's new technological reality.

The academic and theoretical analysis of sources that illustrates the problem of the translator's cognitive system that goes beyond individual consciousness and allows us to identity the physical, social and cultural conditions, as well as the artefacts that, as a part of his cognitive system, impact on the formation of the consciousness of a translation personality. When considering translation activity, a major factor is engagement with situations in a dynamically changing environment in real time, as they affect the cognitive processes and are reflected in the translated text.

However, despite the coherence and scholarly diversity of the proposed viewpoints, we note the insufficiency of summative and schematization approaches in presenting the true nature of translation activity in the modern world.

3. Research Questions

The current investigation raises a number of questions: 1. How is the combination of diverse cognitive (internal) and external processes of translation activity possible within the scope of one model when taking into account the modern trend of the synergetic engagement of the translator and technological translation resources? 2. What is the role of reframing as a reflection of the translator's cognitive efforts against a backdrop of modern automated translation processes?

4. Purpose of the Study

If we were to summarize research in the field of cognitive Translation Studies and the modelling of translation systems, then in this current research we attempt to present a cognitive and matrix model of the translation process from the standpoint of anthropocentrism, a framework approach and synergy as the impact of the interaction of internal (cognitive) and external (technological) factors on the effectiveness of translation activity and its end product. The central component of the translation space in question is reframing, which relates to the translation consciousness, and this reflects the substance of the translation personality coupled with cognitive and meta-cognitive processes. The engagement of the translation personality with external artefacts making up the translator's arsenal creates the synergetic unity of the translation reality, a unity which is reconstructed in the process of translating a text into a foreign language.

5. Research Methods

The present study uses a conceptual method which enables the identification of the logical qualities of a translation model based on a representation of the object of the research. We set out with a practical sociological study in the form of an online poll of translators from various professional communities on using current translation tools and automated systems, as well as an analysis of translation errors performed on the Smartcat platform. For the purpose of our analysis we chose an original text in Russian totalling 2,250 words, its automated translation and final edited version as done by a professional translator into English. The analysis consisted of a comparative analysis of the linguistic features of the original and the translated text and the linguistic description method.

6. Findings

With regard to the interface of cognitive processes and translation, the translator's technological tools can be included in the cognitive reality alongside information and knowledge which are classified and stored deep in the recesses of translation memory. The translator's brain is part of network structure of complex cognitive, social and conceptual relationships mediated by joint activity and artefacts. In the translation reality of today we must factor in cognitive and technological interaction, which with the enhancement of translation processes through automation presupposes a certain amount of cognitive effort for the translator to reconstruct the translation space that is created both by the translator and the machine.

The translator's reconstruction of reality through the use of automated systems constitutes a particular cognitive processing of deep meaning by mediated means in terms of automated translation solutions. On the one hand this can lead to a certain stereotyping of thought and the framing of information reception. On the other hand, the substance of cognitive operations and the very nature of cognitive resources can be transformed, resources which in this instance are used for the dual processing of information based on the original text, and the automated text of the translation submitted for assessment and modification.

In this study we examine the possibility of a schematic vision of the integrated process of translation activity which combines the work of the cognitive and supra-cognitive spheres of the translation consciousness, together with the translator's technical tools, which constitute part of the cognitive space within a single translation model.

6.1. A new vision of the translation process model

The relationship of internal cognitive elements with the external resources of the real world, including the translator's cognitive artefacts and situational conditioned interaction, comprise a single translation reality, as displayed in the matrix translation model (Figure 1).
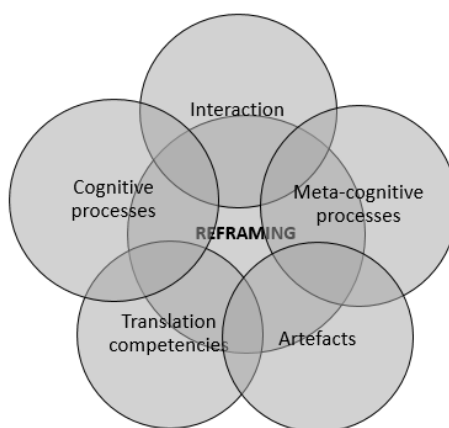
Figure 1. Matrix translation model

Cognitive processes are explicitly connected with the operational and cognitive aspect of the translation process, including the intuitive element, perception processes and comprehension based on background (subject) knowledge. In other words, the cognitive level contains the cognitive processes of the immediate processing of information, such as perception, retention, transformation and subsequent use.

Metacognitive processes refer to self-checking, and the monitoring of mental activity within the context of the cognitive structuring of the translation process, as well as to the involvement of translation strategies. Metacognitive processes are responsible for the conscious regulation of mental activity and its organization with the aim of planning and adopting solutions.

Artefacts include the use of translation resources and disparate forms of collaboration in the course of working on a translation project. In the modern context of translation work the question often arises about translation competences in the light of the dynamic increase in the diversity and volume of translation material and the technical requirements for the effectiveness of processing it.

Interaction is defined by the situational and cognitive relationship between the translator and the artefacts around him which are used in professional contexts. The translator's decisions are based on the process of *interaction and interpenetration* of the cognitive processes of the human consciousness and of the technological artefacts in the real world. The processes of comprehension and perception are not the result of individual decisions or desires, we must make allowance for the effect of 'agents' outside human consciousness, and this within the context of translation activity infers the use of any and all resources and technologies.

Reframing specifies the process of information transformation in a different system of coordinates based on an integrated analysis of the original text, abstraction, assimilation and systematization, comparison and classification. In terms of the matrix translation model, reframing forms the core of the metacognitive level of the translator's cognitive space which creates the deliberate choice of strategy and the controllability of thought processes that are responsible the reconstruction of the original intended meaning. The diagram below shows reframing as an interim process in the reconstruction of a previously created reality in the original language through the transfer of that reality in the target language, and which occupies a central place in the cognitive matrix model of the translation.

6.2. The translator's work with automated translation systems

A practical analysis in the form of a poll of an international community of translators through specialist forums and groups demonstrated the percentage ratio of translation technologies used at that moment in time. The poll involved 87 people, 75.5% of whom are working translators (Figure 2).
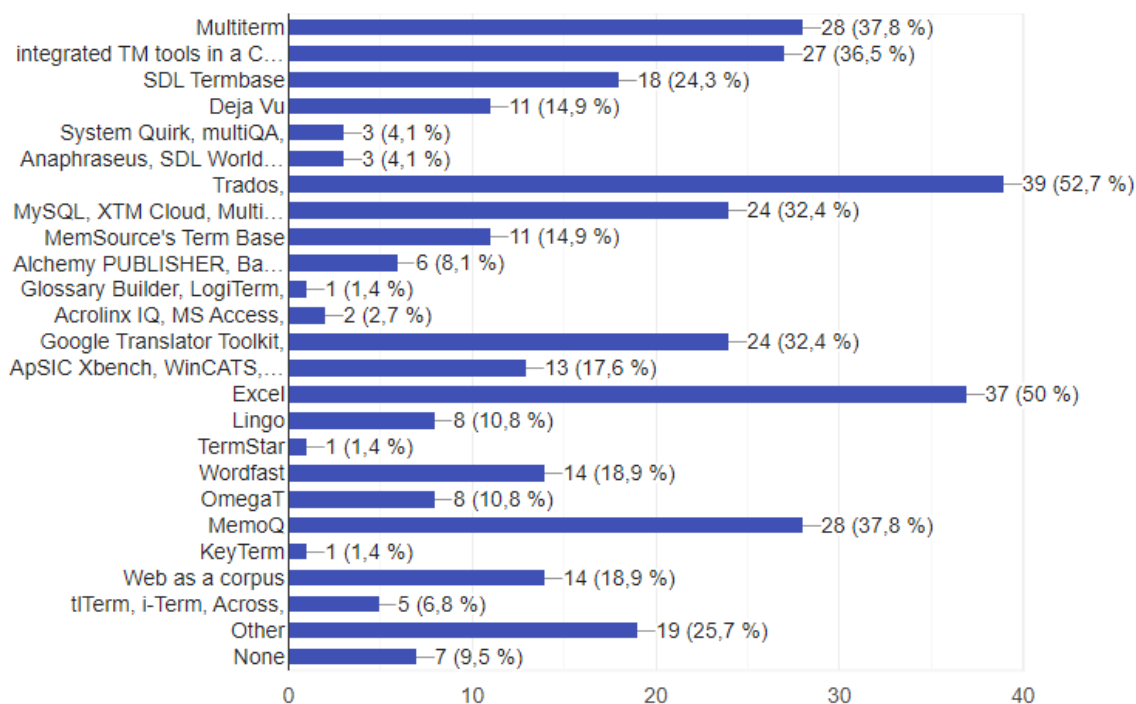
Figure 2. Results of the online survey

The survey showed that reliance on artefacts in the form of modern technological resources in translation practice is a priority factor. Innovations and the large number of available platforms become easily integrated in various types of translation tools without entailing any major changes in the course of the translation process, which still depends on the cogitative behaviour of the translator. This is evinced by the well-developed practice of post-editing, which assumes a deep understanding of the original text and an enhanced 'cognitive capacity' and 'cognitive efforts' which at present are the preserve only of a human being.

Computer tools as part of the modern translator's bag of tricks are referred to as artefacts, and have created a new environment for the enhancement and acceleration of translation processes. In this study we consider cognitive engagement with one of the translation tools: CAT (Computer-Aided Translation), which is a translation solution that provides the translator with access to dictionaries and thesauri, parallel text corpora, various systems of machine translation and machine memory on one platform. However, the value of the human translator in these processes still remains undisputed. In the words of Ovchinnikova (2019), "CAT tools are unsuitable for a detailed semantic analysis of the original text and the building of a mental model of the meaning of the translated text in that that are intended for the formal and semantic processing of linguistic material and the search for correspondences in the contacting languages. Thus, the editing of a completed translation constitutes an assessment of the appropriateness of the choice of linguistic resources for the holistic semantic structure of the text, which is aimed at solving a particular communicative task in the receiving culture".

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Within the remit of our study we conducted an analysis of errors in machine translation from Russian into English performed on the Smartcat platform with subsequent editing done by a professional translator and native speaker of English (Figure 3).
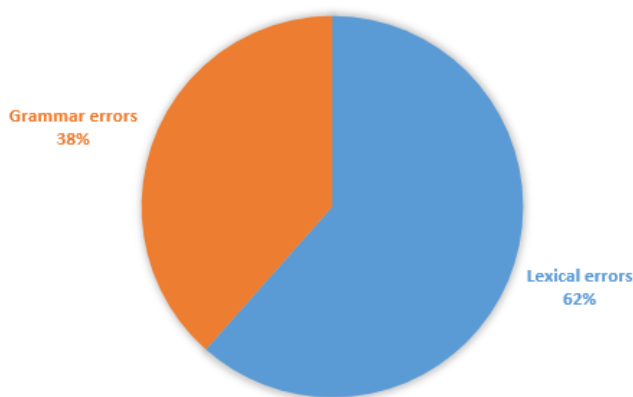
Figure 3. Translation errors chart

Among errors in grammar we noted two categories:

- Error in the tonal and logical articulation of a phrase between the subject and predicate. Where in Russian the dash is used to separate two nouns in the nominative case, in English the verb 'to be' is used (Table 1).

Table 1. Examples of errors in grammar machine translation (category 1)

Original	System translation	Edited version
<…> gde <…>- kod gruppy produkcii produkcii po Obshcherossijskomu klassifikatoru produkcii (OKP); <…> — kod predpriyatiya po Obshcherossijskomu klassifikatoru predpriyatij i organizacij (OKPO)	<…> where <…> - product group code by the All-Russian Product Classifier (APC); <…> — enterprise code by the All-Russian Classifier of Enterprises and Organizations (ACEO)	<…> where <…> is the product group code by the All-Russian Product Classifier (APC); <…> is the enterprise code by the All-Russian Classifier of Enterprises and Organizations

- Omission of the definite article (Table 2).

Table 2. Examples of errors in grammar in machine translation (category 2)

Original	System translation	Edited version
razrabotchika TU	developer of the specification	the developer of the specification
v ustanovlennom poryadke	in accordance with prescribed procedure	in accordance with the prescribed procedure

Among lexical discrepancies we predominantly identified the automatic choice of a word or phrase in two categories of error:

- The choice of a word that did not correspond to the context of the utterance, including departures from stylistic norms (Table 3).

Table 3. Examples of lexical discrepancy in machine tranlslation (category 1)

Original	System translation	Edited version
Dopuskaetsya: sposob soedineniya s drugoj produkciej	It is allowed to: way of connection with another products	It is permitted to: means of connection with other products

- The choice of translation equivalence relating to a category of words with limited combinational possibilities that are missing in the CAT translation memory, resulting in the computer providing literal translations of a combination of the most commonly used versions (table 4).

Table 4. Examples of lexical discrepancy in machine tranlslation (category 2)

Original	System translation	Edited version
po obespecheniyu pomekhozashchishchennosti trebovaniya naznacheniya	for assuring noise immunity requirements of purpose	for assuring anti-interference resistance designation requirements

Analysis of post-editing showed that a high-quality translation requires from the translator a considered review of the context in order to transfer authorial intention and the pragmatic and communicative core of the utterance. Particular importance is attached not only to the transfer of cohesive units but also to the observance of textual coherence. Notwithstanding these reservations, the functional signification of cognitive elements in the translation process has been maintained, including knowledge of terminology and the specifics of term formation in a specialized sphere, broad background knowledge of the subject in question, and also a command of cognitive strategies.

7. Conclusion

Convergence made itself known both on a technological level and in its functional sense. With the dissemination of a common translation memory base professional translators have acquired the possibility of working with the results of an improved machine translation performed with due consideration of individual requirements. However, the effectiveness of this process remains questionable. The crucial factor hindering man's replacement by a machine is the machine's inability to assimilate information. Despite the top-notch performance of the analytical mechanism, which enables data classification and consistencies in a large body of information to be sought, the machine still does not possess the ability to assimilate and merge data, and is focused on the formal and semantic processing of linguistic material, as well as the selection of equivalences in the contacting languages. Nevertheless, semantic analysis and the forming of the text's holistic semantic structure, as well as assessment of the appropriateness of the selected variants to solve a particular communicative translation task are possible with the intervention of the human translator and the editing of the final text of the translation.

If we extrapolate the findings of analyzing machine translation errors for this model of the translation process, we can observe a number of specifics when working with CAT-based automated translation, by way of concluding remarks:

- *Cognitive processes* are distinguished by their distributional nature, in that alongside his/her personal knowledge the translator uses the results of textual information processing that have been provided by the machine in the form of a mediated cognitive resource. Therefore, regardless of the reduced time period spent on a translation, the resulting cognitive efforts of the translator's processing of the text can be increased twice over.

- Working in tandem with translation systems manifests itself in a particular construction of *meta-cognitive processes*, which presume a deliberate adoption of translation solutions based on the totality of the translator's own cognitive operations and the results of the automated processing of the text. This can lead to the application of a new adaptive strategy in the translation.

- Possessing professional translation competences and effective engagement with artefacts in the form of a translation tool kit can provide modern justifications for translation thinking to become quite banal, resulting in possible new format errors. The point at issue here is the possible reliance on automated decisions and interference by computers at a follow-up reading of a text to the detriment of any deep insight into the primary meaning. The substance of reframing is thereby defined both by internal and external structures, including translation memory systems, by the rules and regulations of translation procedures, and by a specific array of translation strategies, resulting in the creation of the conditions for the complex cognitive relationship of the translator and automated systems.

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