2. Review of Literature

2.1. Introduction

This chapter has four sections. The first section, deals with the early Process oriented Translation studies that have attempted to understand the theoretical frameworks and methods the scholars have adopted to study the process of translation.

In the second section, I will review relatively later studies that have attempted to investigate the process empirically and investigate the methods that have been adopted in these researches. In the third section, I will be discussing recent empirical trends that have evolved owing to technological or methodological developments. The last section will focus on various methods adopted in process research in all the sections and attempt to understand the way they have been applied and the limitations and advantages of the methods.

2.2. Early Studies

Linguists have attempted to study the process of translation even before the field of Descriptive Translation Studies came into being. However, the models put forth by these scholars took theories in linguistics as the basis for their models. Since these models were not formed based on empirical researches they lacked validity.

Some of these models are discussed below.

2.2.1. Kade’s Model (1968)

In 1968 Otto Kade put forth a model of translation process. His model was situated in the framework of communication theory. He voices out his belief that a communicative theory approach has a potential to isolate various factors that
affect the process of translation as he sees translation as an act of communication where the translator plays the role of a communicator mediating between the original author and the readers. He observes that not only does the framework isolate the factors but can also trigger further curiosity of the researchers and present the researchers with a wide range of opportunities of further investigations in the other related fields such as micro- or macro-linguistics, psychology or aesthetics (Kade, 1968).

He separates senses associated with the micro linguistics notion of translations which restricts itself merely to conversion of code from a source language to a target language and the notion of translation in the framework of communication theory where translation is treated in a broader sense, where translation is not merely an act of change of code but also as an act of communication.

The following figure represents his concept of translation as a process of communication (Kade 1968:7):

![Fig. 2.1. Kade’s model](image)

According to him, the process of translation as an event of communication
comprise three phases. The first phase deals with the writer as a sender and the translator as the receiver of the message. The second phase is a stage of encoding the message received in source language by the translator into the message in target language. In the third phase the translator himself assumes the role of sender of the message but in the target language and the reader of the target language text assumes the role of receiver of the message encoded in the target language text.

2.2.2. Nida’s Model (1969)
Nida’s model attempts to look at the translation process by applying transformational generative grammar model. His model is based on his hypothesis that:

A careful analysis of what goes on in the process of translating has shown that, instead of going directly from one set of surface structures to another, the competent translator actually goes through a seemingly roundabout process of analysis, transfer, and restructuring. (Nida 1969:484)

According to him the translation is performed in three phases

1. Analysis
2. Transfer
3. Restructuring
The translator, in the first phase, while reading the text, analyzes the message encoded by the author in the source text and breaks the source text language “into its simplest and structurally clearest forms” (Nida, 1969:484). In the analysis stage, while the source text is analyzed by the translator, there are three kinds of analyses that are in play: grammatical analysis, referential-semantic analysis and connotative analysis.

Grammatical analysis
In the grammatical analysis, the translator breaks down the sentence structure into very simple basic structures which Nida refers to as kernels. This analysis does not focus on the meaning of the sentence itself but only focuses on the grammatical structure of the sentences.

Referential semantic Analysis
The referential-semantic analysis deals with the meanings of the lexical elements. The translator analyses the lexical items correlating them with the exact context...
and assigns a meaning to the elements in reference to their respective contexts. For example, a simple word spelt *lead* can have variety of meanings, it could refer to a metal, or a clue, or leading role or an electrical power supply cable or a verb to lead. The translator would analyze the meaning while referring to the context and appropriately decide the meaning that is associated with the word *lead* appearing in the source text.

**Connotative analysis**
The connotative analysis engages itself with the connotations of the words or phrases, in other words, stylistic aspects in the contained in the sentences aspects of the language where the meaning is different from the literal interpretation of the message.

**Transfer**
The second phase in the translation process is transfer. This phase of translation operates at the Level of kernels. The kernels that are formed in the analysis stage are transformed and transferred into kernels in the target text. During this phase of the translation, the text undergoes three kinds of transformations:

1. Complete redistribution- when an idiomatic expression or figurative language expression cannot be expressed as it is in the target language, the target language text is completely changed.
2. Analytical redistribution- when a single lexeme cannot be expressed through an absolute equivalent and is expressed using a combination of lexemes.
3. Synthesis- when a group of lexemes are expressed using a single lexeme.

**Restructuring**
The third and last phase of the translation process is restructuring. In this phase the kernels that are formed in the target language in the transfer phase are
restructured and transformed into target language surface structures. According to Nida, the process of synthesis is extremely dependent on the structure of the target language and has both formal and functional dimensions.

\[ \text{Fig. 2.3. Diller and Kornelius's model} \]

2.2.3. Diller and Kornelius’s Model

According to Diller and Kornelius’s model (1978:16), the original author produces a text in the source language and the translator dons the role of both receiver of the source language text as well as the sender in the target language text that is to be received by the target language receiver i.e. the reader in the target language. The criteria for a target language text to qualify as a translation is the change of code from source language code to target language code and equivalence of meanings between the source language text and the target language text. According to Diller and Kornelius (1978), meaning comprises seven components:

1. the object a text-segment refers to
2. the kind of reference
3. the features, qualities, etc. ascribed to the object by a text-segment
4. the kind of ascription
5. the illocutionary force of the text-segment
6. the way in which the illocutionary force is realized in the text-segment
7. the intended characteristics of the illocutionary act.

According to them, as implied by the above factors, an equivalence of meaning between two texts can be established only if they are semantically, pragmatically and stylistically equivalent (Diller and Kornelius 1978).

2.3. Empirical Investigations in Translation Studies
The empirical investigation of translation process started gaining attention of scholars in the mid-1980s after Descriptive Translation Studies (DTS) gained recognition as an independent field of investigation. The initial studies (e.g. Gerloff 1988; Krings 1986) have attempted to mainly look into issues related to the strategies that the translators use while translating. Subsequently, the research has moved on to investigate more specific research questions that pertain to various translational phenomena, for instance Explicitation (Englund Dimitrova 2005), or specific phases of the translation process, for instance revision (Künzli 2006; Shih 2006a). Two of the other emerging areas are Expertise in Translation (e.g. Englund Dimitrova 2005; Jakobsen 2005) and the Development of Translation competence (PACTE project, 2009).

Several large-scale projects have been undertaken over the last fifteen years which include the TRAP (Translation Process) and Eye-to-IT projects at the Copenhagen Business School, the PACTE project at the University of Barcelona, the PETRA project at the University of Granada, the TransComp (Translator
competence) project at the University of Graz, and the CTP project at the Zurich University of Applied Sciences.

2.3.1. Early Process oriented studies in DTS
The theoretical framework provided by Ericsson and Simon (esp. 1993 (1984)) by form the main foundation for Thin Aloud Protocols employed as means to elicit data pertaining for the experiments aiming to isolate the underlying processes and factors involved in translation. Their model assumes that memory is stored in two kind of storages: the Long Term Memory (LTM) and Short Term Memory (STM). The size of these storages and the access to these storages vary largely. The LTM has the capability to store large chunks of information but the access to the information is difficult whereas the STM although has a limited storage capacity the access to it is very easy. The information that TAP provides is this knowledge stored in the STM of the subjects. Bernardini says that the information coming out from the STM is the information that the subjects are conscious about and can be directly accessed and reported. The information from the LTM, on the other hand, is a result of the cognitive processes and may need some stimulation such as interviews or questionnaires to get an access to the information. Bernardini notes that the information that is not currently being heeded cannot be reported but must be inferred by the analyst on the basis of the verbalizations.

2.3.2. Studies employing TAPs
A number of TAP studies, especially early ones, have been concerned with the recognition and classification of translation strategies and with the detection of differences between professional and non-professional strategies. A number of classificatory schemes have been provided, adopting labels like:

- global/local (Jääskeläinen (1993) Building on Löscher’s definition)
• reduction/achievement (Mondhal and Jensen (1996)),
• monitoring (and revising), search, comprehension, equivalent retrieval, decision making (Krings, 1986) and so on.

Besides, it has been suggested that the performance of professional translators differs from that of non professional translators with regards to both the quantity and the quality of the strategies adopted.

2.3.2.1. Dechert and Sandrock (1984)
Dechert and Sandrock carried out a study pertaining to the translation process. The subjects for this experiment were university students at advanced levels in English. They were asked to translate an original text in English taken from a textbook of foreign language meant for tenth grade students. The subjects were asked to translate the text in fifteen minutes while allowing the use of dictionaries. The subjects were asked to verbalize their actions introspectively and their verbal reports were recorded. Dechert and Sandrock in addition to recording the introspective verbal reports also monitored time that the subjects spent in thinking and verbalizing each translational unit.

Dechert and Sandrock (1984) observe the following patterns in the data of the study:
1. The sentence was the basic unit of translation.
2. Once a solution had been found for the translation of a source text unit, subjects tended to keep their initial solution.
3. There was a strong tendency to retain the syntactic structure of the source text despite divergences from the norms of usage of the target language.
4. There was a tendency to translate at the lowest (word) level and to move to the next translation unit level when the initial attempt failed.
2.3.2.2. Gerloff (1986)

Gerloff in her study at Harvard University uses five American students of French. The subjects are asked to translate text from French into English. The subjects were not allowed the use of dictionary during the study. The subjects were asked to Think Aloud while performing the given task. The purpose of not allowing the dictionary was to extract as much verbal reports as possible. Gerloff devises a system to analyze the talk-aloud protocols by providing categories for identifying linguistic levels of the source text at which individual translation strategies operated:

1. morpheme or phoneme
2. word
3. group (more than one word, not a complete clause)
4. clause
5. sentence

This system made it possible for Gerloff to study the amount and proportion of processing that is being carried out in each language and at each linguistic level of analysis and compare the results of analyses of all the subjects. This comparison of the results enabled the researcher to determine the levels at which the individual subjects operated. For example, professional translators tend to translate larger units compared to the novices.

As a result of her investigations, the scholar comes up with a more complex classification of strategies as compared to Krings (1986), and identifies categories of translation strategies such as problem identification, linguistic analysis, storage and retrieval, general search and selection, text inferencing and reasoning, text contextualisation, and task monitoring.
2.3.2.3. Mondhal and Jensen

Mondhal and Jensen conducted a study in 1996 where ten subjects were given an unseen text from a newspaper article. In addition, the text was not given to the subject in its original form, instead, the text was modified a little by abbreviating the text as well as removing some words that were considered to be unusual occurrences. The syntax was left untouched. The subjects were asked to translate the same text and verbalize while performing the task. The object of the study was to study the Lexical search strategies that the translators adopt.

The scholars note that the lexical search strategies involve production from evaluation strategies and need to be distinguished. The evaluation strategy can further be subdivided into achievement strategies and reduction strategies. An achievement strategy is a strategy where the translator attempts to retain the form of the source text as far as possible while fulfilling the communicative goal of the original author of the source text. According to Mondhal and Jensen, achievement strategies involve four kinds of strategies: spontaneous association, situational association, reformulation and Problem analysis. In spontaneous association, the translator is aware of the problem and operates with associations that occur spontaneously, and searches for a suitable element from the several choices that are available to him. In situational associations, the translator tries to address a problem by recollecting instances that he can associate with in his past experience. In the reformulation strategy, the translator reformulates the source text wherever he feels that the reformulation will not impact the original meaning. Finally the translator may have to resort to problem analysis.

Reduction strategies may be adopted when a translator fails to address the problem effectively and may resort to actions like avoiding translation or simplification of the content etc. The adoption of reduction may both be attributed to linguistic competence and/or to his or her translation maxims.
Evaluation strategies involve, for instance, reflecting on the adequacy and acceptability of translation equivalents.

2.3.2.4. Löscher
Translation strategy, according to Löscher, is “…a potentially conscious procedure for the solution of a problem which an individual is faced with while translating a text segment from one language into another.” (Löscher, 1991: 76).

He adapts the definition provided by Færch and Kasper (Færch and Kasper, 1983).

Löscher (1986 and 1991) reports a study involving relatively large number of subjects. He uses 48 German learners of English as a subject. The subjects were provided with 52 texts and were asked to orally translate them into English or German. The texts provided were in a written form and use of dictionaries was not permitted so that with more problems faced the subjects will produce more verbal reports. The recordings were later transcribed and the analysis of the transcripts led to recognition of number of translation strategies.

Löscher (1991) says that a translation process involves a number of strategies which can be combined and used in various permutations and combinations to achieve the desired result.

Löscher (1996), building on his previous studies, compares the strategies adopted by professional and non-professional translators (foreign language students). He points out that, although the two groups did not differ qualitatively in their use of translation strategies, they do differ quantitatively, i.e. in the distribution and frequency of the strategies employed. Furthermore, following differences can be
seen in the approach adopted by professional translators and non professional translators:

1. the professional translators tend to focus more on the sense as against the non-professional translators who pay more attention to the form.
2. The size of the translation units are larger in case of professional translators
3. The amount of monitoring of the TT is different
4. the attention devoted to stylistic and typological adequacy (greater for professionals in all cases).

Following his researches Löscher (1996:28) has isolated following twenty two elements of translation strategies:

**Original Elements of Translation Strategies**

- **RP**: Realizing a Translation Problem
- **VP**: Verbalizing a Translation Problem
- $\rightarrow$**SP**: Search for a (possibly preliminary) Solution to a Translation Problem
- **SP**: Solution to a Translation Problem
- **PSP**: Preliminary Solution to a Translation Problem
- **SPa,b,c**: Parts of a Solution to a Translation Problem
- **SP$\varnothing$**: A Solution to a Translation Problem is still to be found ($\varnothing$)
- **SP=$\varnothing$**: Negative ($\varnothing$) Solution to a Translation Problem
- **PSL**: Problem in the Reception of the SL Text

**Potential Elements of Translation Strategies**

- **MSL**: Monitoring (verbatim repetition) of SL Text Segments
- **MTL**: Monitoring (verbatim repetition) of TL Text Segments
Lörscher’s model contains five types of translation strategies:

Type I: RP – (P)SP#/SPØ
Type II: RP – →SP (P)SP#/SPØ
Type III: (RP) – VP – (P)SP#/SPØ

Type IV: (RP) – (→SP) – VP – (→SP) – (P)SP#/SPØ; at least one →SP must be realized
Type V: (…) (P)SPa/ SPaØ (…) (P)SPb/ SPbØ (…) (P)SPc/ SPcØ

2.3.2.5. Séguinot

In a study reported by Séguinot (1991), two groups of students of specialized translation were asked to translate similar texts. Both the groups differed in their
level of translation as one group was of students in the beginning of the course and the other was nearing completion of the course. The groups had subjects with French and English mother tongue speakers and were asked to translate two advertisements from French to English. The purpose of the study was to look at the strategies that the translators adopt. She concludes that native speakers of English translating into their mother tongue show more efficient monitoring and revising strategies, and work more at the textual level, whereas non-native speakers seem to rely more on learned principles and lexical-level processes.

Séguinot (1996) reports on another study which a non-comparative study involving two professional translators working together on the same task. The underlying assumption of this study is that the everyday setting (the subjects are used to working as a team) would increase the environmental validity of the experiment, without limiting the experimental validity of the results obtained. As a result of this study, four types of translation strategies are identified as being typical of “professional” translation, namely interpersonal strategies (brainstorming, correction, phatic function), search strategies (dictionaries, world knowledge, words) inferencing strategies (reread ST and TT, consult) and monitoring strategies (reread ST and TT, consult, compare units). This translation process is further described as “iterative”, proceeding in a non-linear fashion and operating on the basis of sentence-level “translation units”, which are, however, often interrupted by pauses and hesitations.

2.3.2.6. Krings

Krings (1986) reports an experiment where eight German students of French were asked to translate a text either into or out of German. The main objective of the study was to identify problems and strategies associated with translation using TAPs as a method to elicit data.
Krings, with regards to the problems involved in translation, identifies the following as ‘problem indicators’:

**The subject’s explicit statement of problems:**
- The use of reference books
- The underlining of source-language text passages
- The semantic analysis of source-language text items
- Hesitation phenomena in the search for potential equivalents
- Competing potential equivalents
- Monitoring the potential equivalents

**Specific translation principles:**
- The modification of written target-language texts
- The assessment of the quality of the chosen translation
- Paralinguistic or non-linguistic features (Krings, 1986: 267)

With regards to translation strategies that the subjects resort to when automatic processing is interrupted, Krings suggests that these can be classified as strategies of comprehension (inferencing and use of reference works), equivalent retrieval (especially interlingual and intralingual associations), equivalent monitoring (such as comparing ST and TT), decision-making (choosing between two equivalent solutions) and reduction (marked or metaphorical text portions).

Three other issues investigated (as discussed by Sylvia Bernardini, 1999) by means of TAPs are translation (or attention) units, automaticity and affective factors.

**Translation Unit**
Translation (or attention) units are defined as “…those instances in the translation process in which the translator’s ‘unmarked processing’ is interrupted by shifting
the focus of attention onto particular task relevant aspects” (Jääskeläinen, 1990: 173, cited in Jääskeläinen 1993: 102). “Unmarked processing” here refers to the sections of translation that were not marked with verbal reporting as the translator did not face any problem and hence no verbal reporting was done whereas, Marked processing, on the other hand, begins with marking of a problem indicator and ends with a solution to the problem or some kind of indication that the attempts to find a solution has been put away for the time being. A “unit of analysis” is described by Gerloff (1986), who identifies seven levels of analysis, from morpheme or syllabic unit level to discourse level. According to most researchers, the size of the translation units is an indicator of proficiency. The professional translators work with larger units (sentence and discourse, or group) and move back and forth more comfortably between different unit levels. However, this does not mean that a professional translator would not stop while translating a sentence, but only that the sentence is processed as a unit, with more local problems tackled in due course of the translation (Séguinot 1996). The suggestion can be put forward, therefore, that attention units are better defined in hierarchical rather than sequential terms, with smaller units being processed within larger units. The search for a term or collocation may be embedded in the processing of a whole sentence, without implying a “word unit” or “phrase unit” analysis.

**Automaticity**

Automaticity is the automatic processing of the translation units and is gained out of experience (Ericsson and Simon, 1993 (1984). Professionals, being proficient in translation, process the units more automatically than the non professionals and most of the scholars agree that automaticity could be an indicator of proficiency in a specific task of translation. Therefore, automaticity in translation has drawn the attention of researchers. Scholars to evaluate the automaticity have largely relied on studying the marked segments reported through TAPs b professional and
non-professional translators. However, the assumption that the non-professional translators verbalize more than the professional translators is not universally accepted. Jääskeläinen and Tirkkonen-Condit, for example, point out factors such as routine and non-routine nature of the translation task. They argue that the professionals might not necessarily verbalize less in a non-routine task as the automaticity may be lacking. Further, they also add that the verbalizations by a professional translator might change as he pays attention to newer problems (Jääskeläinen and Tirkkonen-Condit, 1991).

Affective Factors
Affective factors may be defined as metalinguistic factors that affect the translator. These factors have been investigated by scholars such as by Kussmaul (1991), Tirkkonen-Condit (1997), Laukkanen (1996), Tirkkonen-Condit and Laukkanen (1996) and Jääskeläinen (1997).

2.4. Trends in more recent studies
In a study by Dimitrova who attempts to investigate the correlation between expertise and explicitation in the Translation Process Dimitrova (2005). Dimitrova in her study employs the following methods for data collection and analysis.

(a) Data was collected introspectively through concurrent verbalizations, which are transcribed into TAPs; and (b) computer logging of the process of writing down the TT. She obtains empirical data for the study in the following way. A text in Russian, describing the life of a Ukrainian artist and poet, was given to nine persons with different amounts of experience in translating – professional translators, translation students and language students at university – to translate into their first language (L1), Swedish. The ST contains several text segments with implicit logical links which can potentially (but need not) be explicitated in
translating into Swedish. The participants performed their task with concurrent introspection, and wrote their TT on a computer which recorded and time-coded all their keystrokes.

In the study by Dimitrova the data has been elicited by employing subjects with certain traits (that depend on the object of study) to perform translation task. Then data are elicited based on the verbal reports of various kinds (Concurrent, Retrospective, Dialog protocols etc.). She attempts to study what individuals, with varying amounts of experience in translation, actually do when they are asked to translate a given ST. Translation is an important part of both the literary practices and everyday life of most communities, especially those with small (from an international point of view) standard languages. A fundamental assumption in this study is therefore that not only translators with professional experience, but almost everyone with some degree of knowledge of more than one language will normally have some idea about what to do, if they are asked to translate between the languages. She says that this does not mean that they all have exactly the same idea of what to do, nor the same concept of translation.

She borrows the theoretical framework from the research on expertise in various cognitive domains (Ericsson & Simon 1984/1993) and more specifically from research on writing. She looks at translation as a writing task as translation usually results in a text. She assumes the writing model (Hayes, Flower, Schriver, Stratman, & Carey 1987; Hayes 1996) comprises three main components of planning, text generation and revision and these components are also followed in the process of translation.

2.4.1. The Study by the PACTE Group
Study by the PACTE group, Barcelona, working on Research on translation competence and its acquisition in written translation (Beeby Allison et. al, 2009)
The PACTE Group is carrying out empirical-experimental research into translation competence and its acquisition in written translation. Earlier, they have published the results (cf. PACTE 2002, 2005a, 2005b) of the exploratory studies and pilot tests carried out during their experiment to study translation competence. In the study cited here they have published the results obtained for the translation competence indicator ‘Acceptability’ of translation products and the variable ‘Decision-making’ in an experiment involving 35 expert translators and 24 foreign-language teachers.

They define translation competence as the underlying system of knowledge required to translate. Their study focuses on strategic competence, instrumental competence and knowledge of translation.

Their model comprises the following five sub competencies:-

- **Bilingual sub-competence**- Procedural knowledge required to communicate in two languages.
- **Extra-linguistic sub-competence**- It comprises general world knowledge, domain-specific knowledge, bicultural and encyclopaedic knowledge.
- **Knowledge about translation**- It comprises knowledge about how translation functions and about professional translation practice.
- **Instrumental sub-competence**- Procedural knowledge related to the use of documentation resources and information, and communication technologies applied to translation
- **Strategic sub-competence**- Procedural knowledge of strategies required to guarantee the efficiency of the translation process and solve problems encountered.
- **Psycho-physiological components**- Different types of cognitive and attitudinal components and psycho-motor mechanisms.
The variables studied were:

1. Knowledge about Translation
2. Efficacy of the Translation Process
3. Decision-making
4. Translation Project
5. Identification and Solution of Translation Problems
6. Use of Instrumental Resources

Data were collected based on the text segments termed as Rich Points in their research. These Rich Points were translated by the subjects.

Other means used to incorporate the methods that allow triangulating the results were:-

1. Translation protocols were recorded using the commercial software programs PROXY, Camtasia Studio
2. Direct observation of the Subjects
3. Questionnaires
4. Retrospective interviews

Subjects were asked to perform the following tasks:-

1. Direct translation and completion of a questionnaire about the problems encountered in the translation
2. Inverse translation and completion of a questionnaire about the problems encountered in the translation
3. Completion of a questionnaire about translation knowledge
4. Participation in a retrospective interview.
Rich Points

Advantages of the method

1. Data may be collected on a range of different types of translation problems representative of those commonly encountered when translating.
2. In-depth analysis of the same Rich Point may be carried out using the results obtained from several indicators.
3. The triangulation of data obtained from multiple sources is facilitated.
4. The same methods of data analysis can be used for direct translation and inverse translation in all language combinations involved in the experiment.
5. Greater economy is guaranteed in the experiment, and, as a result, data analysis is facilitated.

When identifying the Rich Points in each text, the following types of translation problems were taken into account:

1. Linguistic problems: lexical (non-specialised) and morphosyntactic.
2. Textual problems: coherence, cohesion, text type and genre, style, intertextuality.
3. Extralinguistic problems: cultural, encyclopaedic and subject-domain knowledge.
4. Problems of intentionality: difficulty in understanding the source text (speech acts, presuppositions, implicatures).
5. Problems relating to the translation brief and/or the target-text reader (affecting reformulation) which, from a functionalist point of view, would affect all the Rich Points
The texts selected for use in the experiment, together with five Rich Points identified in each, were tested in a pilot study carried out in 2004 (PACTE 2005a, 2005b). They also put forth the method of measuring the ‘acceptability’ as an indicator and seem to have been able to successfully measure the acceptability indicator in cases of professional translators versus the teachers.

Though the PACTE group study does not mention the use of TAPs, yet it is relevant to this study as it suggests other means of data collection that take into account the validity of data and incorporates possibility of the triangulation of results. It further mentions variables, criterion for establishing the text segments that will later on be the subject of study and most importantly a model to measure variables which are normally considered to be abstract. These may be helpful for my study, especially while collecting the data and at the time of analysis.

2.4.2. Sabine Lauffer

Lauffer reports a study that she carried out at Toyota factory in Canada. The primary objective of her study is to evaluate the methods used for observing the translation processes in translational research. She uses three translators: one senior and one junior translator working with Toyota Canada and one more translator who had worked with Ontario Government’s translation service. The subjects were given a text that was chosen by the Manager of the Toyota’s Linguistic service department. The text was representative of a typical text that the translators would translate in their daily work. All three translators performed the task in their natural work environments and were allowed access to dictionaries and other resources that they would normally consult. The computers of the subjects were prepared beforehand by installing Translog, keystroke logging software and Camtasia Studio a screen recording software. In addition to this the subjects were video recorded to capture their facial expressions and any other work done away from the screen. The video camera also recorded Think
Aloud verbalizations. Besides the recordings, the subjects were subjected to retrospective interviews while playing back any recordings. This was done to extract information that had not been verbalized during the experiment. Lauffer assumes the role of an observer throughout the study.

Based on this study, she makes following recommendations and suggestions:

- The translators should be observed in their natural daily work environment
- The observation should be of unobtrusive in nature so that there is no interference with the process.
- Software like Translog if embedded in the operating system itself will be more helpful in terms of capturing all the actions performed on the computer instead of those carried out within a particular software. Further, integrating audio and video into the program would ensure that facial expressions and verbalization are in sync with the computer actions.
- Think-aloud protocols, computer programs, audio and video recordings and retrospective interviews with playback should all be used together as each method provides information relating to different aspects of the process.

2.5. Text based studies in Translation studies

Text-based studies of translation have been using the verbal output of professional translators for eliciting data for their studies, probably because such studies are mostly based on published texts where there is a source text written by the author and a target text that has been translated by a translator. However, the access to the thought process and criterion for decision making etc. is not available to the researcher. Although, once in a while, there are critical statements from scholars about characteristics of texts translated by students, very few of them seem to be made on the basis of a systematic and empirical studies. Even in case of these
systematic studies the observations are made on the basis of comparison of source and target text. Studies that attempt to investigate every moment of the process right from the beginning of the task till the end of the task are even fewer. These studies seem to be mostly product and process studies combined, and the students compared with the professionals in such studies were usually students of translation (for example studies by Dancette 1995, 1997; Jonasson 1997, 1998a, b; Künzli 2003). Process studies, on the other hand, have more often been done with students as subjects (Krings 1986a; Lörscher 1991).

2.6. Data Collection
Different aspects of the translation process have been studied within translation studies, mainly since the middle of the 1980s. A major reason for the upsurge in this line of research has been the introduction of TAPs. Examples of such studies are Krings (1986a, 1986b, 1988, 2001), Lörscher (1991, 1993) Jääskeläinen (1999) and Dancette (1995).

2.6.1. What Are Verbal Protocols?
Verbal protocols are rich data sources containing verbalized thoughts of an individual while working on a task. Königs (1991), for instance, mentions various kind of actions that can be identified, such as macro-planning, identification, problem solving, the use of dictionaries etc.

While working on a particular task, subjects, usually, either think aloud as thoughts occur to them (concurrent Verbalization) or they do so at intervals specified by the researcher (retrospective). In some studies, researchers ask the subjects to verbalize their thoughts upon completion of the task. The verbalizations are recorded verbatim, usually using a tape recorder, and are then transcribed.
Verbal protocols differ from introspection. Subjects are not instructed to focus on the cognitive processes involved in the task completion nor are they trained in the self-observation of cognitive processing. The goal is for subjects to express overtly the thoughts that occur to them naturally. Researchers use these data in conjunction with logical theoretical premises to generate hypotheses and to draw conclusions about cognitive processes and products.

2.6.2. **What Can Verbal Protocols Reveal About Thinking?**

In order to verbalize one's thoughts, individuals must be aware of those thoughts and the thoughts must be amenable to language. Thus, verbal protocol analysis can reveal those aspects of thinking and learning that are consciously available, or activated in working memory, and that can be encoded verbally.

A major advantage of verbal protocol data is that they provide the richest information regarding the contents of working memory during task execution. In studies of reading comprehension, for example, verbal protocols have provided a detailed database of the types of text-based and knowledge-based inferences that might occur during the normal reading of narrative texts.

Another advantage of verbal protocol analysis is that it provides sequential observations over time. It reveals changes that occur in working memory over the course of task execution. This has been useful in studies of reading comprehension where the information presented and the individual's representation of the text change over time, in studies of problem solving where multiple steps are involved in reaching a solution and/or where multiple solutions are possible, in studies of expert versus novice task performance, and in studies of conceptual change.
2.6.3. Limitations of Verbal Protocol Data

As is the case with most research methods, verbal protocols have both advantages and limitations. Subjects can verbalize only thoughts and processes about which they are consciously aware. Thus, processes that are automatic and executed outside of conscious awareness are not likely to be included in verbal protocols, and other means of assessing such processes must be used. Also, nonverbal knowledge is not likely to be reported.

Most authors of articles examining the think-aloud procedure seem to disagree with the 1993 contention of K. Anders Ericsson and Herbert A. Simon that thinking aloud does not usually affect normal cognitive processing. It is thought that the think-aloud procedure may lead to overestimates and/or underestimates of the knowledge and processes used under normal task conditions. The need to verbalize for the think-aloud task itself might encourage subjects to strategically use knowledge or processes that they might not otherwise use. Alternately, the demands of the think-aloud task might interfere with subjects' abilities to use knowledge and/or processes they might use under normal conditions. Self-presentation issues (e.g., desire to appear smart, embarrassment, introversion/extroversion) might affect subject’s verbal reports. Finally, the pragmatics and social rules associated with the perception of having to communicate one’s thoughts to the researcher might also lead to overestimates or underestimates of knowledge and processes typically used.

Unfortunately, it is not possible to know if a verbal protocol provides a complete picture of the knowledge and processes normally used to perform a task. Typically, however, no single research technique provides a complete picture. Only the use of multiple measures (Triangulation method) for assessing the same hypotheses and for assessing various aspects of task performance can provide a better picture.
Another limitation of verbal protocol methodology is that it is very labour intensive. The data collection and data coding are extremely time consuming as compared with other methodologies. The amount of potential information that can be acquired about the contents of working memory during task performance, however, is often well worth the time required.

2.6.4. Other Methods used in Process Studies

Verbal report methods include think-aloud, retrospection, dialogue protocols, and Integrated Problem and Decision Reporting (IPDR). The time factor is central in terms of the validity and reliability of the data elicited. Think-aloud was the first method used in process research (Jääskeläinen 2002; Göpferich 2009:16). Since, both think-aloud and retrospection allows access only to information that is being or has been actively processed in working memory, they are used together with other methods, such as questionnaires, interviews, key logging and translation journals or diaries also to elicit data from the informants.

2.6.5. Optimizing the Advantages and Minimizing the Limitations

Several suggestions have been put forth for increasing the likelihood of obtaining verbal protocol data that provide “valid” information about the contents of working memory under normal task conditions. The most frequent suggestions are as follows:

- Collect verbal protocol data while subjects are performing the task.
- Subjects should verbalize all thoughts that occur. One should not direct their thoughts or processing by asking for specific types of information unless one wishes to study the planned, strategic use of that type of information.
- The primary objective is to record data pertaining to the thought process while performing a task, task performance is the primary concern and
thinking aloud is secondary. Since verbalizing thoughts is not a natural event in human behaviour, there might be a need to be reminded of keep talking about the task.

- To minimize as much as possible the conversational aspects of the think-aloud task, the researcher should try to remain out of the subject's view.
- Pilot and warming up tasks could help the subjects to naturalize themselves with thinking aloud.

2.7. Conclusions
The Review of Literature attempts to examine how Process of translation has been investigated in terms of methods as well as other related aspects pertaining to study of translation process. After the review, it was found that in the early period of the translation studies i.e. before the field of Descriptive Translations Studies came into being, there were attempts by the scholars to look at the process of translation using the frameworks existing in linguistics and other fields related to translations for example Kade based his model in the framework of communication theory. However, after the advent of Descriptive Translation Studies, scholars from various fields have come together and attempted to carry out empirical investigations pertaining to translation, both as a process and a product.

The following facts emerge after the review
- The scholars engaged in the process studies have heavily relied on Think Aloud Protocols for which the framework has been provided by Ericsson and Simon, and other verbal methods like Integrated Problem and Decision Reporting (IPDR) to elicit data from the translators.

- Further, they have been combined with one or more of technological methods like video recordings using video cameras or webcams, screen
recordings using screen recording software like Camtasia Studio, keystroke logging using Translog and other means like questionnaires and retrospective interviews by the translators. The reasons for using multiple methods may be to overcome the disadvantages of the Think aloud Protocols as discussed above i.e. to capture the unvoiced or unmarked parts of the translations or maybe also to cross verify or triangulate the observations.

- Most of the Scholars have used few subjects while conducting experiments as a part of their study and the texts provided to subject were short. Owing to which it may be difficult to make definitive statements as translation process may be far too complicated a process to be theorized based on limited sampling. However, these finding are of value in terms of identifying the elements and factors that relate to the process of translation.

Scholars have designed their own experiments for investigating the process of translation using different methods to elicit data. This may be due to the absence of suitable corpora to study the process of translation.

Keeping this issue in mind, I would be focussing on the design of the corpus that is suitable for process research that may facilitate Corpus based and Corpus driven process oriented researches in the next chapter.