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Difficulties that Jordanian Translators Encounter in Translating Technical Texts and Expressions from English into Arabic

الصعوبات التي يواجهها المترجمون الأردنيون في ترجمة النصوص والعبارات التقنية من اللغة الإنجليزية إلى اللغة العربية

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Master of Arts in English Language and Translation

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Authorization Form

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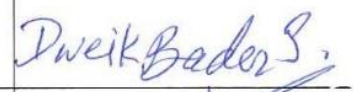
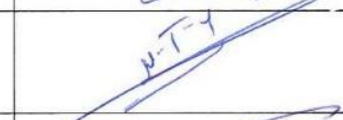
Prof. Bader S. Dweik	**Supervisor**	
Dr. Nisreen Yousif	**Member**	
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Dedication

I dedicate this work to my family mainly my husband, Ayman; my sons, Mousa and Yousef; and my three beloved daughters, Abla, Reem and Layan.

My heartfelt appreciation goes to my dearest parents Fahmi and Mouna, my brother Moneer, and my sister-in-law Mariam who all supported me throughout my study and without whom this work could have never been achieved.

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Difficulties that Jordanian Translators Encounter in Translating Technical Texts and Expressions from English into Arabic

Prepared by: **Manar Fahmi Abu-Elayyan**

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Abstract

This study aims at investigating the problems that Jordanian translators encounter in translating technical texts and expressions from English into Arabic. It also aims to highlight difficulties that translators face in translating technical texts and expressions in the fields of medicine, business, agriculture, industry and law .The study is based on translating (5) texts that vary in difficulty. The sample of the study consisted of (20) participants: (10) M.A. students majoring in English from the Middle East University (MEU), Amman, Jordan, and another (10) translators who work in translation offices in Amman. To achieve the above mentioned aims, the study also conducted interviews with students and translators to identify the factors behind these difficulties and to provide some solutions. Results of the test were analysed by using the two approaches; qualitative and quantitative.

The study aims to answer the following three questions:

1- What are the difficulties that Jordanian translators encounter while translating technical texts and expressions from English into Arabic?,

2- What factors cause such difficulties?,

3- What solutions can be offered to overcome these difficulties?

The study revealed that some of the difficulties that the participants faced were related to language difficulties such as : lexical choice, syntax, and semantics. It also found that the participants resorted to literal google translation because of lack of experience, lack of

knowledge, absence of enough practice, and shortage of specialized bilingual dictionaries. These difficulties are also manifested in the following:

1. Inability to find the equivalence in the target language,
2. Inability to adopt a successful translation and suitable strategy,
3. Lack of background knowledge in the technical fields and their terminology,
4. Lack of knowledge in both languages,
5. Lack of linguistic and stylistic knowledge in the source and target language,
6. Lack of cultural and scientific terminology which result in incorrect and improper translations.

The results of the test matched the results of the interviews in semantic, syntactic and lexical. Accordingly, the researcher suggests that translators need to practice more, develop their personal knowledge, reading comprehension skills, attend training courses in translation, and also need to resort to specialized bilingual dictionaries.

For future research, the researcher suggests to investigate some techniques and ideal procedures to be adopted while translating technical texts and expressions from English into Arabic to produce an acceptable translation that reflects proficiency and high knowledge of the translator.

Keywords: Difficulties, Translation, Factors, Solutions, English, Arabic.

الصعوبات التي يواجهها المترجمون الأردنيون في ترجمة النصوص والعبارات التقنية من اللغة الإنجليزية إلى اللغة العربية

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إشراف

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الملخص

هدفت الدراسة إلى معرفة الصعوبات التي يواجهها المترجمون الأردنيون في ترجمة النصوص والعبارات التقنية من اللغة الإنجليزية إلى اللغة العربية، كما هدفت إلى إلقاء الضوء على أسباب وطرق حل هذه الصعوبات خاصة في مجال النصوص التقنية التالية: الطب، والأعمال، والزراعة، والصناعة، والقانون. اعتمدت هذه الدراسة على اختبار مكون من خمسة نصوص تقنية متفاوتة في الصعوبة، واستخدمت عينة مكونة من عشرين مشاركا، عشرة من طلبة الماجستير في تخصص اللغة الانجليزية في جامعة الشرق الأوسط، عمان، الأردن، إضافة إلى عشرة من المترجمين ممن يعملون في مكاتب الترجمة في عمان.

ولتحقيق الأهداف المذكورة أعلاه أجرت الباحثة مقابلات مع المترجمين والطلاب تهدف إلى معرفة العوامل التي أدت إلى الصعوبات وتقديم الحلول لها. وتم استخدام الأسلوب الكمي والنوعي في الدراسة لتحليل نتائج الإختبار.

وهدفت الدراسة الإجابة عن الأسئلة الثلاثة التالية:

– ما الصعوبات التي يواجهها المترجمون الأردنيون في ترجمة النصوص والعبارات التقنية من اللغة الإنجليزية إلى اللغة العربية؟

– ما العوامل التي تسبب تلك الصعوبات؟

– ما الحلول التي يمكن اقتراحها للتغلب على تلك الصعوبات؟

بينت نتائج الدراسة أن بعض الصعوبات التي واجهها المشتركون تشمل صعوبات لغوية لها علاقة في اختيار المفردات، في التراكيب النحوية، ودلالات المعاني. كما وجدت الدراسة بأن المشتركين لجأوا الى الترجمة الحرفية عن طريق برنامج جوجل (أو محرك البحث). بسبب قلة الخبرة والمعرفة،

وغياب التدريب الكافي، ونقص في القواميس المتخصصة ثنائية اللغة. وتتجلى هذه الصعوبات أيضا فيما يلي:

1- عدم القدرة على إيجاد البديل (المكافئ) في اللغة الهدف أو المنقول إليها،
2- عدم القدرة على تبني ترجمة ناجحة وطريقة مناسبة،
3- قلة مخزون المعرفة في المجالات الفنية ومصطلحاتها،
4- نقص المعرفة في كلا اللغتين،
5- قلة المعرفة اللغوية والأسلوبية في اللغتين المنقول منها وإليها (اللغة الهدف)،
6- النقص في المصطلحات الثقافية والعلمية مما يؤدي إلى ترجمات خاطئة وغير مناسبة.

ولقد توافقت نتائج الإختبار مع نتائج المقابلات في دلالاتها وتراكيبها النحوية ومفرداتها، ولهذا، فقد اقترحت الباحثة بأن يقوم المترجمون بالتدرب أكثر، وتطوير المعرفة الشخصية، ومهارات القراءة والاستيعاب لديهم، وحضور دورات تدريبية في الترجمة، واللجوء الى قواميس متخصصة ثنائية اللغة.

وفيما يتعلق بأبحاث المستقبل تقترح الباحثة تقصي وتبني بعض الوسائل والإجراءات النموذجية أثناء ترجمة النصوص الفنية والمصطلحات من اللغة الانجليزية إلى اللغة العربية مما يؤدي إلى ترجمة مقبولة تعكس كفاءة ومعرفة المترجم.

الكلمات المفتاحية: الصعوبات، الترجمة، العوامل، الحلول، اللغة الإنجليزية، اللغة العربية.

Chapter One
Introduction

1.0 Introduction:

1.1 Background of the study:

Generally, translation is not an easy job. Recently, technology has invaded all aspects of life and sciences. Its expansion in the world meant that technical information needed to be translated into other languages. Technical translation is a translation of terminology i.e engineering, medicine, economics, psychology, agricultural and law.

Since technical materials are written in English, this made it enjoy a great significance in the twentieth century as it is now the language of a wide range of inventions. Due to technological developments, a lot of difficulties have emerged in translating technical texts and expressions from English into Arabic. Such an issue indicates that any researcher in the field should highly consider such difficulties and work for solutions to make any technical translation acceptable.

Nowadays, Arabic is one of the official languages of the United Nations. The Arab world is a large consumer of science and technology. So, science and technology are needed everywhere because of globalization in which the whole world has become a small village. Although Arabic is one of oldest

languages of the world, it suffers a lot for not being technically served. This can be one of the main reasons that delay the translation process of many terms related to computer in particular and to various types of technology in general (Hazza, 2013).

Technical translation is concerned with rendering meaning of source texts into target texts for communication between two languages. It needs an expertise who is conversant with difficulties that might be outlined in the following: difficulties with words, sentences, and terminology. As for the difficulty with words, the most obvious and serious ones are caused by words. Source translation words might be simply misunderstood, as that sometimes results in catastrophic translations. Alternatively, the meaning of the source translation words might be understood by the translator, but he/she fails to select an appropriate target language equivalent.

Difficulty with sentences, is caused by the differences between the structure of English sentences and that of Arabic. Such difficulty usually might be faced with: "1-tense and aspect, 2- certain sentence types (for example: a- compound versus complex sentences, b- defining versus non-defining relative clauses, c- active versus passive sentences." (Inani1998: 70), Therefore, sentences might be running, complex and so long, they could be ambiguous and specialized sentences, even the style of writing is considered one of the difficulties.

1.2 Statement of the problem:

Technical translation involves foreign concepts and expressions that may not be available in Arabic, as English and Arabic stem from different origins, Germanic and Semitic. Consequently, different situations may create problems to Arab translators. Technical errors and inaccuracies may cause troubles to the manufacturer, nerve distress for the client, and may cause serious accidents. Therefore, it is worthy to investigate this issue and to probe its implications. In this study, the researcher will shed light on the difficulties that Jordanian translators might encounter in the process of translation, explore their causes and suggest some remedies to overcome such difficulties.

1.3 Objectives of the study:

This study aims to:

1- Investigate the difficulties that Jordanian translators face while translating technical texts and expressions from English into Arabic.

2- Investigate the factors that cause such difficulties.

3- Suggest suitable solutions to overcome such difficulties.

1.4 Questions of the study:

1- What are the difficulties that Jordanian translators encounter when translating technical texts and expressions from English into Arabic?

2- What factors cause such difficulties?

3- What solutions can be offered to solve out these problems?

1.5 Significance of the study:

Although there are many studies conducted on technical translation worldwide, to the best knowledge of the researcher, there are a few studies that deal with technical translation in Jordan. This study may fill a gap in the literature related to technical translation. It may also be a benefit to translators, teachers and students of translation along with curriculum planners and any scholars interested in the field of translation studies. Errors committed by translators of technical texts may lead to property damage, financial loss, injury or even loss of life; e.g: mistranslations of medical texts or user's manuals for heavy machinery, etc.

1.6 Limitations of the study:

The findings of this study may not be generalized to all kinds of translation in Jordan. It is only limited to the technical types of translation that include medical, business, agricultural, industrial and legal texts. Results of this study are also restricted to the instruments and samples used in this investigation.

1.7 Limits of the study:

This study was conducted in Jordan during the second semester of the academic year 2019-2020.

1.8 Definitions of terms:

Theoretically: **Technical Translation** is defined by Ghazala (1995) as "[t]he translation of scientific and technical terms of all kinds: medical, physical, chemical, mathematical, mechanical, technological, biological, agricultural, computer and other terms of the various branches of science." (p.156)**.** Byrne (2006) also defines it as "a type of specialized translation involved in the translation of documents produced by technical writers such as user's guides, manuals, medical transcripts and prescriptions or technological subject texts" (p.280).

Operationally: In this study, the researcher will focus on technical translation as presented in: medicine, business, agriculture, industry, and law, translated by native speakers of Arabic, rendering the meanings of technical texts from English into Arabic.

Jordanian translators: Theoretically, means translators belonging or related to the country of Jordan, or to its people or culture, Jordanian citizens, or the persons of Jordanian origin, whose job is translating texts from one language to another.

Operationally: It means those Jordanians who will participate in this study, namely translators. Jordanian translators are those persons who are able to render the meaning of technical texts from English into Arabic, and practice

translation in specialized offices and companies and M.A students majoring in translation.

Technical texts and expressions: Theoretically, they mean "words, phrases, and terms, pertaining to a mechanical or industrial art or applied science." (Thorndike, 2010: 1908).

Operationally: they refer to medical, business, agricultural, industrial and legal.

Chapter Two
Review of literature

2.0 Introduction

This chapter consists of theoretical literature and empirical investigations related to difficulties Jordanian translators encounter in translating technical texts and expressions from English into Arabic. The theoretical one aims at providing information about technical translation, factors related to difficulties encountered, and offering some solutions. As for the empirical studies, it deals with issues related to problems and challenges associated with technical translation.

2.1 Review of theoretical literature related to definitions of technical translation

Many technical terms in economics, finance, business and industry are being used and learnt as they are in their original source languages. This leads to avoiding translating them into the target language like Arabic, due to the absence of accurate equivalence. Indeed, these terminologies are being used as Arabic words or jargons because of their circulation among Arab users.

Scholars and linguists like Newmark (1988), Farghal and Shunnaq (1992), Ghazala (1995), William and Chesterman (2002), Dickins and Higgens (2002), Thorndike Dictionary (2010) define technical translation as follows:

Newmark (1988) defines technical translation "as one part of specialized translation; institutional translation, the area of politics, commerce, finance, government etc., is the other. Technical translation is mainly distinguished from other forms of translation by its terminology and its grammatical features". (p.151)

Farghal and Shunnaq (1992) define technical translation as "technical materials normally cover specialized literature emanating from differing disciplines such as sciences, e.g. chemistry, physics; economics, e.g. accounting, public administration; political science; law; religion" (p.203)

Ghazala (1995) defines technical translation as "the translation of scientific terms of all kinds: medical, physical, chemical, mathematical, mechanical, technological, biological, agricultural, computer, internet and other terms of various branches of science. (p. 156). He adds "it is the transmission of English technical terms into Arabic. The greater number of scientific terms (80-85%) are rendered by means of translating them into Arabic equivalents that are a part of Arabic language lexicon. (p.161).

William and Chesterman (2002) define technical translation as the translation of specialized texts which require high level of knowledge to master relevant terminology in diverse domains, such as medicine, economics, science and technology.

Dickins, Harvey, an Higgens (2002) posit that technical translation is not restricted only to technology or natural science but also it belongs to all specialized domains which have their own technical terms.

The term "technical translation" has always been associated with technological connotation as defined in Thorndike's Dictionary "as pertaining to a mechanical or industrial art or applied science; pertaining to the special facts of a science or art, and pertaining to any art or science. (p. 1908)

2.1.1 Review of theoretical literature related to difficulties encountered while translating technical texts and expressions from English into Arabic

Theorists and linguists such as Newmark (1988), Byrne (2006), Anvarovna (2017a) Farghal and Shunnaq (1992), Inani (1998), Abdellatif (2016), and Ghazala (1995) have given a significant importance to translation in general, and technical translation in particular. Furthermore, they discuss the difficulties that encounter technical translators.

Newmark (1988) distinguishes the technical translation from other forms of translation. For him, technical translation is primarily distinguished for its terminology which does not include emotive language, connotations, sound effects, and metaphors. This makes technical texts look simpler to be rendered; however, the reality is that it is not, because some new words appear in technical translation might be ambiguous, and difficult to have their equivalence, in the language to which it is translated.

Byrne (2006) finds it difficult to know where to situate technical translation within a theoretical framework, taking into consideration the problematic diverse range of approaches, models, rules and theories. She argues that "the challenge for technical communicators is to ensure that all of the relevant information is indeed conveyed in a way that the readers can use the information easily, properly and effectively." (p.10)

Anvarovna (2017b) considers technical translation as the most complicated type of translation, for what is needed, not only linguistic but also technical knowledge as well. It is the translation of texts of technical subjects, in particular, documents of different specializations, all kinds of reference literature, dictionaries, products, conformity certificates, operating instructions, engineering plans, scientific and technical articles, business contracts, and other commercial technical proposals. He also believes that in order to understand technical texts correctly, knowing the subject and related

terminology is very important for the translator of the technical and scientific texts. This aims to produce accurate and simple translated texts that preserve the features of the author's style. A specialist translator working with scientific and technical texts should understand not only the meaning of the translated words, but also take into consideration all the differences of their applications. Usually, all documents of a scientific and technical nature have the main features. He adds that a translator of technical and scientific texts and expressions may encounter significant difficulties while translating scientific works i.e., if the word has several meanings, and if the translator lacks proficiency in technical terminology and linguistic ability. Another difficulty that might arise, is the presence of abbreviations in the text which sometimes are not clear even to technical specialists. These abbreviations can be a barrier to qualitative translations. Technical translation is always free of emotional and imaginary language. Therefore, neutral language must be adopted in scientific style.

Inani (1998) points out that translation problems have three basic types: a) individual word problems, b) individual sentence problems, c) problems related to sequences of two or more sentences or by the text as a whole. He asserts that these problems can be overcome by the concept of translation equivalence suggested by theorists of translation.

Abdellatif (2016) mentions that technical translators face problems such as providing the Arab readers with wrong inaccurate translations, because the terms used are not borrowed to cope up with the English texts. She adds that the most problematic obstacles are related to terminology, abbreviations and acronyms which are common in English technical texts for example (GP, 4G, SIM, MicroSD). Furthermore, the translators may suffer from being able to offer acceptable translations because they did not find the equivalent in Arabic. She assures that knowledge and experience of the translator in the technical field are highly required.

Ghazala (1995) maintains that "a translation problem can be posed by grammar, words, style and/or sounds. Thus, we have grammatical, lexical, stylistic and phonological problems". (p.18). He also adds that "the Arabicization of technical translation and scientific terms pose considerable problems, some of which are still unsolved in the translation of many technical terms. Different methods of Arabicization are suggested to tackle these problems (i.e. transference, naturalization, translation and coinage).

The challenges that technical translators encounter are multifarious and attributed to many reasons, including layout, syntax, and tenor. English legal text is the most challenging genre of technical material, due to a very high responsibility in translation. Technical materials cover specialized literature such as sciences, economics and political ones as well.

Halliday (1978) points out that technical materials "require high experience and language competence," otherwise the translator's failure to deal with the content might result in mistranslation, then failure in register. (p.39)

Farghal and Shunnaq (1999) assert that "the major problem facing translators at present is terminology standardization and dissemination in the sphere of science and technology". (p.210). They also describe other problems students face such as (syntax, layout and tenor) as follows: Some English words do not exist in Arabic, since Arabic possesses only tensed clauses, which can lead to "syntactic" problems while translating. Also, Arabic language does not allow the deletion of the circumstantial marker; therefore, the translator must be excellent in Arabic. For example: (let's eat, Grandma. / Let's eat Grandma.) where the parenthetical phrase could cause syntactic problems for the translators and leads to a completely different meaning. Where they define the "layout" as the sketch or plan of the text's physical appearance, related to paragraphing, indentation, and graphic choice for example: (capitalization, paragraphing, indentation, bold typing, etc.). The translator should be aware of the importance of using the significance layout features in texts in general, and legal and economic texts in particular; otherwise, it will affect both the cohesion and coherence of the text. They consider other problems such as "tenor" which they define it as one of the three aspects relevant to register or (language varieties). The term

“Tenor” refers to the relations among the text producers, and receivers, especially the level of formality between the participants either standard, formal or highly formal. They indicate that the lexical choice in legal texts, whether formal or informal constitutes a problem for legal translators. For example:

(Under Apartheid) some translators rendered it as :تحت الفصل العنصري

Where it is supposed to be legally translated as: في ظل الفصل العنصري

Generally, translators’ inability to provide correct and accurate translations of texts is connected with the semantic and lexical problems in the information and technical fields, particularly in the field of economics, law and those texts related to user’s guide and manuals. In addition, to the lack of specialized dictionaries related to technology and communication. This, as a result, might lead to marketing problems and financial issues of newly invented features.

Context usually helps to resolve the ambiguity of a word with many meanings. Part of the content is the field of human experience in which the word is used. The word (***cell)***, for example, will normally have one-only one-of such dictionary meaning as the following (depending on what field it belongs to: in a prison زنزانة , in a monastery or convent صومعة, in biology

خلية حية , in a secret political organization خلية/مجموعة سرية, in electricity خلية كهربية/ بطارية،جزء من البطارية. (Inani, Adil,1998:9).

Dweik (2014) identifies the difficulties that many translators may face in translating technical terms such as linguistic and non- linguistic ones. The linguistic problems include lexical, syntactic and semantic. Where the non-linguistic may include lack of knowledge, lack of lexical reservoir, absence of unified dictionaries and specialized glossaries. In addition, they might be unfamiliar with the equivalence in the target language or abbreviations used for example in the field of finance, medicine, economics, law and agriculture, etc. (p. 265)

Newmark (1988) mentions that "the chief difficulties in translating are lexical, not grammatical ones, i.e. word collocations and fixed phrases and idioms." (p.32). He divides difficulties into two categories: a) you do not understand them, b) you find them hard to translate. He believes that "if you can not understand a word, it may be because all possible meanings are not known to you, or because its meaning is determined by its unusual collocation or are referenced elsewhere in the text." (p.33).

Another difficulty the translators may encounter is terminology problems when dealing with technical and scientific translation of documents. These difficulties include identifying a term, understanding a term, finding the right

equivalent, dealing with the absence of an adequate equivalent, solving denominative variations and overcoming mis-transcriptions. (Matamla 2010:1). The relationship between terminology and translation has always been a close one. From a theoretical point of view, the theory of terminology can make translators aware of many concepts such as the notion of "a term" or the idea of variation, which allows them to identify terms and deal with equivalent denominations. From a practical perspective, translators often venture into the field of terminography, they need to carry out ad hoc searches.

Hann (1992) asserts that the technical translator's job is considered hard and is being increased in fact; when the translator may not understand the source text. He adds "A poor literary translation leads to a dissatisfied reader, whereas a misleading technical translation could result in a hazard to human life." (p.7)

Al-Darawish (1983) implies that languages are different in their morphological, phonological, lexical, semantic and syntactic features. They are not identical in syntax or sentence arrangements, where the translator may shift many items in the text forward or backward, as it is so hard for him/her to master two languages.

The concept of equivalence in translation studies is considered a crucial issue by scholars and theorists, as translators suffer from difficulties related to cultural and functional equivalence as viewed by the following scholars;

Catford (1965) states that the equivalence in translation is a comparing phenomenon between the source text and target counterpart, where the textual equivalence plays as SL textual items. He adds that the words in the source language and the target one are not necessary, having the same meaning in linguistic field, "but that does not mean that they could not, nevertheless, function well enough in the situation." (p.49). He claims that since the main concept of translation is equivalence, then the central difficulty of translation is to find that equivalence of the target language, as the duty of the translation theory is to define the condition and nature of the equivalence in translation.

Baker (1992) infers that the lack of equivalence causes translation problems at the level of words. However, Al -Hattab (1999) asserts that translators of technical terms may face the problem of non-equivalents in Arabic due to scientific developments and new technological terms which are increasingly noticed nowadays, plus the lack of unification of Arabic terms in scientific translation.

Pinchuck (1977) points out that “in fact technical translation demands high qualification if it is to be done properly”. It means that the translation of technical texts and expressions is not an easy job. It requires knowledge, translation skills and high qualifications in the assigned field to be translated.

Abu-Ssaydeh (2006) indicates that the failure to translate technical texts or multi-word units (MWU) is attributed to the failings of bilingual dictionaries and the lack of specialized ones. He believes that MWUs are important to translators as learners of foreign language rather than true bilinguals. Thus, they need to acquire multi-word units, Arabic-English dictionaries, as a solution to overcome the lexicon problem to be able to compete with natives to an approximate level in English.

Zakharenko (2019) indicates that abbreviations lead to difficulties during the process of translation since they are “new linguistic phenomenon and have certain patterns”, so general studies in this regard have been not significantly available yet. Abbreviations can be recognized mostly in scientific and journalistic texts as ambiguity is common and many refer to committees, associations, or organizations.

Similarly, Cronin (2003) believes that abbreviations and acronyms grab the attention of translators regarding the difficulties they might face in the technical texts along with numbers and specialized terminology.

2.1.2 Review of theoretical literature related to causes and solutions of the difficulties of technical translation:

Stolze (2009) believes that technical translation is bound up with terminology and cultural differences between languages in which difficulties may occur unless standardization is adopted by the translator of technical texts. However, Salas (2000) thinks that some difficulties are caused by lack of experience in lexico-semantic levels, register and writing style, as well as spelling and punctuation levels, in addition to cohesion in the translated texts.

Dweik (2014) affirms that the challenges that novice translators may face in translating contracts are caused by lack of knowledge, lack of legal background and equivalence, in addition to lack of competence related to English language terms and style.

Sanchez (2010) proposes to conduct a practical training for the translators in the field of technical translation to overcome the difficulties they encounter. However, Kastberg (2002) advises that technical translators shall adopt the management of personal knowledge (MPK), as a solution for equipped translators. He adds that the skills of research and the management of information are needed to compete with problems technical translators encounter.

Schubert (2009) also affirms that developing machine translation systems (MT) for the translators of technical fields is necessary to assure the clarity and accuracy that may rival the quality of the translation done by human. On the other hand, Newmark (1995a) argues that a good translator should posses a reading comprehension capacity, language sensitivity and writing competence for both languages. Whereas, Salas (2000) believes that a good translation performance needs specialized training, knowledge of the subject field, a wide range of cultural background, interlingual communication, good translation strategies, but never recommends machine translation.

2.2 Review of empirical studies (previous studies)

Many scholars and researchers such as Awawdeh (1990), Gauton and De Schryver (2003), Suwais (2008), Abdellatif (2016), Hazza (2013), Argeg (2015) conducted empirical studies to discuss the difficulties related to technical translation.

2.2.1 Studies related to the difficulties of technical translation

Awawdeh (1990) conducted a study that aimed to identify the main difficulties translators may encounter when translating technical and scientific texts from English into Arabic. He analysed 26 translated texts from English into Arabic, using different disciplines and compared Arabic and European technical writing features. The study came up with broad categories of difficulties such as syntactic, lexical, cultural, metaphoric,

morphological and cohesive problems. Moreover, he suggested a number of methods to deal with these difficulties, such as emphasizing the translator's competency and standardizing scientific terminology on the national and regional levels.

Gauton and De Schryver (2003) investigated the problem of lack of terminology in most fields of specialities as being the essential problems translators face when translating into African languages. They conducted a study to compare and analyze many strategies done by African translators for the most proper equivalent. A ten- parallel text, in all the eleven South African official languages were studied with a combined size of 348,467 running words, with an average of 32,200 words per language. The study came up with a good correlation between the terms, in spite of the difference between languages. In addition, it observed several strategies of translation, one of which was the retention of loanwords translation with English spelling, which reflected the phonological system of the borrowing language. Moreover, new scientific and technical terms were formed and their phonological structure was adapted and accommodated by the borrowing language.

Suwais (2008) investigated the problems and strategies used in translating technical terms and texts. She used a questionnaire distributed at Yarmouk University. The questionnaire consisted of 67 (IT) terms to fourth year (IT)

and (MA) translation students. The findings have come up with the mistranslation of terms by participants or failure to provide any translation. The researcher found that paraphrasing, transliteration, loan translation and borrowing were the most prevalent.

Abdellatif (2016) aimed to examine the difficulties and problems involved in translating thirty cell phone terms from English into Arabic. She also attempted to find out the strategies that have been employed by the participants in translating such cell phone terms. She used a questionnaire which was distributed to the engineering and MA translation students, at An-Najah National University. The researcher found out that the students were not qualified enough in this technical field and should have good background knowledge about telecommunication technology. Moreover, 49% of the translations were unacceptable and lack accuracy. Although cell phone terms were selected from different websites related to cell phone jargon, though many of these terms are used in our daily life.

Hazza (2013) aimed at investigating the problems that Jordanian translators encounter in translating computer terms and the strategies used. He also wanted to evaluate the effectiveness of the translated terminology of computer into Arabic using two tests and two questionnaires. The first questionnaire and test were given to 66 translators with a previous experience. The second test and questionnaire were given to 100 users of

computer. The findings of the study showed that many translators lack the knowledge and strategies in computer science terms and lack the resources to be used such as specialized glossaries. He recommended that borrowing and domestication better to be used as a solution rather than a strategy of equivalence.

Argeg (2015) conducted a study to display the problems of translating medical terms from English into Arabic. The study was applied on postgraduate students in Libya, who were involved in medical translation compared to professional Arab translators working in the medical field, where pharmacological terms were excluded. A questionnaire test was utilized. It included a group of English medical terminology to be translated by 54 Ph.D students in translation and by 12 professional Arab translators working in clinics and hospitals in the UK. The results of the data collected showed real challenges and difficulties in translation that both Ph.D students and professional translators encountered. Furthermore, the study concluded that the reasons behind such difficulties were that the participants lack experience, lack awareness about lexical selection, and lack the use of up- to -date medical dictionaries or (CAT: computer assisted translation tools) . The findings of the study shed lights on the importance of training courses to be offered to the translators, and literal translation should be avoided.

2.2.2 Studies related to causes and solutions behind the difficulties of technical translation:

In this part of the research, the researcher is going to tackle some studies concerned with empirical translations with regard to: economy, politics, advertisement and commercials, automobile and agricultural.

Othman (2013) conducted a study to discuss the impact of lexical problems on translation of economic terminology. The study aimed to find the factors and solutions to help translators create appropriate translations for the economic terms. The study adopted two instruments of 10 questionnaires and interviews, using quantitative and qualitative approaches to collect data. The population of the study was 34 translators working in the Faculty of Economic, University of Aden, while the others working at the National Institute of Administrative Sciences/Aden.

The findings of the data analysed showed that translators encountered lexical problems, meaning comprehension deficit, where ambiguous texts were produced and that affected the total meaning of the translated texts in economy. The study in addition, revealed the causes of such difficulties which were due to insufficient experience, lack of economic culture, lack of sufficient qualifications, plus translators were not aware of the differences between SL and TL equivalence. Moreover, they faced multi meanings of the economic terminology in the context in addition to metaphors.

The researcher suggested to conduct training courses for the translators who need to expand their knowledge of the economic culture, be aware about equivalence in the target language to be capable to offer a good translation of economic terminology and reach a good level of work in this field.

Al-Zu'bi, (2012) attempted to investigate the translation difficulties encountered while translating political terms and expressions from English into Arabic. A test of 30 political excerpts from the speech of His Majesty King Abdulla, (Our Last Best Chance), where distributed among 40 M.A participants from both MEU and Yarmouk University.

The data collected came up with the following results: the translators faced lexical and cultural difficulties during the process of translation of political terminology and expressions, due to lack of equivalence, lack of knowledge background, and lack of awareness in political discourse. She suggested that translators should master translation skills, need to have high qualifications, high proficiency in both English and Arabic languages, and have broad knowledge in cultural and political fields in order to achieve adequate translations.

Daraghmah et al. (2014) aimed in their study to demonstrate the difficulties that translators face while translating advertisements and commercials. The survey included 75 texts of online website advertisements to be translated

from English into Arabic. The texts were distributed among commercial designers and writers. The findings of the study revealed that the participants suffer from semantic and syntactic deficit, equivalents supply problems and standardized terminology. The study showed that the reasons behind such problems are lack of equivalence, lack of consistency while translating technical texts due to low- circulation of terminology and being unfamiliar with the jargon used in the subject field. Moreover, due to the deficit of technological culture in the domain of advertisement and commercials. The researchers in this study assumed that translators of technical translation do not need to worry about non- specialized audiences since their target is the specialized ones. The translators find it difficult to master an enormous number of new terms which enter foreign languages daily and they have to provide some explanation and adopt proper strategies during translation process.

Matrozi and Adina, (2015) in discussing problems encountered in technical translation pertaining automobiles, she found out that differences between American and British English might create a big problem for translators. The wrong use of certain terms might lead to a certain conception which eventually might convey a wrong message. She cited a lot of terms which reflect automotive technology in American and British English. (e.g.:)

(Estate car , station wagon, lorry, truck) , (Bonnet, hood, boot, trunk), (Silencer, muffler, crossing, intersection. etc.) (p. 240).

The solution for such a kind of problem might be solved through the translator being well conversant with the two Englishes; British and American.

Ishaq (2017) aimed in his study to explore the difficulties and problems that experienced interpreters and amateur translators encounter while translating modern scientific terms focusing on agricultural engineering. He mentioned that the problems are attributed to diversity of scientific terms, obstacles to apply unification and standardization, the deficiency of Arabic scientific terms, the huge influx of daily neologisms and synonyms. He added that the study identified scientific textual difficulties which are related to the features of the text i.e. coherence, referential meaning and precision. The study recognized the causes of such problems such as insufficient knowledge about some technical subjects like: maps, figures, drawings, etc. in addition to lack of translation qualification, lack of bilingual dictionaries and encyclopaedias, and lack of the appropriate equivalence in the target language. The study depended on the data which was gathered from a sample of (44) participants working in translation. Two approaches and sources were applied including quantitative and qualitative methodologies. The tools used

for data collection were documents, observations, interviews and questionnaires. (p.7)

The study recommended adopting modern technical systems and scientific regimes in education development, applying science of terminology in all institutions of higher education, applying specific specialization related to one of the translation domains, conduct advanced training to enhance the capacity of translators.

From the preceding empirical studies, the researcher notices that the difficulties translators may encounter could be outlined in culture, dictionaries and lexeme equivalency, style, lack of knowledge and experience, lack of terminology, and scientific background.

Chapter Three

Methodology

3.0 Introduction

This chapter presents the population, sample, and the instruments including the test and interviews, and their validity and reliability. Furthermore, it describes the data collection process, analysis, and the procedures followed in this study.

3.1 Sample of the study

The sample of the current study consisted of (10) M.A students majoring in English language studying at the Middle East University (MEU) Amman, Jordan, and (10) translators working in translation bureaus in Jordan (males and females). The sample of the study was selected purposively to make the investigation convenient. The demographic background of the participants included social data such as: gender, age, occupation, nationality, academic level, and linguistic background as presented in table (1)below:

Table (1): Demographic data related to the participants

Age	No.
22-27	4
28-33	7
34 and above	9
Gender	
Female	13
Male	7
Nationality	
Jordanian	18
Others	2
Employment Status	
Nil	5
Employed	7
Students	8
Number of years working as a translator	
Non	8
0-5	6
More than 5	6
Number of years spent in learning English	
0-5	6
6-10	8
11 and above	6
Number of years spent in English - speaking countries	
Non	11
0-5	6
More than 5	3
Academic Qualifications	
B.A	5
M.A	13
PHD	2
Specialization	
Literature	4
Translation	6
Linguistics	3
Others	7

3.2 Instruments of the study

The researcher **used** two instruments, a translation test and semi-structured interview questions designed to gather information for analysis. The study adopted a combined approach: a qualitative and quantitative designs.

3.2.1 The translation test

The researcher conducted a test for M.A students studying at MEU and translators working in translation offices in Amman, Jordan in order to investigate the various problems they encounter while translating technical texts and expressions derived from technical fields. The test included 5 texts which were randomly selected from: medicine, business, agriculture, industry and law, in addition to using a semi-structured interviews questions to be answered by participants. (See appendix One, p. 102)

The test was validated before it was distributed to the sample. Some copies of the test were handed in personally, others, via email . The participants were given enough time to translate the required material and were allowed to use available dictionaries, books or other resources. The texts were as follows:

- Paragraph one is a sample of a medical text.
- Paragraph two is a sample of a business text.
- Paragraph three is a sample of an agricultural text.
- Paragraph four is a sample of an industrial text.
- Paragraph five is a sample of a legal text.

The test was corrected according to the following system suggested by the (jurors and validators) who proposed model answers:

1- Accurate translation of each paragraph was given (two points) if the answers were semantically and syntactically correct.

2- Acceptable answers were given (1 point) if they were semantically correct but grammatically unaccepted.

4- Incorrect translation of each paragraph was given zero, if the answers were considered semantically and syntactically wrong and fatal linguistic errors were committed that changed the meaning of the given texts. Model answers for the translation test have been suggested by the jurors/ validation experts. (see appendix Two, p. 106)

3.2.2 Interview questions

The researcher interviewed (6) professors, (10) translators and (10) M.A. students. They were all given the same questions to answer. The interviews consisted of written informal open-ended questions. The participants were requested to answer three questions: Namely, the difficulties that Jordanian

translators encounter in translating technical texts and expressions; the causes of such difficulties; and solutions that might be suggested to overcome such difficulties. The researcher adopted the following procedures in conducting the interviews:

- Professors were all interviewed in person in their offices.
- All Translators were contacted by mobile and were requested to send their translations via email.
- Students were given the interview questions in class at MEU and were also requested to email their responses as well.

After each interview, the researcher talked to the interviewees to find out if they had any comments or suggestions. (To see the questions, the reader is referred to appendix Three, p. 108, and 109)

3.3 Validity and reliability of the test

3.3.1 Validity of the test

After the test and the semi-structured interviews were prepared, they were given to a panel of 6 experts (university professors) to find out whether the test and interview questions examine what they are supposed to test. The experts were requested to provide their comments on the test and the

questions of the interview and to offer any suggestions or recommendations. The panel of experts did not include or suggest any modification. Thus, they approved it and the researcher addressed the interview questions as they were set at the beginning.

3.3.2 Reliability of the test

The reliability of the test was conducted by giving it to a group of translators who have the same background of the sample. Two weeks later ,the test was applied again on the same group, then the results were calculated according to the data collected. The results of the test were stable and reliable.

3.4 Procedure of the study

The following procedures were adopted in this study:

1- Reviewing theoretical and empirical studies related to the thesis.

2- Using two instruments: an interview and a translation test done by the participants.

3- The participants were selected and the questions of the test were presented to a panel of four experts for validation and modification.

4- The researcher distributed the test and later conducted the interviews.

5- The data were collected from the participants and then were analysed and tabulated.

6- Results were presented and analysed in the light of the previous theoretical and empirical studies.

7- Conclusions were presented based on the outcome of results.

8- Recommendations for future research were added.

9- References were written according to APA style of documentation which is adopted at MEU.

10- Appendices were annexed at the end of the study.

Chapter Four

Results of the Study

4.0 Introduction

This chapter shows the findings of the following three questions:

1- What are the difficulties that Jordanian translators encounter while translating technical texts and expressions from English into Arabic?
2- What factors cause such difficulties?
3- What solutions can be offered to overcome these problems?

The chapter also reports the results of the interviews conducted with the participants.

4.1 Results related to the first question in the test:

The first question of this study was: "What are the difficulties that Jordanian translators encounter while translating technical texts and expressions from English into Arabic?''

The findings of the performance of the participants in the English translation test are presented in Table (2) p.37 below. Each text is reviewed and discussed separately in order to show the type of difficulties the translators faced during the translation process. Each text was divided into 4-5 sentences

that varied in length. The translation of each sentence was checked in terms of accuracy of language, grammar and content. The erroneous translations were also analysed and commented on. A detailed analysis of the results are presented in Table (2) which will be discussed later. The researcher took into consideration that all model translations were provided by experts specialized in their fields.

Table (2): Translators' performance in the test:

Test	Accurate Answer (2 points)		Acceptable Answer (1 point)		Wrong Answer (Zero)	
	Freq. Out of 20	%	Freq. Out of 20	%	Freq. Out of 20	%
Text 1 Medical	2	10%	3	15%	15	75%
Text 2 Business	1	5%	11	55%	8	40%
Text 3 Agricultural	1	5%	6	30%	13	65%
Text 4 Engineering	2	10%	6	30%	12	60%
Text 5 Law	1	5%	4	20%	15	75%
Mean of responses participant	7%		30%		63%	

Text (1): Medical

A Mechanical Approach to The Characterization Of Material Failure of Atherosclerotic Lesions

Failure of atherosclerotic plaques can lead to potentially life threatening clinical events such as myocardial infarction (MI), stroke, or transient ischemic attack (TIA). The most frequently described plaque failure mechanism is tensile rupture of the fibrous cap; however, often during angioplasty another plaque failure mechanism occurs in which the atherosclerotic plaque separates from the internal elastic lamina (IEL).

(Dr.Ahmad Hassouna, Isra' Hospital, Amman-Jordan, has suggested the following model answer:).

يؤدي فشل الترسبات العصيدية في جدار الشريان إلى حالات سريرية تهدد الحياة مثل إحتشاء عضلة القلب أو الجلطات الدماغية العابرة ،إن من أهم مضاعفات العصيدة الدهنية والترسبات هو تقرح الغطاء الليفي، و يمكن من خلال عملية فتح الشريان أن تحصل آلية لإنخلاع الترسب الدهني وانفصال هذا الترسب عن الطبقة المرنة الداخلية للشريان.

As shown in the Table (2), some respondents were unable to translate the medical text due to their lack of knowledge in this field. Table (2,p.37) indicates that the percentage of the correct answers was only (10%) and

(15%) acceptable, while (75%) were wrong answers as demonstrated in the example below:

The accurate answers are based on the model answers provided below by Dr. Ahmad Hassouna and considered semantically and grammatically correct:

1- *Failure of atherosclerotic plaques can lead to potentially life threatening clinical events such as myocardial infarction (MI), stroke, or transient ischemic attack (TIA).*

يؤدي فشل الترسبات العصيدية في الشريان إلى حالات سريرية تهدد الحياة مثل إحتشاء عضلة القلب أو الجلطات الدماغية العابرة.

An acceptable translation of the above statement which was provided by the participants and considered semantically correct but grammatically not, reads as follows:

من الممكن أن يؤدي فشل صفائح تصلب الشرايين إلى أعراض سريرية تهدد الحياة مثل إحتشاء عضلة القلب أو الجلطات الدماغية أو نقص التروية العابرة.

As for the incorrect translations pertaining to this statement, two samples are presented below:

-يمكن ان يؤدي الفشل في الصفيحة اللويحية التعصدية الشريانية الى نتائج سريرية

-يمكن ان يؤدي فشل لويحات التصلب الكلوي الى احداث سريرية تهدد الحياة.

The incorrect translations might be caused by the following factors:

a- Semantically wrong because of misunderstanding the text

b- Wrong lexical choice due to lack of knowledge in this field

c- Highly technical terminology with which the translator was not conversant

d- Google translation with cosmetic change

e- Few translators were unfaithful to the text as they used deletion strategy for the portions they were unable to translate.

2- *The most frequently described plaque failure mechanism is tensile rupture of the fibrous cap;*

The model translations of the above statement, as provided by Dr Esam Kayed and the cardiologist Dr.Ahmad Hassouna respectively, are:

-وفي كثير من الاحيان فإن آلية فشل الصفائح الأكثر شيوعا هي تمزق الغطاء الليفي المشدود.

-إن من أهم مضاعفات العصيدة الدهنية والترسبات هو تقرح الغطاء الليفي.

As for the incorrect translation related to the statement above, two samples are shown below:

إن آلية فشل لصفيحة\ لوحة الاكثر شيوعا تم وصفها وهي فتق توتري في الغطاء الليفي.

آلية فشل البلاك الأكثر شيوعيا هي تمزق الشد الليفي.

The incorrect translations, committed by the students and translators, might be caused by the following factors:

a- Wrong lexical choice such as:

Atherosclerotic صفائح عصيدية

b- Literal translation such as:

Clinical events أحداث سريرية

c- Missing information or incomplete translation such as:

Plaque failure mechanism آلية تقلص الشرايين وانسدادها

d- Google translation or mistranslation

Tensile rupture فشل الكلى

The analysis of text (1) Medical

Below, translation difficulties are categorized according to their types supported by examples from the respondents. For brevity, each text is dealt with separately, and for clarity, each text has been divided into a number of sentences. However, in the real experiment, all sentences were given as one solid text. If the translator has missed anything it will be added in ~~(with a strikethrough)~~. If a certain type of mistake is repeated, it is represented as (x4), which indicates that this type of difficulty, for example, has occurred four times.

Text (1) Medical

1. *Failure of atherosclerotic plaques can lead to potentially life threatening clinical events such as myocardial infarction (MI) stroke, or transient ischemic attach (TIA).*

2. *The most frequently described plaque failure mechanism is tensile rupture of the fibrous cap;*
3. *however, often during angioplasty another plaques failure mechanism occurs in which the atherosclerotic plaque separates from the internal elastic lamina (IEL).*

Table (3): Types of difficulties encountered in the medical text

Sentence No.	Type of mistake	Example
1.	English structure (SVO) syntax	فشل علاج أوبئة تصلب الشرايين يمكن أن يؤدي (X4)
	Keeping word class syntax	Potentially = ممكن
	Literal translation. Translation method	(X6)clinical events = احداث سريرية can lead = يمكن أن يقود
	Typo/ Spelling mistakes. Lack of editing.	stroke = السكتة الماغية clinical events = احداث شريرية
	Mistranslation	*tensile rupture* = فشل الكلى Transient ischemic attack = هجوم فقر الدم العابر atherosclerotic plaque = مانعات تصلب الشرايين tensile rupture = فشل رئوي
2.	Lack Subject. syntax	ومع ذلك يحدث غالباً (~~فشل أخر~~) أثناء الية تقلص والشرايين وانسدادها التي تنفصل...
	Uncertainty	Plaques = أمراض أو أعراض
	Keeping source word	(x4) Plaque = البلاك (x3) Clinical = كلينيكية

	Googling	فشل لويحات تصلب الشرايين يمكن أن يؤدي الى الحياة المحتملة تهدد الأحداث السريرية
	Vague translation. semantic	النوبة الإقفارية = Transient ischemic attack العابرة
	Googling	ويوصف بالأكثر هو تمزق الغطاء الليفي
	Nonsense Googling	في معظم الأحيان هو موضح البلاك فشل الية الشد تمزق ليفية كاب
	Word order. Translation method.	إن ألية فشل الصفيحة الأكثر شيوعا تم وصفها الية فشل اللوحة الأكثر شيوعاً هي تمزق ...
	Mistranslation	تمزق الشد = tensile rupture of the fibrous cap الليفي The most frequently described plaque failure الية فشل الترسبات الموصفة تكراراً =
3.	Non-idiomatic translation	ألية فشل كارثية = Plaque failure mechanism رأب الأوعية = Angioplasty
	Lack of familiarity with SL	مع ذلك، غالباً ما يحدث ذلك
	Googling	غالباً ما يحصل أثناء القسطرة ألية اخري للفشل اللويحي، حيث ينفصل تصليب الشرايين عن الصفيحة المرنة الداخلية وجود الية أخرى لفشل البلاك تنفصل فيها اللوحة المصلبة للشرايين...
	Vague translation. semantic	الصفائح العصيدية = (x3) atherosclerotic plaque
	Incomplete translation. Deletion.	فان تصلب الشرايين يحدث داخل الصفائح الداخلية المرنة
	No translation. Deletion.	3

As shown in Table (3) p. 42, there were common difficulties in the three sentences such as language difficulties, literal translation, mistranslation and googling, lack of editing, deletion, repetition (style), and terminology. Translators were as bad as M.A. students in this regard. In fact, we can argue that these types of difficulties stem from the lack of knowledge of medical texts which will often lead to google translate.

On the other hand, each sentence has some peculiar structural difficulties, due to its structure in most cases. In sentence (1) for instance, keeping the English (SVO) structure was repeated 4 times. In sentence (2), students kept a source word ‘plaque’ four times, and ‘clinical’, which in fact is also used in many Arabic translations three times. Others were uncertain about the translation of ‘plaque’ and so they gave more than one translation. Non-idiomatic and vague translation appeared several times especially in sentence (3).

Text (2) Business

Corporate Governance

Corporate governance is the collection of mechanisms, processes and relations by which corporations are controlled and operated. Governance structures and principles identify the distribution of rights and responsibilities among different participants in the corporation (such as the board of directors, managers, shareholders, creditors, auditors, regulators, and other stakeholders) and include the rules and procedures for making decisions in corporate affairs. Corporate governance is necessary because of the possibility of conflicts of interests between stakeholders, primarily between shareholders and upper management or among shareholders.

(This model translation was provided by Dr.Esam Kayed Center for Research and Translation).

الحوكمة المؤسسية

الحوكمة هي عبارة عن مجموعة من الطرق والعمليات والعلاقات التي تحكم وتدير المؤسسات. إن التركيبة الحوكمية ومبادئها تحدد توزيع الحقوق والمسؤوليات بين شتى المشاركين في المؤسسة (مثل مجلس الادارة والمدراء والمساهمون والدائنون ومدققوا الحسابات والمنظمون وأمناء الرهن الاخرون) ويتضمن ذلك القوانين والإجراءات لاتخاذ القرارات المتعلقة بشؤون المؤسسة. إن الحوكمة

المؤسسية ضرورية بسبب إحتمالية تضارب المصالح بين أمناء الرهن، وبشكل رئيسي بين المساهمين والإدارة العليا أو بين المساهمين أنفسهم.

The findings of the second text showed that the percentage pertaining to the difficulties of translating the business text was only (5%) accurate, (55%) acceptable, and (40%) were wrong, as presented in the samples below:

1- *Corporate governance is the collection of mechanisms, processes and relations by which corporations are controlled and operated.*

The model translation of the above statement as suggested by Dr. Esam is as follows:

الحوكمة المؤسسية هي عبارة عن مجموعة من الطرق والعمليات والعلاقات التي تحكم وتدير المؤسسات.

The accurate answers which were provided by the participants are based on the model answer provided below by Dr. Esam:

الحوكمة المؤسسية هي مجموعة من الطرق والعمليات والعلاقات التي تحكم وتدير المؤسسات.

An acceptable translation of the above statement which was provided by the participants reads as follows:

الحوكمة المؤسسية هي مجموعة من الطرق والعمليات والعلاقات التي يتم من خلالها التحكم بالمؤسسات وادارتها.

As for the incorrect translation related to this statement, two examples are presented below:

حوكمة الشركات هي مجموعة آليات وعمليات وعلاقات يتم بها السيطرة على الشركات من خلال تشغيلها.

أدارة الشركات هي جمع اليات والعمليات والعلاقات التي يتم من خلالها مراقبة الشركات وتشغيلها.

This incorrect translation might be attributed to google translation, misuse of dictionary and informal language usage.

2- . *Governance structures and principles identify the distribution of rights and responsibilities among different participants in the corporation, (such as the board of directors, managers, shareholders, creditors, auditors, regulators, and other stakeholders),*

The accurate translation of the above paragraph is:

إن التركيبة الحوكمية ومبادئها تحدد توزيع الحقوق والمسؤوليات بين شتى المشاركين في المؤسسة مثل (مجلس الإدارة والمدراء والمساهمون والدائنون ومدققوا الحسابات والمنظمون وأمناء الرهن الآخرون).

While the acceptable translation reads as follows:

إن التركيبة الحوكمية ومبادئها تقوم على توزيع الحقوق والمسؤوليات بين مختلف المساهمين في المؤسسة (مثل مجلس الإدارة والمدراء والمساهمون والدائنون ومدققوا الحسابات والمنظمون وآخرون من أمناء الرهن)

As for the incorrect translation related to this statement, two examples are presented below:

تحدد بنية ومبادئ الحوكمة توزيع الحقوق والمسؤوليات بين مختلف المشاركين في الشركة (مثل مجلس الإدارة والمديرين والمساهمين والمبدعين والمحاسبين والمنظمين وأصحاب المصلحة الآخرين).

The factors behind such incorrect translation are: improper word choice (e.g creditors المبدعين,) using google translation and misuse of dictionary.

3- *Corporate governance is necessary because of the possibility of conflicts of interests between stakeholders, primarily between shareholders and upper management or among shareholders.*

The phrase: conflicts of interest was translated incorrectly as:

نزاع المصالح/ تضارب المصالح/ تعارض المصالح/ حدث التضارب في المصالح/

While the correct translation is: تضارب المصالح

However, the majority have translated it using google translation into تضارب المصالح which is legally accepted in the business text.

The analysis of text (2) Business

The second text, which discusses ‘corporate governance’, was relatively easier. The technical terminology in this text was less than those found in the first (medical) text. Therefore, it is expected that ‘literal translation’ and ‘mistranslation’ will be considerably lesser. To analyze the types of translation difficulties, the text is divided into *four* sentences as follows:

Text (2) Business

1. *Corporate governance is the collection of mechanisms, processes and relations by which corporations are controlled and operated.*
2. *Governance structure and principles identify the distribution of rights and responsibilities among different participants in the corporation (such as the board of directors, managers, shareholders, creditors, auditors, regulators, and other stakeholders).*
3. *and include the rules and procedures for making decisions in corporate affairs.*
4. *Corporate governance is necessary because of the possibilities of conflicts of interests between stakeholders, primarily between shareholders and upper management or among shareholders.*

Table (4): Types of difficulties encountered in the 'corporate governance' text

Sentence No.	Type of mistake	Example
1.	Contextual mistranslation	*Collection of mechanism = جمع الاليات (2X)* *by which corporations are controlled= مراقبة الشركات (2X)*
	Mistranslation	*by which corporations are controlled and operated = التي تتحكم فيها الشركات وتديرها* *by which corporations are controlled and operated =* *يتم بها السيطرة على الشركات من خلال تشغيلها*
	Prepositions. Syntax.	*corporations are controlled =* التحكم في الشركات (2X)
	Mistranslation of passive voice. Syntax.	*by which corporations are controlled and operated= التي تدار وتضبط من قبل الشركات*
	Acceptable google translation	*حوكمة الشركات هي مجموعة من الاليات والعمليات والعلاقات التي يتم من خلالها التحكم في الشركات وتشغيلها (13X)*
	No translation, deletion.	1
2.	Literal translation	Shareholders = المنظمون/ Regulators = (18X) /المشاركون Participants /حملة الأسهم المتراهنون = stakeholders المقرضين = Creditors /تعرف = Identify ذوي / أمناء الرهن= Stakeholders /مشرفين = Regulators/العلاقة (18X)/هيئة المديرين = board of directors / هياكل = Structure
	English structure (SVO)	*Governance structure and principles identify = مبادئ وهياكل الشركة تعرف*
	Suspected google translation	تحدد هياكل ومبادئ الحوكمو توزيع الحقوق والمسؤوليات بين مختلف المشاركين في الشركة (مثل مجلس الادارة والمديرين والمساهمين والدائنين ومدققي الحسابات (10X) والمنظمين وأصحاب المصلحة الاخرين)
	No translation. Deletion.	1

	Incomplete translation. Deletion.	1
	Fragment / incomplete sentence. Syntax.	*Governance structure and principles identify the distribution of rights and responsibilities among different participants in the corporation* = *هياكل الحوكمة ومبادئ تحديد توزيع الحقوق والمسؤليات بين مختلف المشاركين في الشركة*
3.	Wrong Google translate. Translation method.	الشركات أمور = Corporate affairs (3X)
	Acceptable google translate	وتشمل قواعد واجراءات صنع القرارات في شؤون الشركات (14X)
	Wrong Arabic structure	وبضمنها = And include
	No translation	1
4.	Literal translation	حملة الاسهم = Shareholders (1 X) المتراهنين = Stakeholders (1X)
	Incomplete translation	Or among shareholders = …… (2X)
	Wrong translation. Semantic.	أو بين المساهمين على =Or among shareholders حدا
	Word-by-word translation.	أن حوكمة الشركات أمر ضروري بسبب امكانية حدوث تضارب في المصالح فيما بين حملة الاسهم في المقام الاول والادارة العليا او مع حملة الاسهم الاخرين.
	No translation. Deletion.	1
	Acceptable google translate	تعد حوكمة الشركات ضرورية بسبب احتمال تضارب المصالح بين أصحاب المصلحة العامة وخاصة بين المساهمين والادارة العليا أو بين المساهمين (أنفسهم) (13X)
	Literal translation	أمناء الرهن = Stakeholders نزاع المصالح = Conflict of interest
	Arabic typo/ lack of proofing.	للاحتمالية = Because of the possibility of conflict of interests

Table (4) shows that ‘acceptable google translate’ was the most commonly used strategy in this text. It seems that most respondents start their translation by trying to see if google translate makes sense. They do not even bother to make any slight changes to make it better. However, a few of them used some cosmetics to change google translate into something that would sound more naturally Arabic. In the second place, comes literal translation committed by both M.A. students and translators. It appears that when the respondents do not know the English word or how to translate it, they try to find if this word is translated in Arabic dictionaries. Thirdly, there were some incomplete translations (deletion) for some phrases. This indicates that the respondents did not bother to translate them especially if the main structural components, such as subject, verb and object, are there without that extra phrase. In other words, the respondents considered those phrases as adjuncts.

On the other hand, there were other difficulties such as contextual translation, mistranslation, structural problems: preposition translation, translations related to structure such as those related to the passive voice or those related to keeping the same English structure, wrong Arabic structure, and typos. Some respondents tended to be wordy(style/ usage).

This is not exactly a translation error, but it is something that is not economical. It is also worth mentioning here that ‘mistranslation’ is not

equivalent to ‘literal translation’ as the former entails that the respondent changes the meaning of the source text as in part of sentence (1) above. By contrast, literal translation is less costly as it does not cause strain to translation, but rather uses non-natural language. Finally, sentence (3) has the least number of problems perhaps due to its shortness.

Text (3) Agricultural:

Organic Farming

Organic farming is a method of farming that aims to operate within the natural ecosystem, without using artificial fertilizers, pesticides, or other agrochemicals. Many different strategies are adopted to combat pests. Growing crops and grazing livestock in a balanced rotation prevents pest and parasite build-up. Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields), and companion planting (mixing certain non-crop plants with the main crop) all encourage predators that feed on pests.

(This model translation was provided by Dr.Esam Kayed Center for Research and Translation).

الزراعة العضوية

الزراعة العضوية هي إحدى طرق الزراعة التي تهدف إلى العمل ضمن نظام البيئة الطبيعية دونما استخدام للأسمدة الصناعية أو المبيدات الحشرية أو أية مواد كيماوية تستخدم في الزراعة. وهناك العديد من الطرق المتبعة لمكافحة الحشرات. فالتعاقب المتوازن بين زراعة المحاصيل ورعي الماشية يمنع الحشرات والطفيليات من التكاثر. إن السياجات والفجوات المزروعة بنباتات مختلفة

(عشبا في أسراب أو نباتات أو أزهار برية في الحقول) وكذلك الزراعة المزدوجة (كخلط بعض النباتات من غير المحصول مع المحصول الرئيسي) كل ذلك يشجع الحشرات التي تتغذى على الآفات.

The findings of the third text showed that the percentage pertaining to the difficulties of translating the agricultural text was only (5%) accurate, (30%) acceptable, and (65%) were wrong, as presented in the analysis below:

The accurate translation which was provided by the participants and suggested by Dr. Esam is as follows:

1- *Organic farming is a method of farming that aims to operate within the natural ecosystem, without using artificial fertilizers, pesticides, or other agrochemicals.*

الزراعة العضوية هي إحدى طرق الزراعة التي تهدف إلى العمل ضمن نظام البيئة الطبيعية دونما استخدام للأسمدة الصناعية أو المبيدات الحشرية أو أية مواد كيماوية تستخدم في الزراعة.

The majority of the translators have translated the above statement using google translation as follows:

تعتبر الزراعة العضوية إحدى طرق الزراعة التي تهدف إلى العمل داخل النظام البيئي الطبيعي ، دون استخدام الأسمدة الصناعية ، والمبيدات الحشرية ، أو المواد الكيماوية الزراعية الأخرى.

Luckily, google translation started the Arabic sentence with a verb (تعتبر).

Although there were some correct translations, none of the translators added a footnote to define ‘organic farming’.

2- *Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields), and companion planting (mixing certain non-crop plants with the main crop) all encourage predators that feed on pests.*

The accurate answers are based on the model translation provided by Dr. Esam as follows:

إن السياجات والفجوات المزروعة بنباتات متعددة (عشبا في أسراب أو نباتات برية و أزهارفي الحقول) وكذلك الزراعة المختلطة (كخلط بعض النباتات من غير المحصول مع المحصول الرئيسي) كل ذلك يشجع الحشرات التي تتغذى على الآفات.

While the acceptable translation is as follows:

تشجع السياجات والفجوات المزروعة بنباتات مختلفة (سواءعشبا في أسراب أو نباتات و أزهار برية في الحقول وكذلك الزراعة المختلطة كخلط بعض النباتات الأخرى مع المحصول الرئيسي) الحشرات لكي تتغذى على الآفات.

There were many incorrect translations due to the technical terminology in this sentence such as the following:

نباتات السياج والفواصل التباتية المتنوعة مثل خطوط أعشاب النجيل/ شرائح من الحشائش كل ذلك يشجع الحيوانات المفترسة على أكل الحشرات / يشجع على استقطاب الحيوانات المفترسة التي تتغذى على الآفات.

.

The above translations are considered incorrect, due to using google translation, syntactic error (e.g. *all encourage predators that feed on pests= التي تشجع الحيوانات التي تتغذى على الافات*) , and word -for-word translation (e.g. strips of grass *خطوط النجيل*) as shown above. While predators don't feed on pests logically.

The analysis of text (3) Agricultural

The third text which addresses 'organic farming, was relatively difficult. Compared to 'corporate governance', the technical terminology in this text is more but still less than that found in the first (medical) text. As a result, it is expected that 'google translate', 'literal translation' and 'mistranslation' will be dominant here. To analyze the types of translation mistakes, the text has been divided into four sentences as follows:

Text (3) Agricultural

1. *Organic farming is a method of farming that aims to operate within the natural ecosystem, without using artificial fertilizers, pesticides or other agrochemicals.*
2. *Many different strategies are adopted to combat pests.*
3. *Growing crops and grazing livestock in a balanced rotation prevents pests and parasite build-up.*
4. *Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields), and companion plants (mixed certain non-crop plants with the main crop) all encourage predators that feed on pests.*

Table (5): Types of difficulties encountered in the 'organic farming' text

Sentence No.	Type of mistake	Example
1.	Non-idiomatic Arabic. Syntax.	*Organic Farming is a method of farming that aims to operate= الزراعة العضوية هي طريقة للزراعة تهدف الى العمل* *(14 X)*
	Structural difficulties.	*Organic Farming is a method of farming that aims to operate= الزراعة العضوية هي اسلوب زراعي يهدف الى العمل داخل*
		Organic Farming is a method of farming that aims to operate ان الزراعة العضوية طريقة زراعة تهدف الى العمل = Artificial fertilizers= مخصبات صناعية
	Using SL word	To operate within the natural ecosystem= ضمن النظام الايكولوجي الطبيعي

	Prepositions. Syntax.	*That aims to operate within the natural ecosystem= التي تهدف الى العمل مع النظام الطبيعي* *Organic Farming is a method of farming that aims to operate= الزراعة العضوية هي طريقة الزراعة التي تهدف الى العمل داخل*
	Mistranslation translation	Artificial fertilizers= المواد الصناعية
	Acceptable google translation. Proofing.	*الزراعة العضوية هي طريقة للزراعة تهدف الى العمل داخل النظام البيئي الطبيعي دون استخدام الاسمدة الصناعية والمبيدات الحشرية او المواد الكيمياوية الزراعية الأخرى* *(14X)*
2.	Tense. Syntax.	*Many different strategies are adopted to combat pests. =.... تم اعتماد مجموعة من (5X)* وقد اعتمدت العديد من ....
	Adding extra information. Lexical.	*Many different strategies are adopted to combat pests. = يتم اعتماد مجموعة من الاستراتيجيات لمكافحة الافات والطفليات* (2x)
	Mistranslation	كما تعتمد على العديد من ...
3.	Mistranslation	In a balanced rotation= للتعاقب في نظم متوازنة And parasites = والبكتيريا
	Deleting some information	Parasites = ….
	Non-idiomatic Arabic. Lexical	(3x) In a balanced rotation= في تناوب متوازن In a balanced rotation= التعاقب المتوازن In a balanced rotation= عملية متناوبة In a balanced rotation = باسلوب المداورة In a balanced rotation = تدوير متوازنة In a balanced rotation = دوران متوازن
	No translation	1
4.	Literal translation	*Hedgerows, mixed plant breaks (strips of grass = نباتات السياج والفواصل النباتية المتنوعة مثل خطوط أعشاب النجيل/ شرائح من الحشائش/ خطوط النجيل / (13X)*
	Incomplete wrong translation	*Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields), and companion plants (mixed certain non-crop plants with the main crop) all*

		ان =encourage predators that feed on pests *اختلاف النبات يساهم في تكاثر الحشرات التي تتغذى على الطفيليات*
	Wrong translation. Lexical	*أشرطة من العشب= strips of grass* *صفوف من الحشيش = strips of grass* *شرائط من الحشائش = strips of grass* *سلسلة من الاعشاب = strips of grass* *شرائح من الاعشاب = strips of grass (6X)* *المفترسات = predators* *all encourage predators that feed on pests=* *التي تشجع الحيوانات التي تتغذى على الافات* *أعشاب عطرية= herbs*
	lexical	*Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields),* *= ان السياجات والفجوات المزروعة بنباتات مختلفة (عشبا في أسراب أو نباتات أو أزهار....)* *تحوط الاشجار =Hedgerows* *الافات =Pests*
	Adding a relative pronoun that breaks the sentence structure. Lexical	*all encourage predators that feed on pests=* *التي تشجع الحيوانات التي تتغذى على الافات* *all encourage predators that feed on pests=* *مما يشجع المترسات التي تتغذى على الافات*
	Erroneous google translate. Literal translation.	وفواصل نباتية مختلطة شرائح من العشب والاعشاب والزهزر البرية والطفليات داخل الحقل... السياجات من الشجيرات، مختلطة النبات فواصل (شرائح من الحشائش والاعشاب البرية في الحقول) رفيق زراعة (خلط معينة غير محصول نباتات المحصول الرئيسي) تشجع جميع الحيوانات المفترسة .... التركيز على زراعة الشجيرات الصغيرة، الحشائش والاعشاب والزهور البرية داخل الحقل) اي العمل على زراعة بعض النباتات مع المحصول الرئيسي وتشجع تربية الحيوانات التي تتغذى على الافات

Table (5) shows that some of the good translations were perhaps taken from google. For instance, 14 respondents had similar translation for the first sentence. In some cases, the respondents had the right meaning, but their weak Arabic competency resulted in having non-idiomatic translations.

In other cases, they erroneously used a preposition that is incompatible with the previous or following word.

Sentence length plays a key role in the quantity and quality of problems encountered. Therefore, sentence (2), which is the shortest in the text had two errors only: one in tense (repeated 5 times) and one related to adding extra information (repeated twice). The problems that dominated the third sentence were associated with using non-idiomatic Arabic expressions (lexical) , mostly in one expression that does not have an equivalent or is not familiar to Arabs and Arabic language: balanced rotation.

Finally, the last sentence seems to have the greatest number of problems probably due to its length and due to having several farming technical terms. Therefore, ‘wrong translation’ is the most common type of problems especially with the idiom ‘strips of grass’ and ‘hedgerow’. The most fatal translations were related to blind taking from google. In fact, the translation under ‘erroneous google translate’ were fatal because the Arabic translations were incomprehensible.

There were a few non-systematic difficulties in the four sentences. These include ‘using SL words, mistranslation, deleting some information, literal translation, incomplete wrong translation, and adding a relative pronoun that breaks the sentence structure’ (lexical). Translators were as bad as M.A. students in all these difficulties.

Text (4) Industrial

Fundamentals of Hydraulic Engineering Systems

Description of pipe flow

In hydraulic, the term "pressure pipe flow" refers to full water in closed conduits of circular cross sections under a certain pressure gradient. For a given discharge (Q), pipe flow at any location can be described by the pipe cross section, the pipe elevation, the pressure, and the flow velocity in the pipe.

In most engineering computations the section "means velocity" (V) is defined as the discharge (Q) divided by cross-sectional area (A). V=Q/A. The velocity distribution within across section in a pipe, however, has special meaning in hydraulics.

(This model translation was provided by Dr. Esam Kayed Center for Research and Translation).

أسس أنظمة الهندسة الهيدروليكية التي تعمل بمقاومة السائل المضغوط

وصف تدفق الماء في الأنابيب

في علم الهايدروليك، فيما يتعلق بضغط السوائل فإن مصطلح التدفق في الأنابيب المضغوطة يشير إلى كامل الماء الموجود في قنوات مغلقة داخل المقاطع العرضية الدائرية تحت ضغط معين من

الإنحدار. ففي أي تدفق معين (Q) يمكن وصف تدفق الانابيب في أي موقع معين عن طريق المقطع العرضي وارتفاع الانبوب والضغط وسرعة التدفق في الانبوب. وفي معظم الحسابات الهندسية فإن المقطع (V) يعني سرعة التدفق، يعرف بأنه التدفق (Q) الذي يقسمه مقطع عرضي (A). وعلى أية حال فإن توزيع السرعة عبر المقطع العرضي في الأنبوب له معنى خاصا في الهيدروليكا.

V=Q/A = السرعة= التدفق على مساحة المقطع العرضي .

The results of the fourth text explained that the percentage concerning the difficulties of translating the industrial text was only (10%) accurate, (30%) acceptable, and (60%) were wrong.

The accurate answers are based on the model translation provided by Dr. Esam:

Description of pressure pipe flow

1- *In hydraulic, the term "pressure pipe flow" refers to full water in closed conduits of circular cross sections under a certain pressure gradient.*

وصف تدفق الماء في الانابيب

في العلوم الهيدروليكية (علوم السوائل المتحركة) يشير مصطلح التدفق في أنابيب الضغط الى الماء الذي يملأ القنوات المغلقة في المقطع العرضي الدائري تحت درجة انحدار تشكل ضغطا محددا.

While the acceptable translation is as follows:

وصف التدفق في الأنابيب

يشير مصطلح التدفق في الأنابيب في علم الهيدروليك إلى ضغط الماء الذي يملأ القنوات المغلقة في المقطع العرضي الدائري تحت درجة من الإنحدار تشكل ضغطا معينا.

Where others have translated the title as تدفق الأنابيب , which is a wrong translation due to using google, machine translation, omission strategy and ignorance of the content that lead to a semantic error.

Since the incorrect translation is as follows:

يشير مصطلح تدفق الأنابيب الهيدروليكي إلى أن الماء في القنوات المغلقة من مقاطع عرضية دائرية تحت درجة انحدار ضغط معينة

2- *In most engineering computations the section "means velocity" (V) is defined as the discharge (Q) divided by cross-sectional area (A). V=Q/A.*

The accurate translation for the above statement as suggested by Dr. Esam is as follows:

The acceptable translation for the above statement is as follows:

وفي معظم الحسابات الهندسية فإن القسم (في) اي سرعة التدفق، و كما يعرف أيضا بأنه التدفق (كيو) الذي يقسمه القسم العرضي (أ) .حيث السرعة تساوي التدفق مقسوما على مساحة القسم العرضي.

while the incorrect translation is:

يتم تعريف القسم يعني السرعة نظرا لأن التفريق مقسوم على ....جزئية السرعة تعني التدفق بواسطة المقطع العرضي متقاطع.

This statement was translated incorrectly because of the abbreviations and the mathematical equation used in the source text. So most of the translators rendered it wrongly due to lack of information related to technical terminology and adopting google translation.

On the word level, there were some mistakes as in: Discharge = تدفق, by the pipe cross sectional area= لقسم أنبوب مقطع عرضي متقاطع,

The analysis of text (4) Industrial

The fourth text relates to Industry. It is about the fundamentals of hydraulics. It is rich with technical industrial terms. In addition, it has some symbols that stand for technical industrial terms. However, the language used here is simple. Below is the text divided into four relatively long sentences:

Text (4) Industrial

1. *In hydraulic, the term "pressure pipe flow" refers to full water in closed conduits of circular cross sections under a certain pressure gradient.*
2. *For a given discharge (Q), pipe flow at any location can be described by the pipe cross section, the pipe elevation, the pressure, and the flow velocity in the pipe.*
3. *In most engineering computations the section "means velocity" (V) is defined as the discharge (Q) divided by the cross sectional area (A). V=Q/A*
4. *The velocity distribution within a cross section in a pipe, however, has special meaning in hydraulics.*

Below is an analysis of the respondents' answers:

Table (6): Types of difficulties encountered in the 'Hydraulic Engineering' text

Sentence No.	Type of mistake	Example
1.	English word order. Linguistic difficulties.	Pressure pipe flow= ضغط أنابيب تدفق
	Literal translation. Linguistic difficulties	Sections= أقسام (2X) Gradient= تدرج (12X) Gradient= درجة انحدار Gradient = درجة ميل أو انحدار

	Incomplete Translation. Deletion.	(2X) Under a certain pressure gradient=0 في الهيدروليك ومصطلح ضغط تدفق الأنابيب يشير إلى المياه الكاملة في القنوات ... في قنوات مغلقة من مقاطع عرضية
	Mistranslation. Literal translation.	Full water= تعبئة الماء (8X) Pressure pipe flow= تدفق أنابيب الضغط Term= شرط يشير مصطلح تدفق الأنابيب الهيدروليكي إلى أن الماء في القنوات المغلقة من مقاطع عرضية دائرية تحت درجة انحدار ضغط معينة
	Non-idiomatic Arabic. Lexical.	Full water= كامل الماء (6X) Full water= الماء الكامل Full water= الماء مليء Full water= كامل المياه
	No translation Deletion.	1-
	Googling	في الهيدروليك ومصطلح ضغط تدفق الأنابيب يشير إلى المياه الكاملة في قنوات
2.	Literal translation	by the pipe cross section= لقسم أنبوب مقطع عرضي متقاطع
	No translation. Deletion.	1
	Mistranslation	(2X) Discharge= تصريف (3X) Discharge = تدفق
	Using SL word	Q=كيو
	Googling. Literal translation.	معين التفريغ (س) أنبوب تدفق في أي مكان يمكن وصفها الأنابيب عبر قسم الأنابيب ارتفاع الضغط...
3.	Google. Mistranslation	يتم تعريف القسم يعني السرعة نظرا لأن التفريق مقسوم على .... جزئية السرعة تعني التدفق بواسطة المقطع العرضي **12 miscellaneous erroneous translations** سرعة الانطلاق = Discharge
	Using SL word	في = V أ =A
	Literal translation	يعني = (9X) Mean جزء = Section القسم = (8X) Section
	No translation.	2

	Deletion.	
4.	Literal translation	(3X) Section = القسم
	Keeping SL word order	توزيع السرعة ضمن القسم المتقاطع من الانبوب ، مع ذلك، (3X) توزيع السرعة ضمن القسم المتقاطع من الانبوب ، ولكن، توزيع السرعة ضمن القسم المتقاطع من الانبوب ، الا أنه،
	Acceptable Google translation	مع ذلك يكون لتوزيع السرعة داخل المقطع في (10X) الانبوب معنى خاص في علم السوائل الهيدروليكية
	Google mistranslation	توزيع السرعة ضمن القسم المتقاطع من الانبوب ، مع ذلك،
	No translation. Deletion.	2

Although the text is technical, most of the respondents almost got two sentences right; the second and the fourth. This can be accounted for by listing phrases in the second sentence which made it easy for the respondents to build the Arabic structure. Plus, the terminology in this sentence was not difficult because some of the terms had already occurred in the previous sentence. As for the fourth sentence, it was relatively short and its vocabulary has already been mentioned in the previous sentences. The remarkable erroneous translation was related to keeping the SL word order represented by keeping the linking word ‘however’ in the same place as in the English text.

Sentences 1 and 3 were harder. In the first sentence, there was a noticeable percentage of literal translation especially for the word ‘gradient’ which was translated as a slope rather than different degrees. Mistranslation was also

perceptible especially in the phrase ‘pressure pipe flow’ which was translated literally. This gave an erroneous translation. Instead, the respondents should have translated it as the pressure in the pipe during flow. Finally, there were some non-idiomatic Arabic translations, probably due to googling.

The third sentence was the hardest due to having difficult terminology and mathematical language. Since most google translations depend on the most common polysemous translation, the mathematical terms such as ‘means’ and ‘section’ were erroneously translated. This is even made worse by the high percentage of literal translations.

Text (5) Legal:

Industrial Property and Associated or Adjacent Rights

Industrial property means the intellectual property rights pertaining to works or elements related to industrial, agricultural or commercial activities. From the juristic point of view, it is defined as "the rights pertaining to new innovations such as inventions, industrial drawings and designs, or distinctive signs used either in distinguishing products (trademarks) or commercial firms (trade names) which enable each of their owners to monopolize his invention, trademark or trade name against others". Industrial property includes patents, trademarks, industrial designs or drawings, brands of origins, geographical indications and protection of

plant varieties and trade secrets in addition to trade names and the incorporeal factors of stores. These are usually organized by national commercial laws.

(This model translation is provided by Dr. Adel Azzam Saqf Al-Hait (2015) in "The Reliable Guide to Legal Translation".

الملكية الصناعية والحقوق المرتبطة بها او المجاورة لها:

أما الملكية الصناعية فإنها تعنى حقوق الملكية الفكرية على المصنفات أو العناصر، ذات الإتصال بالأنشطة الصناعية والزراعية والتجارية. ويعرفها الفقه بأنها: " الحقوق التي ترد على مبتكرات جديدة كالإختراعات والرسوم والنماذج الصناعية،أو على شارات مميزة تستخدم , أما في تمييز المنتجات (العلامات التجارية) , أو تمييز المنشات التجارية (الإسم التجاري),وتمكن صاحبها من الاستئثار باستغلال إبتكاره أو علامته التجارية أو اسمه التجاري, في مواجهة الكافة".وتشمل الملكية الصناعية براءات الإختراع ,والعلامات التجارية والنماذج أو الرسوم الصناعية ,وعلامات المنشأ أو المؤشرات الجغرافية ,وحماية الأصناف النباتية,والأسرار التجارية,إلى جانب الاسماء التجارية,والعناصر المعنوية للمحل التجاري ,التي تنظمها عادة قوانين التجارة الوطنية.

The findings of the fifth text presented that the percentage pertaining the difficulties of translating the legal text was only (5%) accurate, (20%) was acceptable, and (75%) were wrong.

The accurate answers are based on the model translation provided by Dr. Adel:

1. *Industrial property means the intellectual property rights pertaining to works or elements related to industrial, agricultural or commercial activities. From the juristic point of view, it is defined as "the rights pertaining to new innovations such as inventions, industrial drawings and designs,*

الملكية الصناعية تعنى حقوق الملكية الفكرية المتعلقة بالمصنفات أو العناصر ذات الصلة بالأنشطة الصناعية أو الزراعية أو التجارية. ومن وجهة النظر الفقهية، يعرف بأنه الحقوق المتعلقة بالإبتكارات الجديدة مثل الإختراعات والرسوم والتصاميم الصناعية.

Some translators have translated the statement above correctly as:

ومن الناحية القانونية، يتم تعريفها على أنها الحقوق المتعلقة بالإبتكارات الجديدة مثل الإختراعات والرسومات والتصاميم والرسومات الصناعية.

While the acceptable translation is as follows:

تعني الملكية الصناعية حقوق الملكية الفكرية المتعلقة بالأعمال أو العناصر المتصلة بالأنشطة الصناعية والزراعية والتجارية. من وجهة النظر القانونية التشريعية هذه فإنها تعرف بالحقوق المتعلقة بالإبتكارات الجديدة مثل الإختراعات والرسومات والتصاميم الصناعية.

The incorrect translation is as follows:

الملكية الصناعية هي حقوق الملكية الفكرية المتصلة بالأعمال أو العناصر المتصلة بالأنشطة الصناعية أو الزراعة أو التجارة من الفقهية وجهة نظر تعرف بأنها حقوق الإبتكارات الصناعية والتصاميم والرسومات.

2. *Industrial property includes patents, trademarks, industrial designs or drawings, brands of origins, geographical indications and protection of plant varieties and trade secrets.*

The accurate translation is as follows:

وتشمل الملكية الصناعية براءات الإختراع والعلامات التجارية والرسومات والتصاميم الصناعية أو العلامات التجارية في المنشأ والبيانات\المؤشرات الجغرافية وحماية الاصناف النباتية والأسرار التجارية.

The acceptable translation is as follows:

تشمل الملكية الصناعية براءات الإختراع والعلامات التجارية والرسوم والتصاميم الصناعية أو العلامات التجارية للأصول والبيانات الجغرافية وحماية الإختلافات والتنوع للأصناف النباتية والأسرار التجارية.

The incorrect translations are as follows:

تشمل الملكية الصناعية براءات الإختراع والعلامات التجارية والتصاميم الصناعية أو الرسومات وماركات المنشأ والمؤشرات الجغرافية وحماية تنوع المصنع وأسرار التجارة.

تتضمن الملكية الصناعية ايضا اللوحات الفنية والعلامات التجارية.

The majority of the translators incorrectly and literally translated the phrase "protection of plant varieties and trade secrets" into

وحماية الأصناف النباتية\ أو المصانع المختلفة والأسرار التجارية :

While the correct translation, according to Dr Adel, is

وحماية الأصناف النباتية :والأسرار التجارية

The incorrect translations are due to google translation, misuse of dictionary and lack of legal background as presented in the following:

Against= أمام, Signs = نماذج,

The analysis of text (5) Legal

The last text addresses the industrial properties and the adjacent rights. Although the text is longer than the others, the number of sentences is the same. This means that the word mean is higher here. The text has several listings and the terminology is mediocre and simpler. Therefore, it is expected that the number of type of problems encountered here would be less.

Text (5) Legal :

1. *Industrial property means the intellectual property rights pertaining to works or elements related to industrial, agricultural or commercial activities.*
2. *From the juristic point of view, it is defined as "the rights pertaining to new innovations such as inventions, industrial drawings and designs, or distinctive signs used either in distinguishing products (trademarks) or commercial firms (trade names) which enable each of their owners to monopolize his invention, trademark or trade name against others".*
3. *Industrial Property includes patents, trademarks, industrial designs or drawings, brands of origins, geographical indications and protection of plant varieties and trade secrets in addition to trade names and the incorporeal factors of stores.*
4. *They are usually organized by national commercial laws.*

Respondents' answers were as follows:

Table (7): Types of difficulties encountered in the 'Intellectual Property' text

Sentence No.	Type of mistake	Example
1.	English word order. Syntax.	الملكية الفكرية تعني حقوق الملكية ..... (11X)
	Literal translation .	(13X) Elements= عناصر (1X) works = أشغال
	Mistranslation	(6X) Works = مصنفات
	No translation. Deletion.	2
	Acceptable Googling	تعني الملكية الفكرية حقوق الملكية الفكرية المتعلقة بالعمل أو العنلصر ذات العلاقة بالصناعة والزراعة او الأنشطة التجارية (13X).
2.	Literal translation	(12X) Against= أمام
	No translation. Deletion.	1
	Mistranslation	(7X) Signs = نماذج (2X) against = من Defined = تدافع
	Incorrect word class. Syntax.	Enable = تمكين
	Acceptable googling	(12X) " من وجهة النظر القانونية، يتم تعريفها بأنها الحقوق المتعلقة بالبتكارات الجديدة مثل الاختراعات والرسومات والتصاميم الصناعية والعلامات/ النماذج المميزة المستخدمة إما في تمييز المنتجات (العلامات التجارية) أو الشركات التجارية (الأسماء التجارية) التي تمكن كل من المالكين لاحتكار اختراعه أو علامته التجارية أو اسمه التجاري ضد الآخرين
	Missing conjunction . Syntax.	(3X) الاختراعات الصناعية ، الرسومات والتصاميم
	Function words	His invention = اختراع له

	translated separately	
	No translation. Deletion.	Against others = was not translated All the sentence is missing
	Messy order. Syntax.	التي نمكن كل من ماليكها من احتكار اختراعه الاسم التجاري ضد الاخرين
3.	Mistranslation	البيانات = (9X) Geographical indications الجغرافية مصانع = (2X) Plants غير متجانسة = Plant varieties
	Using SL word	بروتيك =Protect ماركة = (3X) Trademark
	Literal translation	مؤشرات = (6X) Geographical indications جغرافية غير ملموسة = (10X) Incorporeal أشكال النباتات = Plant varieties العوامل غير منظورة = Incorporeal factors أصول = (9X) origin
	No translation. Deletion.	All the sentence is missing Trade secrets = was not translated 1
	Inaccessible Arabic structure. Syntax.	Incorporeal factors = المعنوية العوامل
	Keeping SL order . syntax.	(11X). الملكية الفكرية تشمل .....
	Acceptable google translation	(12X) تشمل الملكية الصناعية براءات الاختراع والعلامات التجارية والرسوم والتصاميم الصناعية والعلامات التجارية للأصول والمؤشرات / البيانات الجغرافية وحماية الأصناف النباتية والأسرار التجارية بالضافة الى الاسماء التجارية والعوامل غير الملموسة للمخازن.
4.	Literal translation	وهم عادة ما يكونوا منتظمين من قبل القوانين التجارية

	Inaccessible Arabic structure. Syntax.	قوانين التجارية الوطنية
	mistranslation	National commercial laws = قوانين تجارية عالمية
	mistranslation	these are usually organized by national commercial laws (8X) وعادة ما يتم تنظيم هذه القوانين التجارية الوطنية
	No translation	1
	Acceptable google translation	(12X) وعادة ما يتم تنظيم هذه بموجب القوانين التجارية الوطنية

Acceptable google translation was dominant in all sentences (13 for sentence 1, 12 for 2, 3 and 4). This indicates that most respondents usually try to depend on google before translating. Even the other types of mistakes can be traced back to google or other machine translation services available online and/or offline.

This is supported by the high number of literal translation and mistranslation committed by the students and the translators alike. Moreover, it is googling and poor Arabic skills that resulted in keeping the English word order (11 occurrences for sentence 1 and 11 for sentence 3). Literal translation and mistranslation were also dominant in sentence 2, 3 and 4).

On the other hand, there were some non-systematic problems that were committed on an individual basis. These include ‘incorrect word class,

missing conjunction, function words translated separately, using SL word, inaccessible Arabic structure, and no translation.

4.2 Results of Interviews

4.2.1 Results related to the first question:

The Main Difficulties that M.A Students Encountered while Translating Technical Texts and Expressions from English into Arabic

Participants of (10) M.A Students at MEU, majoring in English language, were interviewed in person or via phone or email. Moreover to another (10) translators working in translation offices in Amman, Jordan. In addition to a number of professors working in different universities and places, , and all were requested to mention the main difficulties that M.A. students encounter while translating technical terms and expressions from English into Arabic. Some of the participants' replies are stated below as follows:

Amal Dahlan , a translator and interpreter with a five- year experience in the translation field, believes that the most common difficulty that might encounter a translator of technical terms and expressions is the fact that translators, and Arabic translation field in general, cannot keep abreast with the rapid developments in the scientific and technical area, in addition to the application and introduction of new scientific language that has no compatible Arabic terminology or derivatives. A way to tackle

such difficulty would be applying contextual translation or extensive research and consultation with subject experts.

Amani Al-Agha who is a translator and interpreter for more than 5 years in the field of translation mentions that all of the new terms related to sciences and developments are being invented/created in the west, but localized in the Arab world. Consequently, they are the most difficult job, in addition to cultural-specific terms that are difficult to translate.

Dr. Esam Kayed, mentions that the major difficulties of translating technical texts and expressions were as follows:

1- Cultural differences might sometimes lead to misleading outcomes, the translators must be equipped with a cultural background so as to produce something to cope with.
2- Shortage of vocabulary and equivalent terms.
3- Structural mismatching
4- Deletions and additions.

Dr. Majed Abdullatif, believes that difficulties are always available and hard to overcome, simply because translator's mother tongue is devoid of them. So, the least solutions are to adopt transliteration, free translation or sometimes phonetic transcription.

Similarly, Dr. Mohammed Al Khouli asserts that most difficulties are grammatical including syntactic errors, usage mistakes, run-on sentences and clauses, besides to the wrong use of commas and proper nouns. He adds that abbreviations and figures used in technical translation are common difficulties.

On his part, Dr. Ibrahim Abu Shihab indicates that changing technical terms, moreover to the lack of knowledge about some of the technical terms make translation ambiguous and difficult to be treated.

In the same vein, Dr. Sulaiman Al-Abbas, thinks that such difficulties occur while translating technical terms and expressions because of lack of background knowledge in the determined field that leads to mistranslation. So translation should be done by accredited translators. Moreover, there are scarcely unified dictionaries available in both languages that help translators to produce a good and acceptable piece of translation in the technical field.

The other participants such as M.A. students at MEU and Translators working in different translation offices in Amman replied to the interview questions through emails or phone as summarized bellows:

1- Unfamiliarity with the source language and technical expressions are the main difficulty for M.A. students.

2- Participants' deficiencies in the techniques and procedures involved in the process of translating technical terms and expressions.

3- Inability of participants to find the proper equivalent in the target language.

4- Lack of background knowledge in the technical field leads to literal translation of technical terms. Translators were not better than M.A. students in this regard.

5- Some translators do not focus on the contextual meaning as the original writer used.

6- Inability to recognize the differences between the source language and the target language.

7- Some of the participants deal with the technical texts, terms and expressions as normal texts, not as specialized ones.

8- Some of the respondents admit that the technical texts offered for translation were of a high standard and not easy to render because they involve specialized terminology.

9- The technical expressions may have more than one translation, so they do not know which one to use.

10-Lack of prior knowledge related to abbreviations, equations, and acronyms used in technical fields.

4.2.2 Results related to the second question:

The second question in this study is about the factors which stand behind the difficulties that M.A. students and translators encounter while translating technical terms and expressions. The interviewed participants such as M.A students at MEU, and translators working in translation bureaus in Amman, furthermore to professors working in different Jordanian universities, provided in writing and via email their replies related to the factors behind such difficulties as follows:

Translators such as Dr, Noor Jaber and Hussam Al- Quddah, who working in the translation field, point out that, due to the rapid technology and applied sciences advances that are not addressed by experts in the Arab world, which leaves the translators with no terms of references for such terms and expressions. Similarly, in many cases translators do not get ample and necessary material to review ahead of time, and some translators fail to prepare and research alternatives nor do they understand the context.

Another translator, Dima Hamad Allah, who has a big experience in the field of translation asserts that the factors that cause such difficulties are language and cultural differences, and lack of reading technical materials. Moreover, it is difficult to find a proper equivalent for the terms associated with technologies.

Other professional translators such as Noor Marridi and Amani Al-Agha identify the following reasons:

1- Inadequate knowledge of the target language
2- Wrong choice of the correct word/words
3- Lack of experience in the field of technical translation
4- Not being exposed to several categories of translation, i.e. literary, political, technical, legal, etc.

Another translator, Fatema Sarayra, and Hussein Abu Naba'a, mentions that the factors that stand behind such difficulties can be observed in the courses in the study whose plans do not prepare students well in such fields, as well as to the lack of knowledge and less contact with those whose mother tongue is English.

Furthermore, they believe that the inability of the translator to find the meanings of the technical terms in context, lack of knowledge about the subject matter, and lack of adequate practice are fundamental factors.

Another professional translator, Dr. Mohammed Alkhouli, states that ignorance in the technical field, lack of prior knowledge, weakness in both languages English and Arabic, lack of grammatical skills and lack of reading sources related to technical field might lead to such difficulties.

Similarly, Dr. Ayman Yaseen, thinks that the factors related to the difficulties while translating technical texts and expressions may be outlined in the following:

1- Lack of enriched knowledge on translator's part
2- Technical terms are, by themselves, very much hard and complex, not only to translate, but also to understand and comprehend.

Other participants of M.A students and translators replies are as follows:

1- Using Google machine translation that sometimes gives irrelevant equivalence especially with cultural terminology.
2- Lack of translation skills needed in translating technical texts and expressions.
3- Interference of L1 which leads to mistranslations and literal translations.
4- Increasing number of daily technical terms and technological terminology.
5- Lack of training courses that deal with technical translation.
6- Misuse of dictionaries made the participants unable to find the equivalents in the target language.
7- Lack of prior background knowledge in the technical fields.
8- Lack of opportunities to travel abroad to English speaking countries.
9- Adopting interference strategy while translating the technical texts.

10- No time management while translating the technical expressions and terms.

11- Technical fields include symbols, maps, acronyms and abbreviations that are not easy to be realized.

4.2.3 Results related to the third question:

The third question in this study belongs to the solutions suggested by interviewed participants such as (10) M.A. students at MEU, and (10) translators working in the field of translation and academia such as: Hussein Abu Naba'a and Hassan Al-Quddah, besides to (6) professors working in different universities and places in Amman, such as:

Dr. Mohammed Hilmi, Dr. Sulaiman Al- Abbas, Dr. Dima Al-Idwan, Dr. Majed Abdellatif, Dr. Aseel Shbeikat and Dr. Ayman Yasin. Their replies and suggestions were provided by email or in person as summarised below:

1- Preparation in terms of reading, researching and getting background information on the topic in both languages as well as seeking assistance on subject matter to clarify any ambiguity.

2- If a translator has to translate technological terms, it is highly recommended to add the original term in brackets and use specialized dictionaries.

3- Students should be in direct contact with native speakers of English language.

4- Universities should provide translation workshops in technical fields.

5- Translations of scientific and documentary programmes should be taken into consideration.

6- Students and translators should be aware of the differences in styles and usage between source language and target language.

7- Organizing intense courses in translation practice by expertise.

8- Being well conversant with the most commonly used terms and expressions in all varieties of translations.

9- Cultural background needs to be given to facilitate translation job.

10-Attending meetings and seminars discussing translation issues and problems.

11-Translators should be armed more and more with broad experience.

12-Training and remedial courses should be intensified for translators.

13-Conducting more readings, more translations in the technical fields and more training courses, moreover to relevant courses which must be included in the B.A study plans.

Chapter five

Discussion and conclusion

5.0 Introduction

This chapter discusses the results of the study and explains it in light of the reviewed literature. It ends with a conclusion and some recommendations and suggestions for future research.

5.1 Discussion related to the findings of question one:

What are the difficulties that Jordanian translators encounter when translating technical texts and expressions from English into Arabic?

After examining the translations of the five texts, the difficulties encountered are manifested in the following: lexical difficulties, linguistic difficulties such as: syntax, semantics, difficulties related to method of translations such as : googling, a literal translation and out of context translation and choosing the wrong strategy.

The lexical difficulties as shown in tables (3,4,5,6, and7), p.(42,50,58,67,76), resulted from choosing the wrong terminology which is caused by the literal translation or mistranslation. The vocabulary below are examples of such difficulties, the findings can be summarized as:

keeping word class (Potentially = ممكن), literal translation (clinical events = احداث سريرية,) Regulators = المنظمون), typos (stroke = السكتة الماغية),

mistranslation (*tensile rupture* = فشل الكلي) , uncertainty (Plaques = أمراض أو أعراض), keeping source word (ecosystem= الايكولوجي النظام , Plaque = البلاك), non-idiomatic translation (In a balanced rotation= التعاقب المتوازن, And include = وبضمنها , Angioplasty = رأب الأوعية), prepositions (*corporations are controlled*)التحكم في الشركات , wrong translation (Or among shareholders= أو بين المساهمين على حدا) .

Such findings agree with the studies of : Newmark, (1988) who reported "problems in idioms. Some new words appear in technical translation might be ambiguous, and difficult to have their equivalence, in the language to which it is translated" ; they also go along with Farghal & Shunnaq (1999, p.210) who stated that the problems were mainly in terminology and standardization, they also describe other problems students face such as (syntax, layout and tenor) as follows: Some English words do not exist in Arabic, since Arabic possesses only tensed clauses, which can lead to "syntactic" problems while translating; The result goes hand to hand with Inani, (1998, p.5) who asserted that the problem was in word equivalence; with Abdullatif, (2016) who also stressed that the problems lied in abbreviations and choosing an equivalent term for the source language, and finally with Dweik, (2014, p.265) who assured that the problems mainly lie in equivalence and lack of specialized dictionaries.

The linguistic difficulties are manifested in syntax, (structure) and sentence form, English word order, tense, incomplete sentences, difficulties in using relative pronouns, keeping passive voice structure, (e.g. *by which corporations are controlled and operated= التي تدار وتضبط من قبل الشركات*), and messy word order.

The linguistic difficulties go side by side with Ghazala (1995, p. 18) who mentioned that the problems of translators were mainly syntactic; with Dweik, (2014, p. 265) who also affirmed that the problems were mainly syntactic as well; with Farghal and Shunnaq (1999, p.210) who also ascertained that the problems were syntactic in origin. The causes behind these difficulties that translators encounter resulted from weak linguistic skills which, from the researcher's opinion, caused by lack of: knowledge, reading comprehension and lack of grammatical skills.

With regard to semantics which is the general meaning of the sentence or the concept, there were difficulties in : mistranslation (National commercial laws = قوانين تجارية عالمية), inaccessible Arabic structure (Incorporeal factors = المعنوية العوامل), non-idiomatic Arabic (Full water= كامل الماء), and typos (stroke = السكتة الماغية).

The current findings go parallel with the results of Byrne, (2006, p.10) who indicated that the problems were mainly semantic in origin; with those of

Anvarovna, (2017) who found that the problems were related to abbreviations and acronyms: Such terms might not be comprehended by the translator; as in Dweik, (2017, p. 265) who assured that one of the major problems that encounter translators was of the semantic type. For example: Pressure pipe flow= تدفق أنابيب الضغط , which considered miss translation and semantically wrong. In the researcher's point of view, the reasons behind such difficulty are due to lack of experience in the scientific field and lack of terminology.

The main reasons for the semantic difficulties are related to literal google translation problems, the participants resorted to google translation in the five texts. Google translation is prevailing in the participants answers. The researcher's findings are also in line with Dweik, and Al Najjar, (2010, p.193) who assured that google translation with cosmetic change (literal) was one of the problems that the translators encountered.

5.2 Discussion related to the findings of question two:

What factors cause such difficulties?

In light of the findings in chapter four, the challenges that the translators and students alike encountered, can be related to the following factors: Lack of experience, lack of knowledge, absence of enough practice, and shortage of specialized bilingual dictionaries and lack of familiarity with the texts.

With regard to lack of experience, the findings of this study go along with that of Salas, (2000) who also assumed that lack of experience in lexico-semantic level left a great impact on the translated text.

Concerning the lack of knowledge, the findings of this study are in line with that of Dweik, (2014) who ascertained that lack of knowledge pertaining technical translation, leads to misunderstanding of the translated texts.

Lack of training is manifested in the high percentage of google translation found in chapter four. In this regard, the researcher's findings are consistent with that of Sanchez, (2010) who realized that inadequate training was a major factor behind inaccurate translations.

The study also found that there is really a shortage of specialized bilingual dictionaries. This made most translators depend heavily on what they found on the internet. The findings of this study, support Abu-Ssaydeh, Abdulfattah (2006) who believed that, the absence of such dictionaries may lead the translator to use inadequate terms.

5.3 Discussion related to the findings of question three:

What solutions can be offered to solve out these problems?

As mentioned above, the translators' difficulties found in chapter four, made it clear that there was lack of experience, lack of knowledge, absence of enough practice, and shortage of specialized bilingual dictionaries.

Accordingly, the findings of this study pertaining to question number three, suggests the following solutions which can be outlined in the following:

Practical training, personal knowledge, machine translation, developing reading comprehension skills, securing specialized bilingual dictionaries. As for practical training, as a solution, the researcher realized that it is a necessity to improve the quality of translation and that copes with the study of Dweik, (2014).

Looking at each translator separately, there were significant individual differences. Therefore, personal knowledge is very fundamental for any translator as it broadens the translators' mind and enriches his/her background. The researcher's findings agree with that of Katsberg, (2002) who argued that personal knowledge is a very essential tool for translators.

The mistranslations at the sentence level, found in chapter four, are related to reading comprehension issue. Thus, more readings trigger thinking of

translators, helping them envisage the content and translate it properly. Such a finding go side by side with that of Newmark, (1995) who encouraged reading for comprehension purposes.

Again, our findings in chapter four indicate that most, if not all, translators did not use specialized bilingual dictionaries. The researcher's findings showed that securing specialized bilingual dictionaries help in solving out a lot of problems for translators. Such a finding also goes parallel with the study of Dweik, (2014).

5.4 Conclusion and recommendations

The data obtained by means of test and interviews, indicated that the participants, whether M.A students or even translators, encountered difficulties while translating scientific and technical terms and expressions. These difficulties are manifested in the following:

1. Inability to find the equivalence in the target language,
2. Inability to adopt a successful translation and suitable strategy,
3. Lack of background knowledge in the technical fields and their terminology,
4. Lack of knowledge in both languages,
5. Lack of linguistic and stylistic knowledge in the source and target language,

6. Lack of cultural and scientific terminology which result in incorrect and improper translations.

This study also revealed the following factors stand behind such difficulties:

1. lack of awareness in the characteristics of source language,
2. lack of knowledge in the scientific and technical fields,
3. lack of dictionaries related to technology and science,

To overcome the difficulties in translating technical texts and expressions, the study suggests the follows:

1. Reading more texts, researches and scientific articles relating to technology.
2. Attending training courses and workshops in technical translation,
3. participate in technological and scientific seminars and conferences to gain more terminology in the fields of economy, medicine, politics and agriculture, etc.
4. Gaining more awareness in the content of technical fields,

5.5 Suggestions for future research

This study recommends:

1. Conducting more research in other areas of technology that Jordanian society needs,
2. Investigating some techniques and ideal procedures to be adopted while translating technical texts and expressions from English into Arabic to produce an acceptable translation that reflects proficiency and high knowledge of the translator,
3. In light of the difficulties, the researcher also suggests that MA students, majoring in translation, should obtain sufficient knowledge about the target language in different fields, practice more on a variety of topics to enhance their translation competence, avoid literal translation which most of the time distorts the meaning.

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Appendix One
The test

Dear participants,

This test is designed to help in writing the M.A. thesis titled "Difficulties that Jordanian Translators Encounter in Translating Technical Texts and Expressions from English into Arabic".

Your kind cooperation and participation are highly appreciated.

The Researcher,

Manar Fahmi Abu Elayyan

The Middle East University

Amman, Jordan

Note : using external resources such as dictionaries and internet translation programmes are allowed.

Translate the following technical texts into Arabic according to the context available hereinafter:

(1) A Mechanical Approach to The Characterization Of Material Failure of Atherosclerotic Lesions

Failure of atherosclerotic plaques can lead to potentially life threatening clinical events such as myocardial infarction (MI), stroke, or transient ischemic attack (TIA). The most frequently described plaque failure mechanism is tensile rupture of the fibrous cap; however, often during angioplasty another plaque failure mechanism occurs in which the atherosclerotic plaque separates from the internal elastic lamina (IEL).

(2) Corporate Governance

Corporate governance is the collection of mechanisms, processes and relations by which corporations are controlled and operated. Governance structures and principles identify the distribution of rights and responsibilities among different participants in the corporation (such as the board of directors, managers, shareholders, creditors, auditors, regulators, and other stakeholders) and include the rules and procedures for making decisions in corporate affairs. Corporate governance is necessary because of the possibility of conflicts of interests between stakeholders, primarily between shareholders and upper management or among shareholders.

(3) Organic Farming

Organic farming is a method of farming that aims to operate within the natural ecosystem, without using artificial fertilizers, pesticides, or other agrochemicals. Many different strategies are adopted to combat pests. Growing crops and grazing livestock in a balanced rotation prevents pest and parasite build-up. Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields), and companion planting (mixing certain non-crop plants with the main crop) all encourage predators that feed on pests.

(4) Fundamentals of Hydraulic Engineering Systems

Description of pipe flow

In hydraulic, the term "pressure pipe flow" refers to full water in closed conduits of circular cross sections under a certain pressure gradient. For a given discharge (Q), pipe flow at any location can be described by the pipe cross section, the pipe elevation, the pressure, and the flow velocity in the pipe.

In most engineering computations the section "means velocity" (V) is defined as the discharge (Q) divided by cross-sectional area (A). V=Q/A. The velocity distribution within across section in a pipe, however, has special meaning in hydraulics.

(5) Industrial Property and Associated or Adjacent Rights

Industrial property means the intellectual property rights pertaining to works or elements related to industrial, agricultural or commercial activities. From the juristic point of view, it is defined as "the rights pertaining to new innovations such as inventions, industrial drawings and designs, or distinctive signs used either in distinguishing products (trademarks) or commercial firms (trade names) which enable each of their owners to monopolize his invention, trademark or trade name against others". Industrial property includes patents, trademarks, industrial designs or drawings, brands of origins, geographical indications and protection of plant varieties and trade secrets in addition to trade names and the incorporeal factors of stores. These are usually organized by national commercial laws.

Appendix Two

Validation Committee [Experts interviewed]

Name	Position	Specialization	Place of work
Dr. Esam Kayed	Assistant Professor	English Literature	Israa University
Dr. Mohammed Al-Khouli	Professor	Applied Linguistics	Dar Al-Falah for Distribution and Translation
Dr. Adel Saqf-Al-Hait	Professor	Translator	Self-Employed
Dr. Ahmad Hassona	Cardiologist	Cardiology	Israa Hospital, Jordan

The validation letter is as follows:

Dear Professors,

I am, Manar Fahmi Abu Elayyan, an M.A. student in the Middle East University, working on my thesis titled :

Difficulties that Jordanian Translators Encounter in Translating Technical Texts and Expressions from English into Arabic

Based on your experience and knowledge in the field of linguistics and translation, you are kindly requested to assess the validity of these items that include technical texts and expressions in the field of medical, economic, agricultural, engineering, and legal, as recommended by Dr. Bader S. Dweik, my supervisor. These items represent a test for translators working in translation bureaus in Amman, Jordan, and for M.A students enrolled in the Middle East University. The test includes 5 items collected from different resources to be translated from English into Arabic.

Your time, effort, and cooperation are highly appreciated.

Best Regards,

Manar F. Abu Elayyan

Appendix Three

Validation Experts and the Semi-Structured Interview Questions

Name	Position	Specialization	Place of Work
Dr. Majed Abdellatif	Associate Professor	Linguistics and Phonetics	The Middle East University
Dr. Ayman Yasin	Associate Prof.	Linguistics	PSUT
Dr. Mohammad Hilmi	Associate Prof.	Literature	Al-Israa University
Dr. Sulaiman Al-Abbas	Assistant Professor	Applied Linguistics	Arab-Open University
Dr. Dima Al Idwan	Assisstant Professor	Translation	Al Zaytouna University
Dr. Aseel Shbeikat	M.A	Linguistics	Al-Israa University

Dear professors,

Please answer the following questions:

1- According to your experience in translation, what are some of the common difficulties that translators face in translating technical terms and expressions?

2- Based on your opinion, what factors may cause such difficulties?

3- What solutions do you suggest to overcome such difficulties for better translation?

Appendix Four
Model translation

A Mechanical Approach to the Characterization of Material

Failure of Atherosclerotic Lesions (1)

Failure of atherosclerotic plaques can lead to potentially life threatening clinical events such as myocardial infarction (MI), stroke, or transient ischemic attack (TIA). The most frequently described plaque failure mechanism is tensile rupture of the fibrous cap; however, often during angioplasty another plaque failure mechanism occurs in which the atherosclerotic plaque separates from the internal elastic lamina (IEL).

(This translation was provided by a cardiologist called Ahmad Hassouna, Isra' Hospital, Amman-Jordan).

يؤدي فشل الترسبات العصيدية في جدار الشريان إلى حالات سريرية تهدد الحياة مثل إحتشاء عضلة القلب أو الجلطات الدماغية العابرة ،إن من أهم المضاعفات العصيدة الدهنية والترسبات هو تقرح الغطاء الليفي، أو يمكن من خلال عملية فتح الشريان أن تحصل آلية لإنخلاع الترسب الدهني وانفصال هذا الترسب عن الطبقة المرنة الداخلية للشريان.

Corporate Governance (2)

Corporate governance is the collection of mechanisms, processes and relations by which corporations are controlled and operated. Governance structures and principles identify the distribution of rights and responsibilities among different participants in the corporation (such as the board of directors, managers, shareholders, creditors, auditors, regulators, and other stakeholders) and include the rules and procedures for making decisions in corporate affairs. Corporate governance is necessary because of the possibility of conflicts of interests between stakeholders, primarily between shareholders and upper management or among shareholders.

الحوكمة المؤسسية

الحوكمة هي عبارة عن مجموعة من الطرق والعمليات والعلاقات التي تحكم وتدير المؤسسات. إن التركيبة الحوكمية ومبادئها تحدد توزيع الحقوق والمسؤوليات بين شتى المشاركين في المؤسسة (مثل مجلس الإدارة والمدراء والمساهمون والدائنون ومدققوا الحسابات والمنظمون وأمناء الرهن الآخرون) ويتضمن ذلك القوانين والإجراءات لاتخاذ القرارات المتعلقة بشؤون المؤسسة. إن الحوكمة المؤسسية ضرورية بسبب إحتمالية تضارب المصالح بين أمناء الرهن، وبشكل رئيسي بين المساهمين والإدارة العليا أو بين المساهمين أنفسهم.

Organic Farming (3)

Organic farming is a method of farming that aims to operate within the natural ecosystem, without using artificial fertilizers, pesticides, or other agrochemicals. Many different strategies are adopted to combat pests. Growing crops and grazing livestock in a balanced rotation prevents pest and parasite build-up. Hedgerows, mixed plant breaks (strips of grass, herbs and wild flowers within fields), and companion planting (mixing certain non-crop plants with the main crop) all encourage predators that feed on pests.

الزراعة العضوية

الزراعة العضوية هي إحدى طرق الزراعة التي تهدف إلى العمل ضمن نظام البيئة الطبيعية دونما استخدام للأسمدة الصناعية أو المبيدات الحشرية أو أية مواد كيماوية تستخدم في الزراعة. وهناك العديد من الطرق المتبعة لمكافحة الحشرات. فالتعاقب المتوازن بين زراعة المحاصيل و رعي الماشية يمنع الحشرات والطفيليات من التكاثر. أن السياجات والفجوات المزروعة بنباتات مختلفة (عشبا في أسراب أو نباتات أو أزهار برية في الحقول) وكذلك الزراعة المزدوجة (كخلط بعض النباتات من غير المحصول مع المحصول الرئيسي) كل ذلك يشجع الحشرات التي تتغذى على الآفات.

Fundamentals of Hydraulic Engineering Systems (4)

Description of pipe flow

In hydraulic, the term "pressure pipe flow" refers to full water in closed conduits of circular cross sections under a certain pressure gradient. For a given discharge (Q), pipe flow at any location can be described by the pipe cross section, the pipe elevation, the pressure, and the flow velocity in the pipe.

In most engineering computations the section "means velocity" (V) is defined as the discharge (Q) divided by cross-sectional area (A). V=Q/A. The velocity distribution within across section in a pipe, however, has special meaning in hydraulics.

اسس أنظمة الهندسة الهيدروليكية التي تعمل بمقاومة السائل المضغوط

وصف تدفق الماء في الانابيب

في علم الهايدروليك، فيما يتعلق بضغط السوائل فإن مصطلح التدفق في الأنابيب المضغوطة يشير إلى كامل الماء الموجود في قنوات مغلقة داخل المقاطع العرضية الدائرية تحت ضغط معين من الإنحدار. ففي أي تدفق معين (Q) يمكن وصف تدفق الأنابيب في أي موقع معين عن طريق المقطع العرضي وارتفاع الأنبوب والضغط وسرعة التدفق في الأنبوب. وفي معظم الحسابات الهندسية فإن المقطع (V) يعني سرعة التدفق،و يعرف بأنه التدفق (Q) الذي يقسمه مقطع عرضي (A). وعلى أية حال فإن توزيع السرعة عبر المقطع العرضي في الأنبوب له معنى خاصا في الهيدروليكا.

V=Q/A = السرعة= التدفق على مساحة المقطع العرضي .

Industrial Property and Associated or Adjacent Rights (5)

Industrial property means the intellectual property rights pertaining to works or elements related to industrial, agricultural or commercial activities. From the juristic point of view, it is defined as "the rights pertaining to new innovations such as inventions, industrial drawings and designs, or distinctive signs used either in distinguishing products (trademarks) or commercial firms (trade names) which enable each of their owners to monopolize his invention, trademark or trade name against others". Industrial property includes patents, trademarks, industrial designs or drawings, brands of origins, geographical indications and protection of plant varieties and trade secrets in addition to trade names and the incorporeal factors of stores. These are usually organized by national commercial laws.

(This translation is provided by Dr. Adel Azzam Saqf Al-Hait (2015) in "The Reliable Guide to Legal Translation".

الملكية الصناعية والحقوق المرتبطة بها أو المجاورة لها:

أما الملكية الصناعية فإنها تعنى حقوق الملكية الفكرية على المصنفات أو العناصر، ذات الإتصال بالأنشطة الصناعية والزراعية والتجارية. ويعرفها الفقه بأنها: " الحقوق التي ترد على مبتكرات جديدة كالإختراعات والرسوم والنماذج الصناعية،أو على شارات مميزة تستخدم , إما في تمييز المنتجات (العلامات التجارية) , أو تمييز المنشآت التجارية (الإسم التجاري),وتمكن صاحبها من الإستئثار باستغلال ابتكاره أو علامته التجارية أو اسمه التجاري,في مواجهة الكافة".وتشمل الملكية

الصناعية براءات الإختراع ,والعلامات التجارية والنماذج أو الرسوم الصناعية ,وعلامات المنشأ أو المؤشرات الجغرافية ,وحماية الأصناف النباتية,والأسرار التجارية,إلى جانب الأسماء التجارية,والعناصر المعنوية للمحل التجاري ,التي تنظمها عادة قوانين التجارة الوطنية.